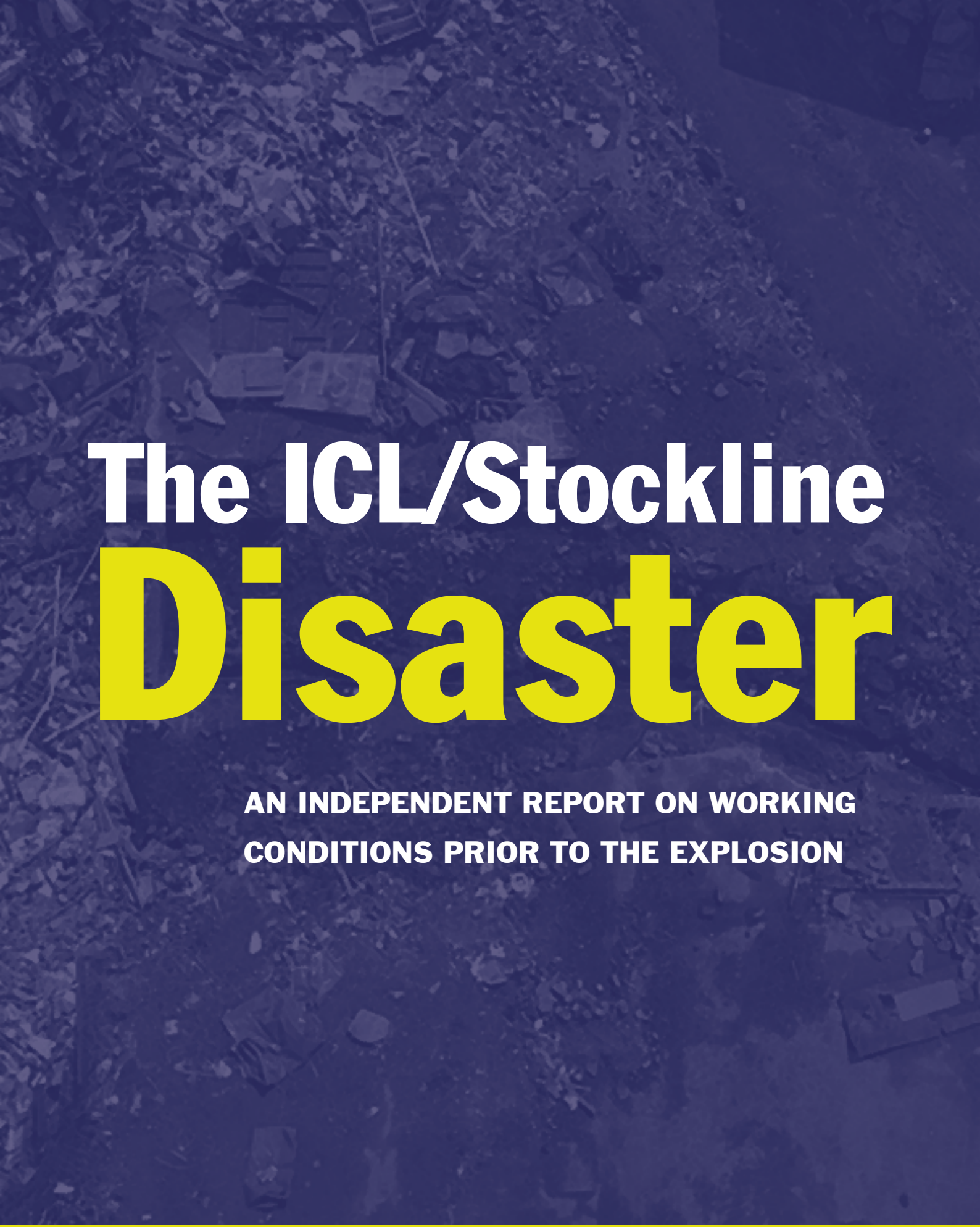

The ICL/Stockline Disaster

AN INDEPENDENT REPORT ON WORKING CONDITIONS PRIOR TO THE EXPLOSION

UNIVERSITIES OF STRATHCLYDE AND STIRLING

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‘The ICL/Stockline Disaster: An Independent Report on Working Conditions prior to the Explosion’

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Preface

by Ann McKechin M.P. Glasgow North

On 17th August this year, ICL Tech Ltd and ICL Plastics pled guilty to a number of charges under Health & Safety legislation in relation to the explosion at the Stockline Factory in Glasgow on 11th May 2004 which killed 9 employees and left many seriously injured.

As the local constituency M.P. the events surrounding that day in 2004 and the desperate search for survivors which followed are ones that I and many others in the local community will never forget. However despite the fact that over three years have elapsed this is only the start of the long search for answers as to why such a devastating event could have occurred in the centre of a major city in 21st century modern Britain. As a society we must not forget that for the workers, victims and families the trauma and grief still continues. That is why this Report is so vital in showing with great clarity what I believe is the overwhelming case for a full judicial public inquiry led by one of Scotland's senior judges.

From the start it was clear that the criminal charges brought to court would not provide a full explanation. As yet, the families of those who were killed and the employees who survived have still to have access to the huge amount of evidence gathered by the Crown Office and HSE or the ability to question the key players about the events on the day itself and in the months and years beforehand when many suspect that obvious warning signs were missed.

There are very worrying claims from a variety of sources that the history of health & safety practice in the factory was far from satisfactory over many years. The employees were not unionised and a significant number of them have stated that safety concerns were routinely ignored by company directors.

The structure of the building itself which was constructed over 150 years ago as a mill has led to questions about its suitability for industrial processes involving gas, dangerous chemicals, dust and extreme heat – if the building had been a standard single storey factory unit, the level of death and injury would have been significantly less as most of the victims were working in the second floor office. These fears have been heightened by statements about a number of significant alterations to the building's fabric over the last 25 years apparently without statutory consents and the weight of equipment on old wooden floors.

There are also many questions to be asked about HSE's involvement with the factory – why their own risk assessment criteria did not require more frequent inspections; why they allowed the firm to self-certify the rectification of defects noted in their previous visits; and why the condition of the building and its equipment did not lead to further inquiries. Their treatment of the whistle blowing call by one former employee, Laurence Connolly, just a year before the explosion which I believe was handled very badly, also needs to be fully examined along with the protocols or lack of them used by HSE to protect such workers.

This disaster is set against a background in which over the last ten years, the rate of fatal injury at work in Scotland has with the exception of one year, remained significantly higher than the U.K. average. Shockingly, over the period from 2001/02 to 2004/05, the number of fatal injuries to workers actually increased by 29% in Scotland compared to a decrease of 12% for the UK overall. Scotland faces a different legal environment for prosecuting health & safety offences but not a better one. Prosecutions must be made through the Procurator Fiscal office rather than being taken directly to court by HSE staff. P.F. offices face great challenges in coping with a very wide workload and perhaps it is not surprising that there is few staff that has great experience in this area of law or is able to give it the degree of priority it requires if enforcement is to act as a proper deterrent. In addition the fines issued by Scottish courts are usually significantly lower than their English counterparts – in 2004/05 the average fine was a mere £4,846. We need firstly to see dedicated P.F. staff in every regional office working closely with HSE staff to build up a thorough working knowledge of these problems and secondly, a recognition by the Scottish judiciary that the current level of penalties is contributing to the problem rather than tackling it.

Over the last three years I and my colleague, Patricia Ferguson MSP for Maryhill have worked closely with the Stockline Support Group set up by the STUC and ably administered by Ian Tasker, Assistant General Secretary. Throughout that time the group members and many others in the local community have repeatedly asked that we ensure that such an event can never occur again. Only a full public inquiry, already supported by thousands of ordinary people across Scotland and 120 members of Parliament at Westminster, including our new First Minister, can give them the justice they deserve and let Scotland address its shameful record on protecting vulnerable workers.

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Introduction

- On 11 May 2004, nine workers were killed and more than thirty-three injured in an explosion at the ICL Plastics plant of Grovepark Mills in Maryhill, Glasgow, This was the worst health and safety incident in Scotland since Piper Alpha in 1988 when 167 lives were lost, and the worst on mainland Scotland since the 1960s.

- This report has been produced by a multi-disciplinary team of academics and experts with specialist knowledge in the fields of occupational health and safety, finance, employment rights, architecture, corporate accountability and industrial relations. Their intention was not to duplicate or mirror the official investigation but to examine issues and raise questions that might be neglected or under-explored by that investigation.

- The principal aims of the research team and their report were as follows:

    - to understand as fully as possible the circumstances and contexts within which the disaster occurred. These include the company, its regulation, structure and financing, its work practices, employment relations, built environment and health and safety practices.

    - to ensure that the experiences of those workers and ex-workers, who wanted their voices to be heard, were fully documented. Workers' experiences can be a vital source of knowledge in the prevention of future disasters. Workers' silence has all too often led to a lack of justice: legal, social and economic.

    - to build up a picture of what working life was like inside the factory.

    - to consider the role played by inspection, regulation and enforcement agencies that directly and indirectly determine the policies and practices of companies such as ICL Stockline.

Overall Contexts

- One recent estimate suggests that globally as many as 5,000 people die daily from work-related injuries and illnesses. The Health and Safety Executive's (HSE's) figures – an underestimate – reported 593 UK work-related deaths for 2004-5.

- Despite these statistics little importance is often attached to this serious social problem of industrial illness and injury. Explanations for this include legislative and regulatory weakness and a health and safety deficit in workplaces where workers lack collective empowerment through trade unions.

- Contributing to this health and safety deficit has been the reluctance to criminalise employers who commit safety offences.

- The very language (and concepts) used is part of the problem. Terms such as 'human error' or 'normal accidents' suggest wrongly that industrial accidents are either normal and unavoidable occurrences, or attributable to the actions of individual workers, thereby masking broader realities such as employer-driven cost cutting, lack of worker representation and consultation and/or regulatory failure.

- Over many years the HSE has recorded significantly higher rates of fatal and major injuries for Scotland as compared to the UK as a whole. For example, between 1996/7 and 2005/6 Scottish employees have averaged 58% higher rates of fatality than the UK overall. Scottish workers are thus at greater risk.

- HSE's attempts to explain this 'Scottish anomaly' have produced unsatisfactory conclusions. Alternative explanations include weaknesses in the inspection and prosecution of safety offenders. To illustrate this – at the time of the Stockline disaster the HSE reportedly had only 68 inspectors to police 600,000 out of about 3 million workplaces, in a UK-wide context where inspection has been de-prioritised.

- In Scotland, the impact of the de-emphasis of enforcement has been aggravated by lower levels of fines on safety offenders, of prosecutions resulting from workplace deaths/serious injuries and of investigations resulting from work-related illness. While in England and Wales, eight company directors and five companies have been convicted of manslaughter, no director or company has ever been convicted of a homicide offence following a work-related death in Scotland.

Research Methods

- The Research Team used 'action research' methods, based on the participation of a group of seven ICL Stockline workers and ex-workers representative of different sections/functions in the plant. Both 'risk mapping' and 'body mapping' exercises were used whereby workers provided unrivalled evidence of working conditions, potential hazards and symptoms of ill-health. In-depth worker interviews provided further invaluable data.

- Ethical research protocols - including written consent, confidentiality and the anonymisation of contributions - were adhered to throughout the research process. The one exception to the anonymised interviews was that freely given by Laurence Connolly Snr who wished to make public his experiences, particularly in his dealings with the Health and Safety Executive.

- The worker-centred research approaches were combined with methods used by academics drawing on their areas of expertise, including finance and accounting, industrial relations, the built environment, regulation and health and safety.

ICL Stockline: Company Structure, Workplace/Workforce Profile and Employment Relations

- As the parent company, ICL Plastics has control over all six companies within the group, including ICL Tech. ICL Plastics and ICL Tech were the two companies named in the criminal charges.

- Scrutiny of the accounts registered at Companies House suggests that Campbell Downie, as the majority shareholder of the entire group and a Director of five of the six companies, was the dominant controlling figure for the whole group.

- There is little doubt that the parent company (ICL Plastics) was cash rich as can be seen from the following table.

Financial Year ended	Cash holding
30th November 2003	£897,511
30th November 2004	£455,187
30th November 2005	£749,950

- At the global policy and financial levels Campbell Downie appeared to exercise total control. At an operational level authority for the day-to-day running of the factory was delegated to the Managing Director, although even here Downie was heavily involved in operational matters. The evidence from workers' testimonies suggests that Downie attended the premises on a daily basis, walked through the workshops regularly and took most operational decisions. Ultimately, the style and substance of decision making and the exercise of authority appears to have rested with the Downie family.

- Workers report an authoritarian style of management from the top down and a long-standing and overt hostility to trade unionism. The following quotes relate to reported attempts to establish a trade union in the plant.

> And the MD at the time, Frank Stott, said more or less that if it ever happened whoever was responsible would not be there for long. Something along those lines…(W4)
>
> Anti-union. Stewart McColl was anti-everything. It was him. He was the most important thing to him. He was everybody. He was the lawyer, jury and judge. He was the lot. He told you what he done. He made the verdict. (W4)

- More broadly, employment relations were characterised by an absence of consultation with the workforce on either a formal or informal basis.

- There were no procedures for raising pay levels nor for deciding who should receive bonuses and at what levels. Workers complained of heavy-handedness, arbitrariness and favouritism by management in terms of pay determination.

> If you had the balls to ask for a pay rise you would go for it but you would know the answer anyway. It was irrelevant. I don't think [the pay rise you received] was about the work you were doing. I think if they liked you and you didn't cause any problems you got something. If you were a problem you got nothing. (W1)

- Grovepark Mills was a four-storey building. Beneath the ground floor was a basement which contained a large number of steel supports (ACRO props). The ground floor and its annex contained many processes and much machinery, including the fabrication sections, coating shop, compressor room, shot blasters, electric and gas ovens, pallet and powder storage, gas tanks, heaters and despatch. The first floor contained various store rooms, racks, pallets, lockers, tools, forklift trucks, CNC milling machines, ovens and a canteen. The second floor contained the general offices of ICL and Stockline. The third floor housed more storage areas containing *inter alia* paper records, exhibition stands and a boiler. Above this floor was a flat roof.

- Fabrication consisted of batch production of variable volume. Orders could be repeats or could consist of one-off products. Consistent with these jobbing production methods production seemed to involve taking all the work that was offered, irrespective of whether the productive resources could cope with the demands. Around a dozen employees worked in the main fabrication area with a couple more working in an outbuilding. Plastic sheets would be cut to size or were pre-cut and then worked upon in various ways – sawed, placed in the oven for formatting or finishing, machined, cemented or welded together.

- Six workers were employed in the coating department where incoming parts would be blasted with fine aluminium powder, de-greased using Genklene, coated and then cooked in gas ovens to harden.

- Two workers were employed in despatch and the remainder of 50+ workforce were employed in various ancillary and managerial roles and in the offices.

- Cost-minimisation was a central imperative linking production, market niche, managerial style, employment relations and labour utilisation. Workers reported increasing pressure to improve productivity through intensified monitoring.

- Symptomatic of the company's preoccupation with minimising costs was the decision taken to reduce some workers' holiday entitlement, triggered ironically by a mistaken interpretation of the European Working Time Directive at the time of its introduction in 1998, as this worker reported.

> See when the holiday thing came out – you must get a minimum of 20 days holiday a year – we were actually getting 28 days and they started cutting it to 20 days…They gave us this form to sign, and I refused to sign it. I said, 'I don't get 20 holidays a year, I get 28 days', and I gave it back. So he then came up with a draft that was even worse'. (W2)

Hazards in the Plastics Industry and at ICL/Stockline

- The health hazards facing plastics workers, recognised for several decades, include skin, neurological and respiratory problems and these are documented in the full report. In addition to diverse chemical hazards, plastic workers often face other dust hazards, noise and vibration hazards, hot and cold working conditions, manual handling and machinery hazards and poor welfare arrangements.

- By 1997 occupational health professionals had documented a wide range of chemical and physical hazards attached to materials, processes and machinery in the plastics industry, leading to recommendations that proper medical surveillance and workplace controls (including adequate ventilation and exhaust systems, regular air monitoring and properly fitted personal protective equipment - PPE) be put in place. From worker accounts and the evidence encapsulated in HSE correspondence and statutory notices, it is difficult to identify such effective measures in place in the plant.

- The unavailability of records and data on what substances were used at ICL Stockline, on engineering controls and personal protective equipment, despite requests by the Research Team to the HSE, means that it is not possible for us to ascertain with certainty exactly what levels of exposure to what substances occurred at the plant. Nevertheless, as we document, worker accounts provide factual insight.

- Many of the chemicals used at ICL Stockline presented potentially serious threats to human health, e.g. methylene chloride, dichloromethane, styrene, trichloroethylene. Worker testimonies indicate that, in many different respects, such substances were not controlled at various times at all by engineering methods. In several instances there were no extraction or proper local ventilation systems available. Workers report that initially they were provided with no protective equipment and then later only with masks or gloves but with no information, instruction, training or supervision regarding their appropriate use.

- The Research Team did access a report by Glasgow Technical Services produced immediately after the disaster which listed the chemicals and materials they could identify on the site. These include hazardous substances which could present a range of acute and chronic, short-term and long-term adverse effects to those exposed.

- Most significantly, we have an extensive set of accounts by workers who list a wide range of symptoms they experienced when carrying out various production processes and when exposed to dusts and fumes in hot and poorly ventilated workrooms. Workers even reported the presence of asbestos.

- The risk mapping exercise enabled us to build up a physical and organisational picture of a workplace, processes and material to identify where hazards existed, what risks were attached to those hazards and the impact of those hazards on workers.

- Workers identified risks throughout the building. For example -

> You had dust and fumes from all the ovens – you had the wee sort of – this is going to sound silly – you know the clean room? (*laughs*) The Wendy House. It was one of the most disgusting places in there, it was so filthy, but they called it the clean room. This is what they called it didn't they? It was the clean room. Nobody ever used it, it was full of junk. Paper and dust and all that. (W3)

Right next to my office there was a blaster for any parts that came in, they would get blasted off before they got dip-coated and when the blaster door was open the dust just went everywhere. There was no extraction for it. The only extraction was the main entrance where the goods would come in. There wasn't any fan or anything like that to extract the dust. Me, personally, I felt as if it affected my respiratory system. And there were other chemicals, I mean, when you went into fabrication you could taste it as soon as you walked in, you know, all this stuff was airborne. (W4)

- The lack of effective extraction appeared to have been a particularly serious problem in the fabrication and coating sections and was related to the presence of dust (from plastics or MDF) and fumes (including those from solvents or cleaning agents).

We used to come in and cut MDF. There was only one saw that had an extraction on it. (W2) That didn't work properly. (W3) There were no windows in the place. There were two vents on the roof but x got them blocked up because they were letting too much heat out. (W2)

When I look back on it now, the chemicals I was working on, the shot blasting, I was breathing in the actual blasting. When you blast stuff the shot turns to powder and you have to open the door to take the bit out that you have blasted. So you opened the door to the blaster and all this stuff came scooting out. There was supposed to be an extractor inside the thing but I don't think it was working right. (W1)

…the electro-static was just like a powder you did was you put your electrical charger on it and then you just spray powder and it's attracted to the component and then it was drawn out, up into a ducting and round the ducting into a box outside. Obviously this was just a home-made box, basically a wooden box, and it must have been when the fan was on you got to a point when no more air could get in. So everything was coming out of the sides of the box and blowing back in through the roller shutter door into the factory. (W4)

- Other related risk relate to potential exposure to hazardous chemicals and to fumes burnt off during the curing process from the ovens.

My concern was that the chemicals were openly used. Some people would be using different chemicals at more or less every bench. And when some of the ovens were on with no extraction, that was another complaint. I felt my eyes with the heat and the fumes building up – it was almost unbearable. (W1)

It was really horrendous. F. Didn't bother about PTFE [flu] and he didn't tell us when he was putting parts in the oven to cure them. It was only when we smelt the fumes and shouted, 'F, have you put something in the curing?' and he would go 'Aye'. Wee I. would go like, 'Get out of the road until it's cured'. When the oven cools down it means that the fumes are going to stop. (W5)

- The ovens themselves were regarded by workers as hazards. One had been fabricated from parts of a bin lorry but even this was regarded as less of a problem than the condition of another oven.

> I think they got one of these skips you'll see at the back of supermarkets. If you have boxes you put them in, press a button and it squashes into it, you know that sort of thing. They converted it into an oven. [It was converted] in-house by Mr McC. They got gas people to bring gas ovens in. (W2)
>
> But that isn't as sinister as it sounds…I would have been more concerned about the other oven. If somebody was to say to me about the ovens, the one that was home-made and the bought one, I would have been a lot more concerned about the bought one, because it was from the dark ages. I don't know how old it was. The door did not fit properly. You could put your hands round about the door. So this thing wasn't sealed. The door rattled all over the place. And what they used to do was this door would lift up and then they would drag the parts out and spray it on the front trolley while the oven door was open and the flames were there. And what they used to do in the winter because there was no heating at all in there…was put the gas ovens on and have the doors open while they were working…in the coating shop it went from one extreme to the other – it was either so hot you couldn't breathe, because of all of the different ovens (gas and electric) or it was absolutely freezing. (W4)

- Workers described signs and symptoms consistent with exposure to some of the substances listed above and the known adverse effects. The most commonly cited were effects on the respiratory system, but these were often experienced in combination with a range of other complaints/symptoms.

> Just trying to get a deep breath, trying to fill my lungs to capacity was pretty hard. My eyes got affected by I don't know what it was, but when I started in there I found my eyes going yellow. I went to the eye clinic and I can only describe it as like my skin peeling from my eyeball. Like a film. I would try and take it away and I would put my finger in it or a cotton bud and it was just peeling off the eyeball. I would say [that I had been working there] about eight or nine months, something like that. I was pretty fit when I started there but I felt as if my health went downhill. (W4)
>
> Well, personally, I had tightness in my lungs. Then I started getting pneumonia-like illnesses and then I started getting pains in my lower back which would probably have been my liver or kidneys. My back is sore just now, my back is killing me…I had asthma, but since I've not been there I've recovered from that and use my inhaler very, very seldom. (W2)

The first time I got it [PTFE flu], it started at my ankles and crept up my legs. It's a feeling that you are not well, that you are getting the flu…It comes up, up, up and then you feel stiff, you start to sweat and you start to get the shakes. And see when you get the shakes, you are going like that, you can't stop yourself. Basically I was told it was because I smoked. It always me and I. that got the PTFE [flu]. And one day the two of us got it at the same time…It makes you feel you just want to go to your bed. And that's what I done when I went home. It wears off after a couple of hours but the effect of it is horrendous. I. will tell you. If you ever speak to I. about it, I'm telling you, he's caught it that many times. I've had it maybe three or four times but I've maybe had the symptoms of it and not realised I've got it. Some days I didn't feel well. I think that probably what it was. I caught PTFE [flu] but not the full PTFE. And I felt quite a lot of times during the day. (W5)

The Management of Health and Safety at ICL Stockline

- Workers' testimonies constitute a powerful indictment of the general approach to health and safety management taken by management at ICL Stockline. They reveal the routine disregard of health and safety legislation and statutory regulations, including serious breaches of COSHH regulations. There are many graphic examples of this negligence, of which the following complaint following exposure to chemicals is quite typical.

But I was working with this stuff [gold paint supplied by Trimite] one day – I never had any gloves on – and all this paint was getting stuck to my fingers and up my nails and in my hair. I never thought of looking at the actual tin that [this fellow worker] was using and it was only when I seen a skull and crossbow on the tin that I thought, 'There's something wrong with the stuff we are using'. So I took a closer look and I complained to Bill Masterton that I was getting a tingling feeling in my hands. I complained for weeks and weeks. Bill's like this, 'Och, it's just work, go and wash your hands every time you are finished using it. I said 'But I'm still getting the tingling sensation' [after I wash my hands]. So I read the actual thing on it and it says, 'the downside effect of this paint is if it comes into contact with your skin is that you could get a tingling sensation, which is irreversible. Irreversible on the tin! I'm like that 'I've got this and it's irreversible'. So I pointed that out to Bill. I said, 'Look at the back of that tin, you should have told me before I started even touching that paint that I had to have gloves on, or special gloves, and see the smell of this stuff'. (W5)

- Working with some of the machinery proved quite dangerous.

> …what happened was the machine was just so old it had cracked. So I was using a sword blade like that, it hit the table, the sword blade shattered and it went in there in my hand. So it caught an artery and it was skooshing blood all over the place...I ended up in the Western Coronary Care because my heart went into shock because I bled so much. (W2)

- Presaging the now identified cause of the disaster, workers reported that they were aware of serious problems that had emerged with regard to the gas pipes.

> Somebody came in and condemned the gas pipes. For about a week or two we had no gas. The thing is we were led to believe it was the Health and Safety (Executive) because I know for a fact that somebody did complain because they were having odd job men [working on them]…one of the guys actually phoned the Health and Safety and pointed out that they had odd job men working on the gas pipes, shouldn't it be somebody who is CORGI registered working on the gas pipes. I'm not 100% sure if they came in, if they contacted them or what they did, but there was talk they came in around that time as well. (W2)
>
> They built the oven themselves…And then they had to get people in for the gas burners and I think that's what it was. I think it was them that noticed that something was wrong. They condemned. They actually cut the gas off. They said, under whatever regulations they work under, that they found dangerous pipes, so they were going to disconnect them. So they disconnected them and left. Then what happened was it was like the two handy men in the place, they were called out. They started working on them to sort the leaks. So it was like a spray they got and what they did was they would put the gas on and they went along the pipes spraying it all and identifying leaks. And then they would fix them. But the pipes were never replaced (W4)

- Apparently belated attempts were made with regard to health and safety practice, but these did not lead to action over vapours gasses, dust, temperature extremes or the effects of chemical hazards. In the words of one worker, they amounted to instructions such as, *'Keep the place tidy! Get things up on the walls!*'.

> I think that after all the problems he [McColl] was having with health and safety he was trying to ensure that was happening. Now he was trying to implement some things, but it was just cosmetic…He would put up signs saying "You must wear goggles", "You must wear ear protection", "You must wear gloves", "You must wear visors". But if you've not got them how can you wear them? If you walked in the place and you would see all this stuff – it was cosmetic (W2).

- Employers have legal responsibilities to ensure the provision and exchange of information and information and instructions that enable employees to be properly informed about risks and health hazards and to provide appropriate training. For example, under the Health and Safety (Consultation of Employees) Regulations, in circumstances where there is no trade union recognition, employers must ensure that a system for consulting workers on health and safety is in place. The regulations allow for the company to choose between a system of consultation through safety reps elected by the workforce or a system of direct consultation.

- Given that there were no elected safety reps at ICL Stockline, it was incumbent on management to directly inform the workforce on information from the accident books and any assessments made under COSHH regulations. Workers' testimonies provide clear evidence that ICL Stockline's organisation of H&S representation and consultation fell well short of legal compliance. For example, contrary to the minimal legal requirement, management apparently failed to provide its workers with a prepared statement of general policy.

> There was absolutely nothing [in the way of formal consultation between employer and employees] no health and safety committee…If I remember right, there was a notice on the wall about Factory Acts or something, you know, but that was about it really. If the company had a policy regards safety or [specific hazards] in all the years I was there nobody ever said to me anything about it. (Interview Laurence Connolly Snr. 16 January 2006)

- The health and safety training, instruction, supervision and communication systems and practices appear to have been seriously deficient.

- Contrary to the Management of Health and Safety at Work Regulations (1999) and the COSHH regulations, no risk assessment was undertaken by management during the years of employment according to the knowledge and recollection of the workers' interviewed. No workers were recalled ever having been involved in the specific process of risk assessment. On at least one occasion employees put specific requests to management under the regulations.

> I asked for them [the documentation that the company was required to keep under COSHH regulations] because I was not well. I went up to them and said 'Could I get copy of the COSHH assessments of these sheets'? 'What do you want them for'? 'Well, it's just to help my doctor in case one of these [chemicals] has gone to my lungs'. 'I'll have to see Peter'. 'Right, no bother'. 'Peter will get them organised for you'. He never did it so I badgered and badgered him. 'Oh, these things take a couple of days to run off a copy'. That was over three years ago. 2001, probably around August/September. And he never gave me them. (W7)

- The key piece of legislation in relation to the use of protective equipment in the workplace is the Personal Protective Equipment at Work Regulations (1992). PPE should be appropriate for the task and for the substances to which it is applied. Yet, notwithstanding the obvious hazards, all the workers interviewed insisted that management for many years had neglected to provide important items of protective equipment. Telling evidence comes from Laurence Connolly.

> If you worked on a timescale and me being there 13 years, once I started to complain then one or two things did start to creep in. Like you were given a mask [but this was after] about 10 years. But I might as well have been given a Halloween mask because I didn't know what I was using and I didn't know if the mask was any good for it. I think it did make a difference because I felt before I had the mask and I was using the chemicals, I used to go out sometimes feeling sickly, feeling light-headed, not feeling too well, and when I wore the mask I didn't have these symptoms. You know, not as bad, as there were some days I did, but not as bad. It would depend on what chemicals you were using. So I did feel the mask did help but I don't think it eliminated it because a lot of times you could be in there and I might be six feet away and have my back to people working with chemicals…you would have your mask on but I wouldn't know what chemicals you were working with, so I would be only six feet away from these chemicals behind me, with no protection. (Interview Laurence Connolly Snr. 16 January 2006)

- The equipment that was latterly provided often proved to be inadequate.

> Then they gave us gloves and they weren't even chemical gloves. They used to melt, all the fingers used to fall off them. Put the gloves on and you would be working with whatever and then maybe you would be using the cement for the glue and the finger had been stuck to the part…So they just made life awkward. More hassle. They were just melting onto your hand. (W2)

- Perhaps the most telling observation regarding the lack of protective equipment is provided by one of the workers interviewed.

> I don't know how much of the footage that you saw of the actual day the blast happened. If you ever get a chance to see any of that you look and see how many people came out there with safety equipment. A fireman commented, 'Did everybody say "Oh there's a blast, wait until I take all this safety gear off before I run out"'. Nobody came out with anything on, absolutely nobody. When a building blows up you don't have time to go and change. You will see, I think, x and y had a pair of cotton overalls. (W4)

Regulation – Health and Safety Executive

- The HSE failed to recognise the nature of industrial relations at the plant and the potential problems that employees might face if management discovered that they had approached HSE with complaints about health and safety. This failure is summed up by the readiness with which HSE inspectors revealed the identity of a worker in full view of the very same managers he had complained about. This episode revealed at best a staggering naivety on the part of HSE and, at worst, collusion with management that risked compromising workers' employment status.

- HSE failed to recognise the importance of keeping lines of communication open with workers as well as with management. Laurence Connolly's testimony demonstrates HSE's failure to have communicated with workers either before or after regulatory contacts with ICL/Stockline. This failure meant that workers were denied important information gathered by HSE relating to their employers' compliance with the law and relating to the risks to which they were being exposed. HSE's abject failure in this respect therefore disempowered workers in their efforts to improve health and safety conditions at the plant.

- HSE inspections seemed, according to this testimony, unable to comprehend the complexity and gravity of the hazards that workers were exposed to in the plant. Thus, it appears that key features of the risks that workers were exposed to (air quality and the integrity of purpose built equipment in the plant) were barely investigated. The need for a more comprehensive approach to the ongoing inspection of safety critical features of safety management and the management of hazards is supported by the evidence provided by workers in this report. Only comprehensive testing of known process hazards and full communication with workers would have improved HSE's ability to identify the key problems at the plant.

- The ability to identify health and safety problems during HSE 'walk-through' inspections would certainly have been limited by the advance warning that preceded visits and afforded management the opportunity to carry out a quick health and safety make over.

- All those features of HSE's approach to regulating safety at ICL/Stockline stem from the 'compliance' regulatory philosophy adopted by HSE outlined in the introduction to section 6 below in which the trust and co-operation of managements is the primary aim of the regulatory process. This brief exploration of the regulatory issues relating to ICL/Stockline reveals the fundamental contradiction that exist in system of regulation that is heavily biased towards the protection of managements' right to manage, even where this involves a serious compromise of workers' safety and health.

Building controls

- The question remains as to why such a factory - which was clearly demonstrating symptoms of structural stress under increasing live loading conditions - was allowed to accommodate a variety of hazardous processes with a high explosion risk?

- The anecdotal evidence from the workforce points to the management adopting a "running repairs" strategy to floor joist deflections and cracking brickwork, rather than undertaking a detailed structural assessment of the buildings capability to support live loads from material storage. The reports that the ground floor had been "held up" with temporary ACRO props (scaffolding poles) for many years, provides further proof of this somewhat haphazard approach to structural safety'.

- Where there is a risk of explosion a framed structure is now required to ensure that in the event of such, the removal or displacement of an external brickwork panel will not result in similar progressive structural collapse.

- If relatively major structural works have in the recent past been carried out to the factory, why is there no evidence of a Building Warrant?

- Did the management carry out any risk assessments as to whether the building structure could support the additional loadings from palletised materials and new processes?

- Why were the repairs to the areas of the building that were clearly showing structural stress (floor deflections) of a makeshift nature?

- Given that these structural problems were evident to many of the workforce why did the management not engage a structural engineer to undertake a use and condition survey?

- Why was a factory, which was clearly demonstrating symptoms of structural stress, allowed to accommodate a variety of hazardous processes with a high risk of explosion?

- Who was primarily responsible for ensuring that the structural integrity of the factory was regularly assessed and what statutory/executive agency is responsible for ensuring such inspections occur?

- Dr Stirling Howieson reported, ‘After further investigations it appears that in 1993 an application for a Building Warrant (no. 1993.1310) was submitted to cover "storm damage" to the ICL factory. It does not appear that any warrant was however either issued or discharged (normally signifying completion of the works to the agreed standard). There is reportedly a file note saying that storm repairs do not require a warrant. I have requested that Building Control confirm that this is the case, in writing. No drawings can be found either at Building Control or at the Mitchell Library’. Building Control have no records of any warrant applications and thus any significant alterations to the factory (slappings for fork lifts etc) undertaken over the last 25 years, as reported by the workers would have been "illegal". If this work had been done properly and professionals employed to undertake calculations it would have increased the likelihood of an Architect or Structural Engineer being allowed the opportunity to view the building and identify any shortcomings in the structural integrity re: the imposed loadings/ beam deflections and 'Akro' props in the basement. Any alterations appear to have been done without any specialist engineering input that would have calculated the loads on the new steel/concrete RSJs/lintels.

A Worker's Experiences of the Regulation of Safety at ICL/Stockline

In this extended interview a worker, Laurence Connolly Snr., recounts in full his involvement with the HSE, beginning with the initial contact he made with the body when he raised concerns regarding the health and safety practices at ICL and workers' exposure to hazardous substances. It is important to emphasise that this is not the testimony of an embittered malcontent. Laurence was a committed and skilled worker who had served ICL Stockline for approximately 15 years, leaving the company's employment only three weeks before the disaster.

While in other sections of the report it has been necessary to preserve the anonymity of respondents, Laurence made clear his willingness to be identified. The interview is reproduced as a verbatim transcription except where indicated where minor amendments have been made in the interests of clarity and in order to facilitate the flow of the testimony.

> 'Well, they (the HSE) had been in before I got in contact with them. I didn't know why they were in, we never ever got told why these people were in, they were just people, get the place cleaned up, people coming in we were told. It wasn't till after that we knew who they actually were. I couldn't remember the exact dates [I first made contact] but for me it was when Laurence [his son and fellow worker] started taking not well and it seemed to be every time he came back to work, the work made a couple of errors or something and he would be back off sick again and things like that. That was when I started looking into it, you know, the environment, the chemicals and the different stuff'.
>
> 'I found out through my contact with the MP, Anne McKechin, that the HSE had actually been in prior to me complaining and they had actually set some sort of notice on them, an improvement notice. None of us knew anything about that, that was all sort of news to us. But that had been a couple of years prior to me contacting them. I think it was 2003 [June 2003]. It was actually through her I got the letters and the dates and stuff, it was actually her that passed them on to me. [The improvement notice was] to do with chemicals at first. It was something to do with chemicals, something to do with the COSHH regulations. I don't know exactly why or what they had to improve on or whatever. It was 2003 when I got them involved, that's what it was, and it was like a couple of years before that, round about 2000/1, now when I think about it [the HSE's earlier involvement].'

> ‘I didn’t even know, as I was saying to you, that Health & Safety were coming in or anybody was coming in, it was like the day before we were told “clean up, get the place tidy, put things away, hide things away out of the road” for somebody coming in. But they didn’t always tell us who it was, it wasn’t maybe till likes of the people had been in, done their visit – as far as we were concerned it might just have been a new customer and he was wanting to have a look round the building just to see what it was like and see what we did. But then it would maybe be the day after that we would find out that was the Health & Safety were in, that was the Insurance people that was in, that was a customer that was in. It would only be after the people visited that we would actually find out who they were. We would never find out before who they were.’

Laurence’s contact with HSE began in 2002 due to concerns about the health of his son, a fellow worker at ICL/Stockline.

> ‘I decided to get the HSE involved because of my son’s ill-health. That was the start of it. My son took not well and he took pneumonia and then he came back to work and then took it again and just had constant ill-health. I asked in the work, you know, about the stuff they were using and different things because, for me, there seemed to be a link. Every time he came back from work he took not well again. I couldn’t find out anything in the work so I started looking on the Internet and I started finding out some bits and pieces myself. And then when I started reading it, it became very frightening because a lot of the problems that Laurence has had and still having, you could actually read through these data sheets on all these chemicals and it’s telling you some of the effects that they can have on you. At the same time, they are telling you that you should be wearing certain types of masks, certain types of gloves, impervious overalls, all these sort of things. We never got anything like that. The way it worked in the coating shop you got a pair of overalls and a pair of boots. This was just a plain pair of cotton overalls. We didn’t get any protective clothing whatsoever. I mean, if I went to work I used to go to ASDA and buy three quid denims because they were ruined after a couple of weeks. A pair of steel toe-capped boots. Then gloves appeared, sort of latex gloves, but when you went near any of the chemicals the fingers used to fall off. They used to actually dissolve so they were actually more a hindrance than anything else. They were more problems than not having them’.

> ‘To start with I phoned them up hoping to get some advice but I never really got any. This was somewhere around the middle of 2002. I don’t know how many times I actually did phone them. I mean, Laurence (my son) was phoning them as well. So between the two of us there might have been a dozen, two dozen phone calls. I don’t know. We just wouldn’t let go, we just wouldn’t leave it and eventually we did, in my opinion, shame them into coming in. It wasn’t a case of me phoning up and saying “I find a problem” and them saying “We’ll have a look at this and see what we can do for you”. This went on for months. I had to keep contacting them and then there was that day, all of a sudden there was “Get this fumes cabinet built” and I got stuck in it. Then [in June 2003] two Inspectors walked in that day and that was how I found out the Health & Safety had come in’.

Not only did Laurence have no warning of the HSE visit that had been prompted by his contacts, but, without his permission, he was revealed as a whistleblower by the HSE inspector during the visit.

> ‘One of them asked me my name and I told them. I was in the cabinet at the time and the Inspector said to me, “You’re the one who phoned, I’m x and gave me their card and said to me that if there’s any more problems in future just to give them a ring. The MD and sort of acting manager (Stewart McColl and Ian Mavers) were there at the time. I was gobsmacked that I had been identified. I had absolutely nothing to say at that point in time. I was just shocked’.

From the outset, HSE had tried to persuade Laurence not to remain anonymous and to allow them to give his name to management. After some pressure, and because of the seriousness of the health problems he was experiencing, Laurence’s son decided to allow HSE to use his name.

> ‘The thing was confidentiality was one of the problems I had trying to get them to come in. They said it would be a lot easier for them if they had a name that they could give to the company. And what actually happened was, because of Laurence’s ill health, he decided that the only way he was going to find out anything was to give his name. He actually gave them permission to use his name. It’s in one of the letters. They [management] decided, in their wisdom, that that was me. Stewart McColl just smirked. He had a wee sort of grin. He never said anything, which I’m quite sure he wouldn’t have done in front of them. Mavers - it didn’t seem to really make any difference to him’.

The assumption that the complaint was made by Laurence caused unanticipated tensions in his relationship with management.

> ‘McColl’s general attitude towards me totally changed, you know, from 13 years of never once getting warned about my work, never once questioned about anything that I had done, more often than not the only question I would be asked was “I wonder if you could help us, do you know about this, do you know about that”? Then all of a sudden it changed and it was a case of anything they could find wrong, you know, they sort of started nit-picking and it could be the silliest of wee things. You would get a sheet of material through and it would have a chip, and this was coming from Stockline, nothing to do with me, but I would get the blame because it was chipped. And I’m saying “Wait a minute, I’ve not done anything to that yet”. “You must have cut it” and I’m saying “It’s a sheet of material, I haven’t touched it”’.
>
> ‘It was just silly things. I ended up arguing one day with Nicky Downie [who] ended up as a sort of manager, perhaps Workshop Manager or some title like that. He decided that he was going to have a go at me about my work and I just wasn’t for that. I mean, I had worked in there for 13 years and I had worked in other places as well. 20 years experience. If I had done something wrong and somebody was saying like “You made a mistake there, you did this, you did that” then fair enough, I’ll stand and I’ll take the medicine. But I had done nothing wrong and I wasn’t having it’.
>
> ‘I think other people expected this to happen. People knew what Stewart McColl was like and I think they just expected it. It was total nit-picking. I couldn’t get my holidays when I wanted, it didn’t matter when it was, it was always clashed with somebody else or something. They put a chart up on the wall, so I checked the chart, nobody is off, I’ll take that, then he is going to change the chart because I put in for my holidays, he is going to change the groupings. Things like that’.

> ‘A couple of things occurred [that led to the HSE becoming involved]. One winter the heating was terrible, really, really bad, and one day I got dragged up to the office for some reason, and Stewart McColl, MD, decided to have a go at me about health & safety in the place. And he said to me “Tell your pals down the stair that they don’t need to worry about how cold or how warm it is in there, it’s within the regulations”. I didn’t understand what he meant. So I goes down the stair and I was talking to one of the guys and I was saying to him “He just had a go at me about the heating in the place” and he went “Oh, that’s probably my fault”. I said “What do you mean?” He said “I phoned the Health & Safety about the temperatures in here and told them the place was freezing”. So, going on the assumption of that, the Health & Safety phoned him and told him that one of his workers had complained and that was why he had a go at me. There were one or two coincidences. I mean, as I was saying to you about the fumes cabinet thing, I was there 13 years and never did they ever attempt to give us any sort of fumes cabinet to do any of the gluing or cementing. Then all of a sudden it became number one priority for the two builders to get this thing built. So, within an hour of me getting put in the place, two people came in from the Health & Safety and asked me personally “Was this better for me?”. So, you know, I mean, it’s strange how these things happen, likes 13 years of getting nothing and then all of a sudden you get this fumes cabinet’.

Laurence reported a lack of consultation between HSE and workers at the plant.

> ‘There was no communication. The only way I found out about the visits was when I actually started speaking to Anne McKechin and she started sending letters to them and she was getting responses from them. They would never call a meeting with the workforce and say ‘We had a visit from the HSE four months ago, and they’ve asked us to do *x*, *y* and *z*, and we have done this now’. They would never do anything like that. They would never consult the workers regarding any working practice or anything. There was no consultation with the workers regards health & safety, working practice or anything. Nothing. The only time they consulted the workforce was if they got a new job and they didn’t know how to do it and they would try and nip your brains about how to do the job. That’s the only time. That’s the only way they would consult the workforce’.

The lack of consultation with HSE inspectors was of particular importance, due to the lack of communication by management of the outcomes of HSE visits.

> 'But we never received any communications from the company or the HSE before or after their visits. I tried after the visit of the Health & Safety, and even after I left the place to get information. I mean, I still kept, up to within maybe a week of the disaster, I was still phoning the Health & Safety trying to get them to tell me if it was safe for me, if these chemicals were doing me any harm. And not once did that ever get anybody from the Health & Safety to respond and tell me if the chemicals. Even after I left the place I still, you know, I tried to contact [named HSE Inspector] and I tried maybe within the three weeks of my leaving, up to the disaster, maybe three or four times I phoned the Health & Safety in that period and [this Inspector] was either at meetings or she was out or she was this or that and she never ever returned my calls'.

The only time that he did experience the HSE approaching him at ICL/Stockline was when they revealed his identity to management and asked about the complaint he had made.

> 'The only thing the HSE Inspectors asked me when they visited was, "Was it better for me?" when that fumes cabinet was built. That was all they asked me. I don't know if they were speaking to anybody else. To my knowledge they didn't speak to anybody else and they didn't call a meeting of the workforce. I don't know what the HSE inspectors asked management on their visits. I don't know if they asked about consultation between management and the workforce. I don't know if they asked the company because the company wouldn't tell us. And subsequent to that, in the correspondence between Anne and HSE, there's no mention of that. As far back as 2000/01, which is referred to, although they are not on inspection reports, there's nothing about any form of consultation'.

Apart from this meeting, the only contact Laurence had with HSE was following a request he made under the Freedom of Information Act.

> 'The only time that they have actually tried to speak to me was after I put a letter in asking for details under the Freedom of Information Act. Then they did send me a letter saying that because all the information had been sent to the police, they did not have any to give me. Two weeks after that my son told me "Look, I've just had a letter from my lawyer" and in it there were all the details about me and the visit they had made. Bits had been blanked out, so it was very hard to read but it did have my name on it and other names. So I actually phoned Stewart Campbell's office in Edinburgh and tried to speak to him because I wasn't happy about this. On the front of the letter they stated that the Data Protection Act was the reason why they blanked out people's names but they had sent my details with my name to somebody else. Although it might be my son's lawyer it was definitely about me. And the Health & Safety, in their letters, they did refer to me as Senior and him as Junior'.

‘So I contacted Stewart Campbell’s office and he was away on holiday at the time. So then I tried to contact Stewart North at the HSE in Glasgow. Within about half an hour of me phoning my mobile phone rang and it was Stewart North. He said “I hear you have been trying to contact me”. I said “Oh it’s not before time, I’ve been trying to contact you for months now”. And he went “We have been trying to get a hold of you and we couldn’t get you”. I said “Well, how long did you try today, how many phone calls did you make today to try and get me?”. He went “One”. I said “Funny how half an hour ago I phoned Stewart Campbell’s office and within half an hour of me phoning you phone me.” He said “Oh it’s about your complaint. All we were trying to do was do you a wee favour”. I said “But a couple of weeks ago you sent me a letter telling me you didn’t have any information.” “No, we don’t have”. I said “How can you send that out”. “I’ll have to look into this and I will get back to you but I would like to apologise”. But he never ever did get back to me. Somebody in there had made a mess of it and they were just trying to sort of see what I was going to do about it. That was it. That’s the only time I’ve ever got any response out of them, when I phoned Edinburgh. Any time I phoned the Glasgow Office they weren’t in, couldn’t talk, they don’t know. That was all you ever got’.

[As a result of the HSE’s involvement] if there were any changes they were very minor, if anything, you know. Stewart McColl was, I would say, in the last sort of few years, it’s not that he was safety-conscious, he was a great one for putting up signs for safety first, you know, wear gloves, wear this, wear that, wear the next thing. I would say it was more like a cosmetic thing, you know. There were lots of signs all over the place and for somebody walking in, whether it be a customer or whoever, then they would see all these safety signs or whatever. When he took over as the MD of – see he used to just be in charge of Stockline – but then he took over as ICL and that gave him sort of control of the whole place, the day to day running of it. Then he started to make things look better, if you know what I mean, a wee bit tidier and a bit cleaner’.

‘I would say even in the coating shop, a lot was cosmetic as well. I mean, the practices didn’t change, you know. Before Stewart McColl took over they were doing the same jobs as when he was there. You know, there wasn’t a change in the working practice, if you know what I mean. It might have looked different. The thing was if you walked through the coating shop and there could be a canister there, and all the different things that could go wrong, that paint or whatever it was could be lying there, lying opened with whatever solvents lying about it. But then if there was an Irn Bru bottle then he would go absolutely bananas. It was things like that. Chemicals could lie all over the place and that wasn’t a problem. But if you had a bottle of water or a bottle of Irn Bru on your bench then that was a major health and safety issue’.

‘After the HSE visits things they did put in some storage cupboards, but they were never locked or anything – you could do whatever you wanted with it. I could take a 5 gallon drum [of x] out of the cupboard, and I could leave that lying on my bench. If there was a bottle of Irn Bru beside it he would come down and go bananas about the bottle of Irn Bru “Get that in the bin”. This didn’t change after the HSE visits’.

Laurence’s recollection was that the ‘walk throughs’ made by HSE Inspectors on their visits were brief and lacked thoroughness.

‘How do you look at something individually? Do you actually stop and have a proper look? You might have a glance and look at something on the way past. How many of the HSE inspectors knew that one of the ovens used to be a bin lorry? They must have walked past that. If they knew that was a bin lorry, I’m quite sure they would have said “Wait a minute, that’s a bin lorry”. They might have done something. Did these people actually know what they were looking for? The last time I saw the Health & Safety come in, it was in a wee room and that’s the only place I saw them. If they were outside and they had a look at machinery I wouldn’t see them doing that because of the layout of the building. It was like, if they were beside you, you could see what they were doing, but then they would move on to another part of the building, or they might not have gone into another part of the building, you wouldn’t know, just because of the layout of the building. You would only see them where you were working. They were in our department for two minutes, that was all, absolutely minutes. They weren’t there for any length of time’.

‘To my knowledge the HSE never did an investigation of air quality. But that was one of the things I had asked them. When I spoke to the Health & Safety, when I started to read up on a lot of these chemicals, a lot of them will tell you about [the importance of] the point of extraction, you know, or general extraction. Well, we didn’t have any extraction in there whatsoever. So I asked the Health & Safety about this. So they knew prior to coming in. To my knowledge they never attached or used a meter or monitored the air quality’. .

In the 10 month period between June 2003, when this HSE inspection took place and April 2004, when LC left ICL's employment, Laurence was not contacted by the HSE. There were, to the best of his knowledge, no further visits made by the HSE to the factory and no obvious attempt to ensure the effectiveness of the fumes cabinet.

> 'I still wasn't happy and I contacted Anne [McKechin] who was still in the process of trying to get some details or answers or whatever out of them. She was just getting letters that weren't really telling them anything at all. In that period I contacted the HSE a couple of times and said that I wasn't happy. I said "Why won't anybody tell me was it safe, was it not safe or whatever?" I had asked them a few different things but they never ever contacted me. I can't remember them ever sending me any letters or anything or explanations. I wanted to know about the chemicals, which had been the whole idea of me contacting them to start with. I think one time somebody said to me that the proper things were in place or something along these lines. Well, I pointed out that I had read all the data sheets which called for at the point of extraction and impervious gloves and other different things. I said "There is no way that any of that was in use the day that you came in so how can you say that the proper practices are in place?" But I never got a response to that. Between when I left in April [2004] and May, when the disaster happened, I contacted Health & Safety because I was just livid with them and I wanted answers. I contacted them and – nothing'.

An Independent Report on the ICL Plastics Plant in Maryhill Glasgow

Introduction

On 11 May 2004, nine workers were killed and more than thirty-three injured in an explosion at the ICL Plastics plant of Grovepark Mills in Maryhill Glasgow. This was the worst health and safety incident in Scotland since Piper Alpha in 1988 when 167 lives were lost and the worst on the mainland (in Scotland) since the 1960s. A poignant insight into the human cost of the disaster is provided by the document which lays charges against ICL Tech Limited and ICL Plastics (31 January 2007) and which details the terrible roll call of casualties as follows:

> '…Peter Ferguson, Thomas McAulay and Stewart McColl received injuries from which they died, James Aitken was severely injured to his permanent disfigurement, Alan Byrne was severely injured to his permanent disfigurement, William Aitkenhead was injured, Gordon Bell was severely injured to his permanent disfigurement, Alan Byrne was severely injured to his permanent disfigurement, Nicholas Downie was severely injured to his permanent impairment, permanent disfigurement and to the danger of his life, Alan Donaldson was injured, Monica Flynn was severely injured to her permanent impairment, Daniel Fraser was injured, William Gifford was severely injured, Daniel Gilmour was severely injured to his permanent disfigurement, David Hamilton was severely injured, Martin Hamilton was severely injured to his permanent impairment and permanent disfigurement. Derek King was injured, Archibald Lindsay was severely injured to his permanent impairment, Christopher McGinlay was injured, James McGoldrick was severely injured to his permanent impairment, Ian Mavers was injured, William Masterton was severely injured to his permanent impairment and to the danger of his life, Tammy Nelson was severely injured to her permanent disfigurement, Charles Roberston was injured and Mathew Wylie was injured, and all were exposed to the risk of death and David Andrews, William Chapman, Robert McMillan and Anthony Northcote were exposed to risk of injury and death, all said persons being employees of ICL Tech Limited (Section 1, iv)' and

> '…Margaret Brownlie, Annette Doyle, Tracey McErlane, Timothy Smith, Ann Trench and Kenneth Murray received injuries from which they died, Linda Kinnon was severely injured to her permanent impairment, permanent disfigurement, Nicole Eaglesham was severely injured to her permanent impairment, permanent disfigurement and to the danger of her life, Stacey Eaglesham was injured, Charlene Howarth was severely injured to her permanent impairment, Sheena McColl (now O'Brien) was severely injured to her permanent impairment and to the danger of her life, Claire McShane was severely injured to her permanent impairment and permanent disfigurement, John Turner was severely injured to his permanent impairment and to the danger of his life and Elizabeth Logie was severely injured to her permanent disfigurement, and all were exposed to risk of death and Joyce Russell, James Anderson, James Baxter, Patrick Feggans, David Forde, Linda Johnston, Jason Stewart and Robert Warren were exposed to risk of injury and death (Section 2, iv).

The gravity of the disaster led soon afterwards to the announcement that an investigation would be jointly conducted into its causes by the Health and Safety Executive, the Procurator Fiscal and Strathclyde Police. However, at this stage calls for a Public Inquiry into the disaster were rejected.

It was against this background that a group of academics and experts with specialist knowledge in the fields of occupational health and safety, finance, employment rights, architecture, corporate accountability, industrial relations and human resource management, took the decision to conduct independent research into the circumstances surrounding the disaster. The intention was not to duplicate or mirror the official investigation but to examine issues and raise questions that might be neglected or under-explored by that study. What was the fuller rationale for this independent research?

- To understand as fully as possible the circumstances and contexts in which the disaster occurred. These include the company and its regulation, its structure and financing, its work practices, its management style and employment relations, the built environment and crucially its health and safety policies and practices.
- To ensure that the experiences of those workers and ex-workers who wanted their voices to be heard were fully documented. Historically, when workers have been the victims of catastrophic injuries and illnesses, their voices have been ignored or marginalised. This neglect is more than a matter of peripheral concern since the failure to account for workers' experiences cuts out a vital source of knowledge that can prevent future disasters. Further, the silencing of workers has all too often led to a lack of, or limited justice – legal, social and economic.
- To build up a picture of what working life was inside the factory.
- To consider the role played by inspection, regulation and enforcement by agencies that directly and indirectly determine the policies and practices of companies such as ICL Stockline.

The following report is the outcome of research undertaken from 2004 to 2006. Whilst the findings presented here are derived from various methods and approaches, the core of the evidence and analysis is drawn from ex-workers' testimonies and experiences.

The report is structured as follows.

Section 1 sets the context for the study, outlining health and safety failures in Scotland in the two decades since Piper Alpha.

Section 2 details the research methods which underpin the report, principally participatory action research including risk-mapping and body-mapping. These were accompanied by semi-structured and exploratory interviews. These worker-centred approaches were supplemented by archive research, scrutiny of official documents, an examination of company accounts and research into building controls and the role of regulatory agencies generally.

Section 3 profiles the company structure and finance before sketching an outline of the workplace and providing some insight into the nature of work and labour processes and employment relations.

Section 4 is concerned with the hazards associated with the plastics industry in general those that workers were exposed to at the Maryhill factory in particular.

Section 5 explores the management of health and safety at ICL Stockline, drawing substantially upon the transcribed evidence of workers' experiences.

Section 6 considers the role of the Health and Safety Executive (HSE) - its responsibilities, its policies and its known actions in respect of ICL Stockline. There follows the direct testimony of a worker's experiences of informing the HSE of his concerns with health and safety practices at ICL Stockline and the subsequent responses of that agency.

Section 7 discusses other regulatory bodies and issues**,** including building control and ICL Stockline's practices in relation to these.

Section 8 provides conclusions and suggests recommendations.

In the interests of locating ICL Stockline in the context of Scottish health and safety failures and of demonstrating the research team's rigorous methods of study it has been necessary to begin the report with two rather lengthy but important introductory chapters. Should the reader wish to proceed directly to the data on ICL Stockline then they may wish to commence at Section 3.

Section 1 Overall Context – Health and Safety Failure in Scotland Since Piper Alpha

1.1 Background

Health and safety issues only rarely capture the attention of the media. When they do, it is usually because of a tragic incident and then typically only for a short time until more 'important' news takes precedence. Yet, despite the lack of reliable global estimates, there is every indication that the extent of work-related deaths, injuries and illnesses is staggering. The International Labour Organization (ILO) estimate that each day 6,000 work deaths occur globally and over 2 million such deaths a year (www.hazards.org/wmd). For the UK, the Health and Safety Executive's (HSE) figures, an underestimate, reported for the year 2004/05 a total of 593 work-related fatalities which included 172 employees, 51 self-employed and 370 members of public (Health and Safety Executive, 2007a). These figures do not include the much larger number of occupationally-caused and occupationally-related deaths.

These global and domestic figures raise the question as to why so little importance is attached to this serious social problem of industrial injury and illness. For a long time critical researchers (Carson, 1985) have pointed to legislative and regulatory weakness and the imbalance in the relationships between employers and employees as root causes. Where workers are unable to exercise their rights and are not collectively empowered through trade unions the health and safety deficit is evident. Evidence suggests that twentieth and twenty-first century regulatory approaches to health and safety in the UK have added to this deficit, because of an implicit bias against the criminalisation of employers who commit safety offences (Beck and Woolfson, 2000).

Part of the problem are the concepts and language used. Terms such as 'human error', 'normal accidents' or 'systems failure' suggest that industrial accidents are either as normal and unavoidable occurrences, or attributable to the actions of individual workers. While some of these approaches may have a limited role to play in pinpointing certain causes of accidents, there is a real danger they mask the broader realities of employer-driven cost-reduction, corner-cutting, lack of worker representation and consultation and regulatory failures which are all too often the real contributory causes of injury and illness at work.

1.2 The Scottish Situation

In the last three decades Scotland has experienced a number of major industrial disasters, including the Piper Alpha platform explosion which resulted in 167 tragic and avoidable deaths during the night of July 6th 1988. However, Scotland's status as a health and safety black spot is not related to the occurrence of major industrial disasters alone. Over many years, the HSE has recorded significantly higher rates of rates of fatal and major injuries for Scotland as compared to the UK as a whole. Importantly, these higher rates are not the product of Scotland's offshore oil industry, which is not included in the HSE's comparative statistical reports (Health and Safety Commission, 2006: http://www.tuc.org.uk/h). Overall the Health and Safety Commission's annual reports suggest that across all industries Scottish employees have experienced on average 57.5% higher rates of fatal injuries than the rest of the UK during the reporting periods from 1996/97 to 2005/06; with rates ranging for most years from 40% to more than 100%. These figures are closely mirrored by the HSE/HSC's reported rates on serious injuries. It is important to note that the true picture for major injury rates probably greatly exceeds reported rates due to the greater propensity for under-reporting of injuries in Scottish workplaces (Health and Safety Executive, 2007b). Although research has shown that even the HSE/HSC's fatality figures significantly underestimate the true incidence of workplace fatalities (Tombs, 1999), there is no reason to assume that fatality underreporting significantly distorts the relative position of Scottish as compared to British fatality rates.

Figure 1.1 depicts fatality rates per 100,000 employees for Scotland and Great Britain for the period from 1996/97 to 2005/06 for all industries derived from the HSC's 2006 report. The focus is on employees which means that injuries to the public and the self-employed are excluded.

Figure 1.1 All industry fatality rates per 100,000 employees for Scotland and Great Britain

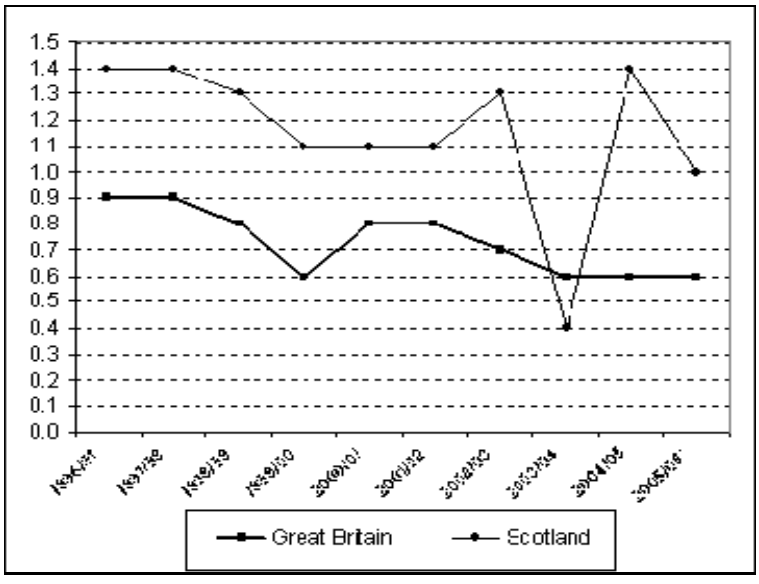

Figure 1.1 shows that, with the exception of the 2003/04 reporting year, Scottish rates for fatal injuries have exceeded those for Great Britain as a whole. Accordingly, the greatest discrepancy in fatality rates occurred in the next to most recent year of 2004/05 when the Scottish employee fatality rate reached 1.4 per 100,000 employees (with 33 fatalities) which was more than double the 0.6 rate for Great Britain as a whole (with 165 fatalities). Overall there is clear evidence that, in terms of fatality rates, Scottish workers are at greater risk than those in Great Britain as a whole.

1.3 The Politics of the Scottish Anomaly

Today the legislative responsibility for health and safety is reserved to Westminster with related areas, such as health, transport, education and justice being devolved to the Scottish Executive. In Scotland the HSC/E has formalised its relations with the Scottish Parliament through a Concordat and the establishment of a Scotland Director. This Director has operational responsibility for the Field Operations Directorate in Scotland and, more generally, advises on relations with the Scottish Executive.

In investigating the issues of health and safety in Scotland in 2004, the Select Committee on Work and Pensions (House of Commons, 2004) noted that,

> HSE considers that the comparative figures for rates of accident, injury and ill-health for England, Scotland and Wales reveal anomalies. Fatal injury rates, for example, are higher in Scotland than for the rest of Great Britain, although so far no definitive reasons have been found for this. On the other hand, rates of self-reported illness are lower. HSE is exploring these anomalies.

Disregarding both the extent of the discrepancy and the urgency of this situation, the committee continued,

> Evidence to the Committee was that there had been positive developments in Scotland such as the Safe and Health Working pilot. However, it was also suggested that there was much to be gained from an increased emphasis on joint resource planning, risk prioritisation and programme working. The Committee recommends that this process would be assisted if HSE actively promote joint resource planning, risk prioritisation and programme working across the devolved legislatures in Great Britain.

It has been difficult to pinpoint the effects of these 'positive developments'. In 2004, the Committee had available HSE reported figures for fatalities and major injury rates for Scotland and Great Britain which show no discernable pattern of convergence between Scottish rates and those of Great Britain.

Similarly, efforts by the HSE to pinpoint the causes of the Scottish anomaly have, at best, produced ambiguous results. The HSE commissioned studies into the Scottish anomaly in 2000, which resulted initially in two studies, R62.079 and R.63.053 undertaken by the Institute of Employment Research at the University of Warwick. Specifically, the HSE tasked the researchers with the following remits[1],

> ***R62.079 Analysis of National Injury Data***
> Background
> With the impending arrival of devolution, it is likely that increased attention will be given to statistics on work-related injuries for Wales and Scotland. The overall injury rates in Wales and Scotland are higher than in Great Britain and in many cases the injury specific rates are higher. The reasons for this are unknown. Objectives:
> 1) To establish a set of demographic, social and economic variables which are relevant in the context of varying injury rates across Great Britain.
> 2) To develop appropriate probability models explaining the relative effects of these variables in the constituent countries of Great Britain.

and[2]

> ***R63.035 Econometric Analysis of Riddor Data***
> At the aggregate level, trends in accident rates will be affected by a whole range of factors, including the socio-political, technological, institutional and economic. However, precise empirical relationships are lacking. This makes it difficult to assess whether year-to-year movements in accident rates are the result of changing economic conditions or underlying safety. The ability to distinguish between the two would clearly be of value to the HSE in targeting its actions and developing proportionate responses to accident rates. Objectives:
> 1) To construct a cross-section time-series panel dataset of RIDDOR fatal accidents and economic variables.
> 2) To use panel datasets to estimate statistical models relating to fatal accident rates to economic variables [sic].

[1] http://www.hseresearchprojects.com/projectsearch.aspx?id=395
[2] http://www.hseresearchprojects.com/projectsearch.aspx?id=410

According to the HSE's interpretation of the findings of these studies, Scotland's higher fatality and injury rates can be explained on account of the different industry mix of Scottish employees, or in other words, do not point at any specific institutional problems. However, when commissioning a further study on the construction industry (RR443 - An analysis of the significant causes of fatal and major injuries in construction in Scotland) the HSE qualified this view this by stating that[3],

> Research (R62.079 & R.63.053) by the by the Institute of Employment Research at the University of Warwick shows that differing rates of non-fatal injury between regions and countries in Great Britain can be almost fully explained by the industries, occupations or other characteristics of the working populations. This does not, however, explain differences in rates for particular sectors and does not examine difference for small and medium sized enterprises (SMEs).

Rather than providing an in-depth look at the problems experienced by workers in the construction industry, this study (RR443) reverted to the HSE's already established line of argument in which discrepancies in accident rates are attributed to the occupational characteristics of the workforce.[4]

The findings indicate that the most significant factor in explaining the difference in accident rates is the differing occupational make up of Scotland and the rest of Great Britain. There are proportionally many more manual (at risk) workers in Scottish construction than in the rest of Great Britain. As a result, it appears that the overall accident rate is higher in Scotland. However, arguing, as the HSE does, that Scotland has relatively greater numbers of employees in industries such as agriculture and construction which appear to carry a greater risk of health and safety failure, is unlikely to explain why Scottish workers are far more likely to suffer fatal or major injuries.

[3] http://www.hseresearchprojects.com/projectsearch.aspx?id=1528
[4] http://www.hse.gov.uk/RESEARCH/rrhtm/rr443.htm

1.4 The Causes of the Scottish Anomaly - Alternative Views

Academic literature provides a wide range of explanations for the divergence of accident rates across different workplaces. These explanations include factors such as different patterns of subcontracting (Hillage, et al, 1998), employee skill levels and employer control over tasks (Dwyer and Rafferty, 1991), the balance of power between employer and employee and the role of organised labour (Nichols, 1986, 1990; Nichols et al 2007; Toms 1990; Reilly Paci and Holl, 1995) as well as the resources available to health and safety inspectorates (Toms, 1990). Together these theoretical approaches point to a conglomerate of interlinking factors which, being sometimes inadequately described as safety culture, relate to aspects which regulate the interaction between employers and employees at work. This political economy of work and safety includes aspects, such as the degree to which employers cut corners, violate safety rule and deviate from best practice, together with the degree to which employees lack the power to counteract these behaviours. Most of these factors are beyond simplistic statistical analysis.

However, in as far as the Scottish anomaly is concerned, there are a number of parameters which may well account for its very significant deviation from the UK's overall safety performance. One element would appear to be the weaknesses, as documented, with respect to inspection and the prosecution of safety offenders. At the time of the Stockline disaster, the Health and Safety Executive was reported as having only 68 inspectors employed in Scotland to police 81,000 factories and workplaces.[5] This figure was widely cited in the press as an indication of the limited priority the HSE had attached to policing Health in Safety in Scotland, despite the nation's dismal safety record. What is less known is the fact that the HSE had, for many years, placed increasingly less emphasis on inspection and policing. This attitude has been reflected, most recently, in a ministerial response to House of Commons questions regarding HSE inspections[6]:

> 1. In marshalling HSE's inspection resource, HSE seeks to target poor performers. The key criteria in establishing the frequency of inspections are the risks presented by particular duty holders, premises or industries and the ability and willingness of duty holders to manage those risks. Where the risk is low and duty holders' ability high, visits are less frequent than where the risk is high and duty holders are failing to manage those risks. In targeting the inspection resource in this way, HSE believes it has the greatest impact on reducing work-related deaths, injuries and ill health.

[5] Sunday Mirror (2004) One Safety Inspector for 1000 Factories
http://findarticles.com/p/articles/mi_qn4161/is_20040516/ai_n12894419

[6] House of Commons Hansard, Written Answers for 25 Jan 2007-08-16
http://www.parliament.the-stationery-office.com/pa/cm200607/cmhansrd/cm070125/text/70125w0016.htm

2. In 2003, HSE ceased to set targets for the number of inspection contacts. Such targets encouraged short visits to low risk places, whereas the Health and Safety Commission's strategy for workplace health and safety 2010 sought a sharper focus on injury and ill health priorities, and more substantial contacts with a carefully selected range of duty holders. Over the last five years or so, the actual time HSE inspectors have spent interacting with and encouraging duty holders has increased by 23 per cent.

3. Important as inspection is, the frequency of inspections is not a particularly useful metric. The Health and Safety Commission's strategy fully recognises the importance of inspection, and the threat of enforcement, as a powerful motivator for improved standards. But to be most effective, they need to sit alongside other interventions, such as encouraging partnership working, communications, and so on.

This ministerial response highlights a deeply problematic attitude towards inspection activities on a number of levels. Firstly, if the 'frequency of inspections is not a particularly useful metric' then there is a real danger that the number of those available to conduct inspections is also considered unimportant. Secondly, while the idea of targeting inspections towards high risk workplaces may be theoretically appealing, it is less clear how these workplaces can be identified in the first place if the number of inspections and inspectors is inadequate. Most reportable accidents are, by HSE's own admission, not reported and it seems likely that those employers least concerned about safety may also be least concerned about reporting. Thus this ensures they remain out of view from an enforcement-light agency. Thirdly, as concerns the idea that inspections should be combined with other interventions, such as encouraging partnership working and communications, there is a very real danger that an emphasis on collaboration will undermine the ability to police particularly those workplaces have failed to meet basic safety standards.

Recent data suggests that UK-wide the HSE is indeed increasingly de-emphasising its role as a health and safety enforcement agency. Thus the HSE's own data reports a UK-wide fall of enforcement notices from 11,335 in 2003/4 to only 6,383 in 2005/06.[7]

In Scotland this lack of focus on enforcement is aggravated by a number of additional factors, including the comparatively lower levels of fines imposed on safety offenders; the lower level of prosecutions resulting from workplace deaths and serious illnesses; and the smaller levels of investigations resulting from work-related illnesses. As regards fines, reports available on the HSE webpage records an average level of fine per case for 2002/03 in Scotland of £7,143 as compared to Great Britain with £9,395. For the year 2003/04 this divergence has narrowed to £13,534 for Scotland as compared to £14,303 for Great Britain. However, preliminary HSE figures for 2004/05 indicate a renewed divergence in penalty levels with an average fine for Scotland of £11,761 and £18,765 for Great Britain.[8]

[7] Health and Safety Commission (2006) Health and Safety Statistics 2005/06 http://www.hse.gov.uk/statistics/overall/hssh0506.pdf

[8] Health and Safety Executive (2006) Health and Safety Offences and Penalties 2004-2005

Perhaps even more discouraging are the levels of enforcement action taken by the HSE in Scotland over time. As concerns the number of offences prosecuted by the HSE in Scotland, the HSE records 233 prosecutions in 2001/02; 268 in 2003/04; 152 in 2004/05 and only 108 in 2005/06 (provisional data). This data is closely mirrored by the number of convictions which reached 137 in 2001/02; 110 in 2003/04; 77 in 2004/05 and only 54 in 2005/06 (provisional data). Similarly, the total number of HSE enforcement notices (comprising improvement, deferred prohibition and immediate prohibition notices) issued in Scotland declined from 1378 in 2002/03; to 1263 in 2003/04 and further to 992 in 2004/05 (the latest available figure).[9]

Research conducted by the Centre for Corporate Accountability (CCA) indicates that only 26% of deaths resulted in prosecutions in Scotland, compared with 46% in the Midlands area of England. For major injuries the CCA reports that in Scotland only 25% of these resulted in investigation of which 9% resulted in prosecutions. According to the CCA, Scotland also ranked last for investigating work-related illnesses with an investigation rate of 24% as compared to 65% in the Midlands[10]. This statistic should be particularly frightening in light of Scotland's industrial heritage and, in particular, the fact that Scotland includes the area with the highest standardised mortality ratio (SMR) from mesothelioma in Great Britain. As regards mesothelioma, the HSE's own statistical analysis reports an SMR in excess of six times the average for Great Britain for West Dumbartonshire as well as significantly elevated SMRs for East Dumbartonshire, Fife, Glasgow City, Inverclyde and Renfrewshire.[11]

Additional research by the CCA conducted in 2003 indicates that only two company directors/senior managers in Scotland have been convicted of health and safety offences of which one of the only received an 'admonishment' and the other received a £1,000 fine. This compares with 27 directors/senior managers convicted in England and Wales of health and safety offences over the same period. Similarly, while in England and Wales, eight company directors and five companies have been convicted of manslaughter, no director or company in Scotland has been convicted of an equivalent homicide offence following a work-related death.[12]

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http://www.hse.gov.uk/enforce/off0405/off0405.pdf and
http://www.hse.gov.uk/statistics/regions/scotland.htm for the very latest figures

[9] www.hse.gov.uk/statistic/regions/tables/regenf.xls

[10] Sunday Herald (2004) In Safe Hands
http://findarticles.com/p/articles/mi_qn4156/is_20040523/ai_n12588936

[11] Health and Safety Executive (2001) Mesothelioma Mortality in Great Britain: An Analysis by Geographical Area 1981-2000, HSE Information Services
http://www.hse.gov.uk/statistics/causdis/area8100.pdf

[12] Centre for Corporate Accountability (2003) Corporate Criminal Accountability in Scotland
http://www.corporateaccountability.org/press_releases/2003/10OctScot.htm

1.5 Industrial Accidents and Corporate Culpability

Scotland's history of industrial accidents continues to be associated with the world's worst offshore disaster, the Piper Alpha incident. However, both offshore and onshore, Scotland has experienced many multi-fatality disasters. In July 1990, six workers died in an offshore helicopter crash when a Sumburgh-based Sikorsky S61N helicopter plunged into the sea after apparently hitting a crane while trying to land on the Brent Spar helipad. The crash killed two crew and four passengers with seven surviving the incident.[13] The same year saw the death of six fishermen off Shetland when the Inverness-registered vessel *Premier* was overcome by a wave.[14] In 1992 eleven employees were killed when a Super Puma helicopter, which was taking workers from Shell's Cormorant Alpha platform, 100 miles north-east of Shetland, to the Safe Supporter "flotel" 200 yards away, crashed shortly after take-off.[15] Some of the worst instances of workplace tragedies occur in Scotland but are finessed out of its workplace deaths' tally because they are 'off shore'.

The Cormorant Alpha disaster illustrates the obstacles victims and survivors face when seeking justice in the wake of an industrial 'accident' (Beck and Woolfson, 2005). During later inquiries about the accident, evidence emerged that the helicopter passengers had had serious safety concerns and had been reluctant to take the helicopter flight that night, but had eventually boarded the helicopter under pressure. Following initial attempts to embark on litigation against Bristow in the UK, the relatives brought their suit against Shell and Exxon to the courts of Texas and Louisiana. Shell sought and obtained interim interdicts in Scotland and injunctions in England, against the bereaved families. This included some 63 individuals in all. The purpose of these restraining orders was to prevent the families from pursuing an award for higher levels of compensation in the American courts as against the courts of England and Scotland. Violation of this court order, Shell warned, could result in the families which in this case also included young children, being "subject to bodily imprisonment". In the end, when faced with the imminent prospect of US court proceedings going ahead, Shell proposed an out-of-court settlement which was reached in early 1996, nearly four years after the disaster. The size of this settlement is undisclosed. What is known is that the imposition of 'gagging clauses' effectively left unanswered vital questions which might have determined any corporate culpability.

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[13] The Shetland Times (1997) Headline Events Over the Years **www.theshetlandtimesltd.co.uk/125years/years.htm**

[14] see [12]

[15] The Scotsman (2002) 400 Deaths in 33 Years http://news.scotsman.com/topics.cfm?tid=472&id=771822002

1.6 Summary

In sum, it is important to acknowledge the ways in which the discussion surrounding health and safety issues, particularly in relation to major incidents, have been 'de-problematised'. The use of phrases and concepts such as 'human error', 'accidents' or 'systems failure' have profoundly influenced public perceptions of industrial 'accidents', casting them as either normal or unavoidable occurrences, or as being attributable to the actions of individual workers. This has served to deflect attention from the deeper causes of health and safety incidents and occupational ill-health as derived from the economic and industrial relations contexts in which workers are frequently disempowered.

The fact that official statistics show higher fatality rates for Scotland indicates that Scottish workers are at greater risk than those across the UK as a whole. Yet, explorations by the HSE of this 'anomaly' have produced ambiguous results and there remains a general failure to have identified the root causes. Academic research has provided diverse explanations for the variability of accident rates across workplaces, whether sectorally, geographically or otherwise. As far as Scotland's exceptional fatal injury rates are concerned, a number of factors may well be more important than others, including the documented relative weaknesses in inspection and prosecution of safety offenders. It is within these contexts that the circumstances surrounding the ICL Stockline disaster should be considered. Prior to presenting research findings we describe in some detail the principles and research methods that have guided our investigations.

Section 2 Research Methods

2.1 Introduction

The report has been prepared partly because no broad and independent investigation of the Stockline disaster has yet been conducted. Most of the methods used in the report can be utilised by any worker or community group wishing to research health, safety and other environmental concerns that they have.

We have drawn on a review of relevant published and 'grey' literature – 'unpublished' material that may exist on the web and in places other than library bookshelves - relating to the management, finance, operation and health and safety of workplaces within the plastics industry. We have also used particular methods to explore conditions within the Stockline company and the Glasgow plant. Research methodology relates to the underlying theory and analysis of how research does or should proceed. Research methods relate to the techniques used to gather and analyse data. The ICL Stockline study drew on a participatory action research methodology that is briefly explained below and used mixed methods to collect and analyse data including interviews, risk mapping activities, analysis of reports on working conditions, accounts, building consents and physical structural changes in the plant.

Central to this report is evidence from the testimonies and experiences of ICL Stockline workers. The ICL Stockline Support Group, composed of victims who survived the disaster and of relatives of deceased workers, was formed in July 2004. Members of the Research Team, who have produced this report, were invited to a meeting of the Support Group in August 2004. At this meeting, the ways and means of investigating events at the Maryhill factory leading up the disaster were discussed and several of the approaches used in the report were outlined for those present, as were the aims of such a report. In addition, written information about these approaches, including risk mapping and lay epidemiology, was handed out. An open invitation was extended to those present to discuss their experiences in groups and interviews. A self-selecting group took up that invitation. This group comprised a broad cross-section of those who had worked at the plant, some for up to two decades, in a variety of locations/functions including fabrication, coating, dispatch and maintenance. Many had considerable experience of the plant's operations and working practices as well as changes that had occurred there over several years. Altogether, seven employees were interviewed, four of whom participated in subsequent risk and body mapping sessions.

This group then met with the 'academic experts' to discuss in detail how the research would be carried out and were informed that the report would be put into the public domain. Consent forms were signed by those wishing to participate (see Appendix 3). The confidential nature of the data, so collected, was also explained. The data were to be anonymised except with regard to one interview where the interviewee gave explicit consent for his name to be disclosed (see 6.2 below). Thus, with this sole exception where workers have been quoted in the body of the report they have been anonymised according to a simple nomenclature (Worker1 – W1, Worker2 – W2 and so on). The data in the form of the original taped interviews and the transcriptions of those interviews has been kept securely on University premises. Only the research team has had access to the data collected.

2.2 Action Research (AR), Participatory Research (PR) and Participatory Action Research (PAR)

Action research is not itself a research methodology, but rather 'an orientation to inquiry'. The term 'action research' covers a wide range of methods including co-operative inquiry, participatory action research, action science, action inquiry and appreciative inquiry. Each of these methods has relevance for use within both organisations and communities. The emphasis is on collaboration between all those involved in the inquiry, so that the knowledge developed in the inquiry process is directly relevant to the issues being studied. Thus action research is conducted *by, with* and *for* people, rather than research *on* people" (Cathy Sharp, *Research for Real* and Eileen Francis VECTOR for Centre for Human Ecology and the Scottish Civic Forum, August 2003).

The Stockline study has used action research and has been prepared with the participation of people employed, or formerly employed, at the factory. Meetings were held in the homes of the participants and other locations. Small focus group discussions and individual interviews were conducted. Working with these participants was a multidisciplinary group of academic experts in accountancy, architecture, corporate crime, industrial relations, occupational health and safety and welfare rights, who formed a cross-institutional, multi-disciplinary research team.

PAR can draw on such methods as rapid appraisal, community, lay and worker epidemiology and citizens' juries. We have used lay and worker epidemiology: that is, worker and ex-worker investigation and documentation of both day to day and critical events in the plant. This has been supplemented by risk mapping methods (described and illustrated more fully in later chapters) combined with semi-structured interviews. These methods have produced rich and often unique data. Acknowledging, understanding and respecting that there are different types of legitimate evidence we have recorded varied but often complementary approaches to evidence based occupational health and safety practice that this report sought to explore.

Conventional participatory research operates in the context of 'lay/worker/community' activity for the collective good. In the work environment this approach has a part to play in the process of vetting substances, processes, materials, buildings, factories and other types of plant and installations. In the past in the UK and within Scotland, we have witnessed many examples of either complacency or over-confidence or both by scientists, regulators and politicians when dealing with potential occupational risks and problems. Their inability to deal with uncertainty, their failure to take data gaps seriously when carrying out risk assessments, their failure to go beyond very narrow risk assessments and skewed cost-benefit analyses which constantly favour capital over community and workers had severe detrimental consequences. The failure to recognise, research or act on research - when potential problems were flagged - occurred with Piper Alpha, Zeebrugge, BSE, asbestos. These illustrate the large scale and the major consequences of such over-confidence or sometimes failure of courage to tackle powerful commercial interests.

The Stockline workers frequently flagged a range of major problems within their workplace and their voices were apparently often ignored by employers, regulators and enforcers. The PAR approach records those voices. Such voices have often been lost, silenced or muted in official enquiries of workplace disasters in Scotland such as Piper Alpha or the semiconductor industry.

Daily, some communities and some continents live with the consequences of the failure of narrow scientific and limited or absent regulatory approaches – whether in Clydebank from asbestos-related diseases, Bhopal in India where many thousands of people were damaged or killed by a pesticide manufacturing plant failures, the Ukraine from the Chernobyl nuclear reactor disaster. Lay/worker/community action on health issues can highlight these failures and bring important precautionary approaches to effectively bear on decision-making as well as inform solutions and the factors which might facilitate or inhibit the application of such new knowledge.

Research and the methods used to research many disasters are not conducted in a vacuum. Research may be framed and skewed in ways that distort or suppress findings. Industrial development through beneficial inward investment for industries may introduce one potential source of bias into some research. The influence of corporations that may resist worker and community action research is another especially when company sponsored research produces findings that favour companies. Better and 'democratic' research models and practices do exist such as the action-research projects used in Clydebank to explore asbestos-related diseases and their impacts on workers, ex-workers, their carers and communities. Other examples such as the work of Phase Two also demonstrate the effectiveness and policy impact of worker and community-based actions (Smith et al 2006).

2.3 *Risk Mapping*

Workers and communities may be ideally placed to identify physical, chemical, biological and management system hazards in the workplace and the likely risks associated with those hazards. They can map the physical and social environment in which they work; they can map the adverse effects that work may have upon the worker (body mapping) and they can map where their workplace is located in terms of factors that promote or damage well being and physical and mental health (global mapping) (Keith et al 2001. ILO 2002 and, in the UK, groups of women in Boston, Lincolnshire and the Women's Environment Network breast cancer survey mapped hazards and risks in communities in partnership with local people, and illustrated how communities themselves, sometimes supported by NGOs, can explore possible health issues and ways to promote health (WEN, 1999). Again, there is a case for acknowledging a variety of evidences, this participatory research is one aspect, of what can become a polarised picture, of strategies informed by partnerships of evidence that are required to tackle health and safety risks. The Sheffield Occupational Health Advisory Service (SOHAS) projects located workers and lay advisors in GP surgeries to uncover the tip of work-caused and work-related occupational diseases' iceberg and they were able to map specific occupations against companies and industries. Such research has exposed major under-reporting of occupational cancer, angiosarcoma from vinyl chloride monomer, occupational asthma and other workplace diseases (Hazards magazine)

These 'participatory' studies have also used well-established and new traditional research methods such as Geographical Information Systems (GIS) but their roots lie in the risk mapping activities of workers in a Fiat plant in Italy many years ago. The maps so prepared rely on worker/community knowledge of processes and procedures rather than managerial and 'expert' assessments which may reflect theoretical evidence rather than the real practice of processes and chemical usage. Again differing public health theories underpin differing approaches to risk and to epidemiology. Prudent decision-makers who use lay epidemiology approaches are searching for health data to demonstrate that there are no major risks associated with hazards: the burden of proof lies with the owner-employer-manufacturer-government to show processes are 'safe'. In contrast to the expert hierarchical view of evidence, this approach is informed but not dictated by science and scientific methods and recognises both the value and the limits of our scientific knowledge.

Gaining more comprehensive evidence entails opening up the research process to ensure communities and workers can contribute to and influence any changes proposed as a result of the research undertaken. However, this strategy carries potential political and economic costs for business. The benefits of participatory research can be considerable. For instance such research may play a role in exposing unrecognised levels of disease or through studying subjective symptoms in an effective way. These could include multiple chemical sensitivity (MCS), syndromes, work related upper limb disorders and repetitive strain injuries, asthma aetiology and occupational stress.

These are conditions common in the general population which could be elevated in particular work groups as are result of occupational factors, but otherwise remain hidden from view among the background population cases, or more commonly linked to lifestyle factors like smoking – for example, obstructive airways disease, heart disease or lung and other cancers in workers in dusty jobs.

The Stockline workers used mapping to explore exactly such problems. All are now being explored by participatory research. These methods may be cost effective or low cost ways of identifying a wide range of exposures to possible disease causes and outcomes through interactive approaches. They are able to deal with rapidly changing situations and almost automatically they increase capacity of communities and workers to involve themselves in public health. This is because the methods recognise and use knowledge and experience of communities in identifying particular health risks. Such methods also help to inform solutions and provide new approaches to conceptualising knowledge, enhancing the potential for action outcomes from research findings. Finally they raise awareness of policy-makers linked to an identification of key local concerns (Loewenson et al, 1995; Loewenson, 1999).

There are of course weaknesses attached to participatory research. For instance the assumption that there is an identifiable community perspective is problematic and this may mean that no precise quantification of a particular problem can be identified. There could be inaccurate or incomplete or partial perspectives provided on an issue bearing in mind that there is a major difference between lay perceptions and lay epidemiology. Lay perceptions of public health problems could include misconceptions about the nature, causes and prevention of disease. However, none of these problems are unique to participatory research

2.4 *Evidence-based Occupational Health and Safety?*

'Evidence-based practice' aims to underpin and promote effective decision-making. Evidence may constitute professionals' statistical, engineering, toxicological or epidemiological reports from randomised control trials or health services research. But evidence can also be qualitatively derived from the user/community perspective.

There are some fundamental differences between quantitative and qualitative research methodologies: namely how the world is viewed and therefore how it might be studied. Quantitative and qualitative methodologies are not directly comparable but rather these approaches and the research methods and tools they inform may be assessed as being more or less useful to the Stockline enquiry that we have conducted. Similarly, criteria of methodological rigour applied to all research to promote good, trustworthy evidence must be appropriate to the research methodology adopted. For qualitative approaches this includes locating research activity as a value-laden social event in itself and requires investigators to make their own value positions explicit and to actively interrogate the influences this may have on the evidence produced. The concept of 'value-free' scientific research is not tenable.

2.5 Epidemiology

Epidemiology has been defined as "The study of the distribution and determinants of health and disease related conditions in populations. It is concerned with both epidemic (excess of normal expectancy) and endemic (always present) conditions… The basic premise of epidemiology is that disease is not randomly distributed across populations" (Shenker. M. in LaDou 1997). The 'epidemiology' of the Stockline workforce has been neglected and worker concerns about their health that merited serious investigations were dismissed by many organisations and individuals. This is important as the focus and methodologies of much research may potentially skew pharmaceutical, toxicological and even epidemiological evidence on public health problems and their proposed solutions. The researchers on and participants in this 'lay epidemiology' project have received no funding from any company, organisation or NGO of any sort. The work has been done in their own time.

The science of epidemiology, viewed as so critical to the development of 'academic', rigorous and high status public health medicine, has replaced clinical case studies as the most effective and credible method for identifying disease clusters. From this perspective clinical cases are viewed as statistically limited sources of information. However, non-epidemiological data. linked to clinical cases or observations, have sometimes resulted in very effective actions. For instance the links between exposures to soot and cancer came from Percival Potts' clinical observations and case reports in the late 18th century. The links between exposure to vinyl chloride monomer and the rare liver cancer angiosarcoma came through primary care physicians near a US chemical plant connecting clinical cases. Such sentinel events should lead to precautionary approaches to hazards but, as the European Environment Agency has documented, such a principle has constantly been ignored at the cost of the lives and health of many workers (EEA 2001). As evidence presented later in the report demonstrates, if such a principle had been adopted, many of the occupational safety and health problems identified at Stockline would have been solved.

2.5.1 Lay Epidemiology

Lay epidemiology is "the process by which lay persons gather statistics and other information and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of diseases" (Brown 1989). In the 1920s and 1930s the physician Sir Thomas Legge and first medical inspector of factories was an early user of 'sentinel' events to trigger investigations of health hazards, (Legge 1934:25-29). He used observational data from workers to identify hitherto relatively unknown risks. For instance, he visited a docks site where the dockers themselves had linked work with a hard wood to cases of ill-health in their members when no physician had done so. This showed that lay assessments should not be dismissed as simply subjective and worthless. Lay epidemiology can draw on qualitative and quantitative research methods in order to generate comprehensive, rich data. The uses of the technique are many and varied and do not simply relate to the investigation of a health hazard or to confirm or disconfirm scientific evidence about correlations and causes of diseases. They also contain important community, individual, political and social elements (Watterson 1994b, Popay and Williams 1994 and 1996).

Lay epidemiology may inform communities about public health problems and solutions. By involving communities in public health policy and the monitoring of practical policy implementation lay epidemiology has the potential to sustain and empower communities and individuals in an organisational and possibly social context. The approach also has potential to help change attitudes to disease causation, disease prevention and the effectiveness of public health measures. In addition it may possibly serve to educate professionals, through lay groups, about new or different public health perspectives. It is part of a campaign for positive change. Such campaigns based on worker initiated or worker led research, like those mentioned earlier on Clydebank with regard to asbestos and through Phase Two with the semiconductor industry have led to improvements and sometimes changes for workers and shaped future research.

Lay epidemiology studies can include tools, mechanisms, techniques and methods that appear 'easy' but are not and may be complex in terms of data gathering. Different types of data are generated and used differently. They may generate similar data to that used by epidemiologists and toxicologists but often this is not the case and they could be more comprehensive, experiential, up to date, relevant and better informed. They can be qualitative – records and histories may provide supporting information in conventional epidemiology whereas in this study it represents core data.

Quantitative methodological concerns regarding the rigour of research including validity of recall, reliability and verifiability, issues about location and length of exposure and exposure levels in conventional epidemiology are shared with lay methods. However, records of incidents, accounts of exposures, details of suspected adverse effects may all be more richly documented in lay epidemiology with the participants' perceived experience acknowledged as their reality unlike other sorts of epidemiological study.

Data collection in lay, community and worker studies may also be presented in forms readily recognised and accepted by conventional epidemiologists. Lay epidemiology is relatively cheap to do, draws on local data, can utilise people pooling knowledge encompassing a socio-participative/participative model. It nurtures transparency in study design, execution and analysis and in this context it is an open process that is inclusive, potentially empowering and recognises uncertainty. It is a positive process which will usually create many benefits with the potential to go beyond the rhetoric of transparency and empowerment as it is embedded in community practice.

Lay epidemiology complements and may triangulate with other methods and reflects current international and national agendas relating to WHO Charter on Environment and Health and the involvement of local communities in their health care. Lay epidemiology may focus on small groups and the evidence does not lend itself to traditional concepts of sample population generalisability but can offer the analytical generalisability of concepts and insights of qualitative paradigms. Yet small studies may produce quite original and important data which can provide real benefits in terms solving problems, engaging communities and creating structures through which wider public health debates and policy formulation can be conducted. As with conventional epidemiology there are perennial problems of identifying random/causal clusters. Health professionals may resist and sometimes oppose any discussion of the issues raised and there may be a lack of good data on exposures although communities can produce experiential evidence about the reality of exposures rather than assumed projections.

Lay epidemiology has the potential to produce knowledge that meets the needs of communities and NGOs whose priorities may be quite different to those of the established scientific community. For instance operationalisation of the precautionary principle often requires information about data gaps rather than ‘data rich’ but ‘information poor’ masses of statistical/epidemiological data. Lay epidemiology may or may not be totally excluded from conventional epidemiological studies. A continuum of both approaches ranging from solely conventional to research controlled, conducted and delivered by lay groups is set out in the table below. In most instances, the type of lay epidemiology studies that have been conducted fall into categories 2-5.

Types of lay epidemiology

1. Epidemiologists design, carry out, analyse and present the study
2. Epidemiologists design, study and train and use lay staff to carry out surveys in a study. Epidemiologists analyse and present data.
3. Epidemiologists invite lay people to contribute to design of study protocol. Lay staff carry out questionnaire surveys, interviews. Epidemiologists analyse, present data.
4. Epidemiologists invite lay people to contribute to study design. Lay people carry out surveys. Epidemiologists, with lay people, analyse and present results.
5. Lay people identify problem and invite epidemiologists to investigate the problem. Back to (1)
6. Lay people identify problems, involve epidemiologists. Joint protocol is drawn up. Back to (3) and (4)
7. Lay people identify problem, involve epidemiologists. Joint protocol. Lay people and epidemiologists jointly investigate problem, analyse results. Joint presentation of results. (Watterson 1999; 2000)

2.6 Semi-structured and Exploratory Interviews

Complementing the action research approaches adopted, and outlined in the previous section, were more conventional academic methods. Principally this involved in-depth interviews with workers and ex-workers, either individually or in pairs. However, underpinning this recognisable specific technique in data gathering we have been informed by oral history methods, which have proved most helpful in enabling us to use the accounts and testimonies of ICL Stockline employees as an indispensable source to reconstitute the what working life in the factory was like through the meanings attributed by participants.

2.6.1 Oral History Approaches

In the 1960s and 1970s oral history widened its scope to include non-elite groups such as racial and ethnic minorities, women, labour activists and workers more generally (Liddington and Norris, 1978; McCrindle and Rowbotham, 1979; Armstrong and Beynon, 1977). Oral historians provided glimpses into the lives of those who generally did not, or could not, record their own stories and revealed insights into their lifestyles, work routines, values and beliefs. This new social history focused particularly on the meanings participants attached to events, phenomena and experiences (Portelli, 1981: 99). The unique value that oral testimony bestows in the pursuit of knowledge is that accounts tell us not just what people did, but what they wanted to do at the time and their reflections upon past events and experiences. Portelli's emphasises that 'memory is not a passive depository of facts, but an active process of creations and meanings' (1981: 101).

Through recording the first hand accounts of variety of storytellers, oral history methods have the potential to democratise the historical record (Schopes, 2004: 2; Thompson, 2000: 9). By moving beyond the use of written records researchers have a multiplicity of sources at their disposal which assist in the reconstruction of the past. Accordingly, as Thompson (2000: 6) noted,

> Reality is a complex and many sided; and it is a primary merit of oral history that, to a much greater extent than most sources, it allows the original multiplicity of standpoints to be recreated…It provides a more realistic and fair reconstruction of the past, a challenge to the established account.

The collection of oral history (or histories) requires researchers to cross the artificial boundaries between the academic institution and the world outside and also between the professional and the ordinary member of the public. The histories are the product of the interviews and are a collaborative endeavour as interviewers comes to learn from the 'subjects'. The reconstruction of the past becomes a more inclusive process and provides the potential for participants and researchers to gain from the process. The process of being asked to record their lives or experiences of certain events can provide participants with a sense of dignity and self-worth through handing on information to future generations and contributing to knowledge (Hubbard, 2000: 4). There is a power or clarity within oral testimonies that derives from the fact that only those who have experienced particular events or phenomena can truly explain what the reality was like and inform our collective understanding of the past.

2.6.2 Interviews – Semi-structured and Exploratory

The qualitative method of data collection maximises the opportunity for 'subjects' to state uniquely what they have they have experienced, to provide opinions and perceptions and to give examples and reveal attitudes (Kent, 1993). Of course, within qualitative research there are a multitude of techniques available but the interview is the most widely used because of its flexibility and its ability to produce data of depth and clarity. Specifically, the researchers' general approach was to see the interviews as both semi-structured and exploratory. In other words, each of the workers interviewed was prompted to answer a series of questions relating to the nature of work, the tasks they performed, the hazards they encountered, the workplace and the built environment, employment relations, key events and incidents that they had experienced or witnessed. The questions were grouped logically around these themes and events in order that workers could more easily follow the progression of the interview.

At the same time, this semi-structured schedule was not rigidly applied. Workers were encouraged to deviate from the structure in order to expand upon their recollections, and researchers were sensitive to workers responding in such a way as to open up new lines of inquiry. Accordingly, interviews were simultaneously exploratory and researchers 'thought on their feet' pursuing areas that had not been – indeed could not be – anticipated in advance of the interviews. In other words, as a research team we were aware of the danger of retaining too close a control over the interview which might prevent the capture of data that would broaden our understanding of the realities of working life at ICL Stockline.

Thus, we operationalised Kvale's (1983: 174) injunction to ensure that the purpose of the qualitative interview is to capture descriptions of the participant's life and to gain an understanding of the meanings they attach to particular experiences. Such a purpose can only be achieved if the participant is allowed to inform the researcher of how best such aims can best be realised. To repeat, the governing principle was that the participant is best placed to describe *their* life and explain how *they* derive meaning from a given experience. As such the researchers acted as a 'guides' rather than 'controllers', an approach consistent with the notion of the interview as an interactive process rather than a 'top down' fact gathering exercise (Anderson and Jack, 1991: 25; Bozzolli, 2002: 149).

2.7 Methods of Financial Analysis

In order to find the publicly available financial information we went to Companies House. All limited companies in the UK are registered at Companies House, an Executive Agency of the Department for Business, Enterprise and Regulatory Reform (BERR).

The main functions of Companies House are to:

- incorporate and dissolve limited companies;
- examine and store company information delivered under the Companies Act and related legislation; and
- make this information available to the public.

Our financial analysis concentrated on the financial year before the explosion, the year of the explosion and the following year (the most up to date year on record).

ICL Plastics Limited and the companies which it controlled submitted three types of reports to Companies House.

1 363s Annual Return. This typically contains the following information-
- the name of the company;
- its registered number;
- the type of company it is, for example, private or public;
- the registered office address of the company;
- the address where certain company registers are kept if not at the registered office;
- the principal business activities of the company;
- the name and address of the company secretary;
- the name, usual residential address, date of birth, nationality and business occupation of all the company's directors;
- the date to which the annual return is made-up (the made-up date).
(and if the company has share capital, the annual return must also contain:
- the nominal value of total;
- the names and addresses of shareholders and the number and type of shares they hold or transfer from other shareholders.

2 The Current Appointments Report

3 The Unaudited and Abbreviated Accounts
Abbreviated accounts of a small company must include:
- the abbreviated balance sheet and notes;

From these documents we were able to ascertain the key players involved as well as to garner limited financial information from the Balance Sheets.

2.8 Built Environment and Building Regulatory Research

Dr Stirling Howieson of the University of Strathclyde initially became involved when contacted by the BBC (Frontline Scotland). He was asked for his opinion of the structural system and whether it was possible that the building had collapsed under its own weight or the weight of the materials being stored. He was also shown the testimonies of many workers claiming that the building had been displaying several signs structural stress. It was also reported that the building had in the recent past been the subject of major alterations; it was reported that a slapping – ‘entrance‘ had occurred on the first floor to facilitate a new fork-lift loading bay. Such work would have required a Building Warrant. A search was then undertaken of both the archives held by GDC Building Control (after 1981) and the Mitchell Library (before 1981).

2.9 Conclusion and Ethical Considerations

The methods used to explore Stockline have been well documented and well tested. They provide a valid and rigorous way of researching the subject and at the same time engaging with those most affected by such incidents. As described under 2.6 above, the necessary ethical steps were taken in the study to obtain informed consent of those participating and to protect their anonymity and confidentiality.

A final comment should be made regarding the importance this study has attached to worker testimonies as a source of informed data. We concur fully with the observation made by Francis Green in an important recent study of work intensity. Green (2005: 3) argued that,

> for understanding the world of work, these informants are in an unrivalled position: they are the ones doing and experiencing the work, and for many aspects of work no other observers can generate more reliable information.

Note

"In a letter dated 9th June, 2005, HSE declined our Freedom of Information request for all HSE documentation held in relation to ICL/Stockline. The request was declined with reference to sections 30 and 31 of the Freedom of Information Act which allow for data to be withheld if legal proceedings are ongoing. Throughout the period that we researched this report we therefore had no access to HSE documentation or records of regulatory contacts with the plant. It should also be made clear that this report did not seek to influence the outcome of the criminal case against the ICL companies. Indeed, we have delayed publication of findings until the case had been concluded to avoid prejudicing the outcome of the case. This report investigates the circumstances surrounding the explosion on the 11th May 2004 from an entirely different perspective than the criminal investigation. As a comprehensive, worker-led investigation into the working conditions that were evident in the years and months leading up to the ICL/Stockline tragedy it presents evidence that take a broader sweep of the relevant management, workplace and regulatory contexts rather than the immediate criminal causes of the explosion."

Section 3 Company Structure, Workplace Profile and Employment Relations

3.1 Information about the Company from Companies House

Companies House records were searched at various times for the most up to date filings. Three types of filings (Unaudited Abbreviated Accounts, Current Appointments Report and 363s Annual Return) were analysed for each part of the company for three financial years ending 30th November 2003, 2004 and 2005. Since charges were brought against ICL Tech Limited and ICL Plastics Limited, we concentrate on those two parts of the company.

3.1.1 ICL Tech

ICL Tech Ltd is incorporated under the Companies Acts with registration Number SC54592. It was incorporated on 26th November 1973 as I.C.L. Technical Plastics Ltd, changing its name to ICL Tech Limited on 19th August 1999. The latest information available on the company from Companies House was filed in July 2006 (363s Annual Return). At that date the sole director of the company was Campbell Hetherington Downie and the Company Secretary was Lorna Grace Downie.

The 363s Annual Return Form also revealed that of the 18,002 issued shares, 15,000 (86%) were owned by ICL Plastics *Ltd*, 3,000[16] by ICL Plastics *Limited* and 2 by Campbell Downie. The two spellings of "limited" (Limited and Ltd) could be indicative of the opacity in the public information available about this company. The two different spellings seem to indicate two different companies (one owning 15,000 shares and the other 3,000 shares). Indeed the addresses given in the 363s return for each shareholder are different. ICL Plastics Ltd address is given as Grovepark Mills, Hopehill Road, Glasgow, G20 7NF and ICL Plastics Limited is given as 12 Woodside Place, Glasgow, G3 7QN. Yet a search of Companies House reveals that there is an ICL Plastics *Limited* and its registered office is 80 St Vincent Street, Glasgow G2 5UB.

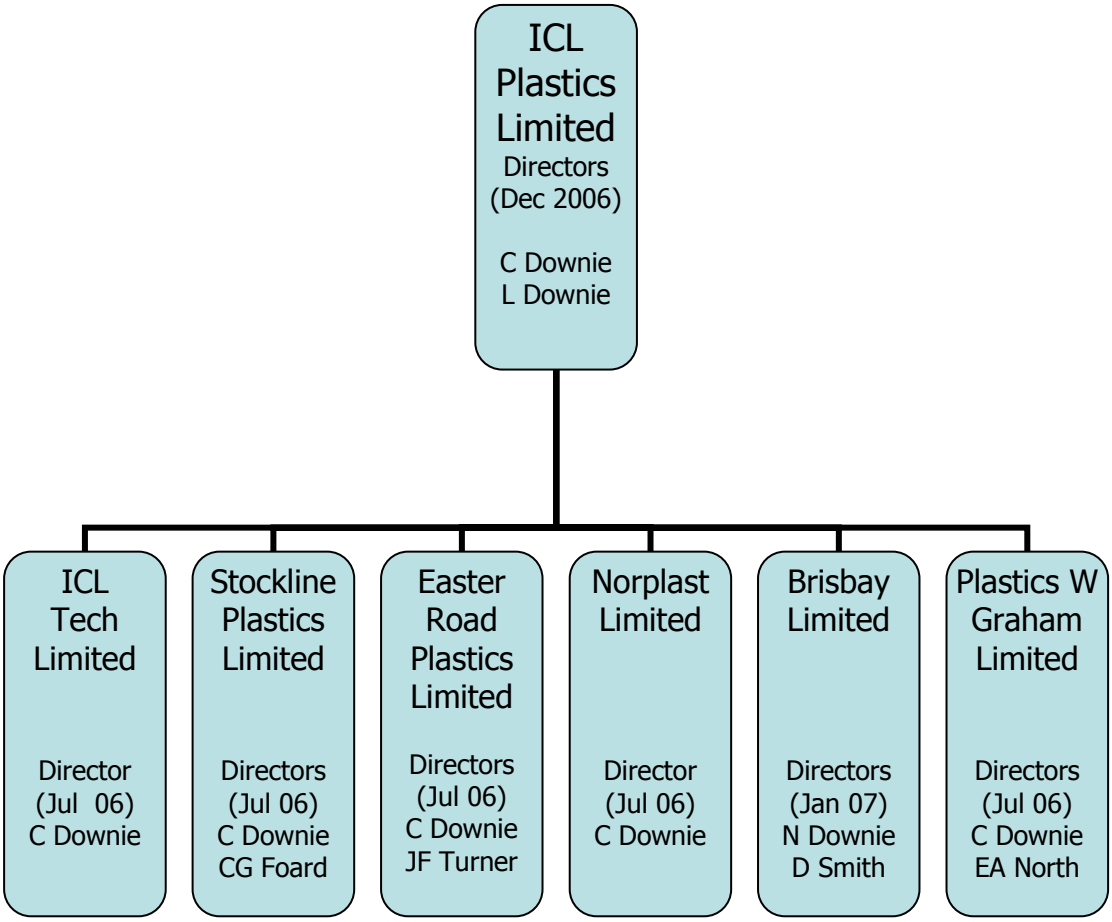
Regardless of any confusion which might be caused by the public documents, the ultimate parent company of ICL Tech Ltd is ICL Plastics Limited (see below).

The latest filed accounts of ICL Tech Limited were for the year ended 30th November 2005. These accounts state that the company is entitled to exemption from audit under Section 249A (1) of the Companies Act 1985. They also note that they are abbreviated accounts which were prepared in accordance with the special provisions of Part VII of the Companies Act 1985 relating to small companies and with the Financial Reporting Standard for Smaller Entities (effective June 2002). In short, the accounts of a company which pleaded guilty to four health and safety breaches legally produced abbreviated and unaudited accounts.

[16] These 3,000 shares had been owned by Frank Stott.

ICL Tech Ltd is part of a group of companies, whose structure can be represented by the following Diagram.

Diagram 1: Structure if the ICL Group of Companies



3.1.2 ICL Plastics

As the parent company, ICL Plastics has control over all six companies within the group including ICL Tech. ICL Plastics was incorporated on 17th November 1961 with registration number (SC36982). ICL Plastics is subject to the same charges in connection with the explosion in May 2004.

In the year to 30th November 2003, the company had four directors, Lorna Downie, Campbell Downie, Margaret Brownlie and Stewart McColl. Both Margaret Brownlie and Stewart McColl lost their lives in the disaster. In the two following years, Lorna and Campbell Downie remained the two sole directors with Lorna Campbell also acting as Company Secretary.

In the most recent return to Companies House filed December, 2006, the 363s Annual Return shows that there were 35,300[17] issued shares. The dominant shareholder is Campbell Downie who owns almost 68% of the shares. The second largest shareholder is RA Ferguson who owns the majority of the remaining shares (28%).

The most recent accounts available at Companies House for ICL Plastics Limited (for year ended 30th November 2005) are, like the accounts of ICL Tech Limited, abbreviated and unaudited. They are signed off by Campbell Downie.

While it might be argued that full annual report and accounts are fairly opaque, the information in abbreviated accounts is significantly less than their full counterparts. For example, the abbreviated accounts of ICL Plastics Limited do not contain profit and loss accounts. Moreover, ICL Plastics qualifies for exemption from preparing group accounts on the grounds that it is a small sized group. The accounts for ICL Plastics Ltd therefore refer only to the parent company and it is impossible to tell how inter-company transactions are dealt with.

It is impossible to tell from the accounts of all the companies in the group, which were prepared on an "historic cost" basis, how much the assets (land, buildings, equipment and so on) are currently worth. Some of the land potentially occupies prime real estate. In particular, the land on which Grove Park Mills was situated would have lucrative development potential.

One figure in the accounts which is stated at current value is cash. The accounts demonstrate that ICL Plastics owned significant amounts of cash.

Financial Year ended	Cash holding
30th November 2003	£897,511
30th November 2004	£455,187
30th November 2005	£749,950

The latest accounts also reveal that by the end of November 2005 "the amounts and allocations of insurance recoveries have yet to be fully specified" with respect to the event on 11 May 2004.

[17] CH Downie 23,992; JH Downie 4; NC Downie 4; RA Ferguson 10,000; JS McColl 1,300

3.1.3 Conclusions from the Financial Information

Overall there are four strong messages which can be taken from the accounts.

- The accounts are highly suggestive that Campbell Downie was in control of the whole group of companies. He was a director in the parent as well as each part of the company except Brisbay. Nicholas Downie was a director of Brisbay. In terms of ownership, Campbell Downie was the majority shareholder owning almost 68% of the shares.

- There is little doubt that the parent company was cash rich. Moreover, it owns potentially valuable land. Any suggestion that ICL was in too precarious a financial position to pay adequate compensation to the workforce, would be unethical. Moreover, it is clear from the parent company accounts that it is expecting a payout from their insurers. The likely amount of this does not appear in the accounts[18].

- In terms of documents which provide accountability and transparency to stakeholders, the accounts are poor. It is difficult to ascertain how much salary was paid to the directors. While the accounts do not show any dividends being paid to the shareholders, directors who were also shareholders could have received generous salaries, as could have the Company Secretaries.

- The issue of small company audits are raised Stuart Riddell, head of ACCA Scotland wrote[19] that audit 'is both a valuable discipline and a guarantor of good financial housekeeping internally, and the best source of comfort for external stakeholders'. It could be argued that in the case of ICL Plastics, the accounts were indeed of little comfort to stakeholders. Riddell also was concerned that 'one of the main dangers in abolishing the statutory audit is a distinctly higher risk of fraud'. While there is no suggestion of fraud in the ICL Plastics group, the case remains that a lack of auditing could leave companies open to such accusations.

[18] From the two day hearing at the High Court in Glasgow, it appears that the company received £420,000 from their insurers. This figure has not been verified by the authors.

[19] Stuart Riddell, As I See It Raising The Annual Audit Threshold Is A Mistake, The Scotsman, June 6, 2003, Friday, Pg. 27

3.2 Management Structure and Workforce Composition

The extent to which Campbell Downie exercised personal control over the parent company and its subsidiaries seems to be confirmed by the evidence presented above in Section 3.1. It seems clear also that he maintained close control over the operations of the factory. The evidence from workers' testimonies suggests that Campbell Downie attended the premises on a daily basis, walked through the workshops regularly and took most decisions of any significance regarding the operations. Indeed, Downie's remit, according to testimonies, would extend to matters such as pay determination or spending money on new equipment.

In these circumstances of Downie's highly personalised control, authority was delegated to the position of the MD, latterly Stewart McColl who, according to worker accounts, extended this apparently authoritarian managerial style to the day-to-day running of the factory. As the evidence indicates (see particularly section 3.8), management was hostile to trade unions and employment relations were characterised by an absence of consultation with the workforce on either a formal or informal basis.

Other managerial positions included Ian Mavers, who is reported as apparently having responsibility for health and safety, Nicholas Downie, Margaret Brownlie (as company secretary) and Bill Masterton (manager of the coating shop). Over 50 were employed at ICL/Stockline, a total distributed amongst the various departments and sections as follows; 12 in fabrication, 7 in coating, 2 in despatch, around a dozen in various ancillary positions and the remainder in the offices.

3.3 Layout of the Building

Grovepark Mills was a four storey building. Beneath the ground floor was a cellar or basement. Evidence from worker testimonies indicates that the basement contained the shot blasting machinery and that a large number of steel supports (ACRO props) were situated here (see section 7.4). The following diagrams (not to scale) of the other floors were created in the course of the risk-mapping exercise on the basis of information provided by ex-workers. In this section, we provide brief descriptions of each of the floors – what they housed and their activities – while detailed consideration of their potential hazards is considered in below (Section 4.5). The ground floor and its annex contained many processes and much machinery including the fabrication sections, coating shop, compressor room, shot blasters, electric and gas ovens, pallet and powder storage, gas tanks, heaters, various offices and dispatch.

Diagram 2: Ground Floor

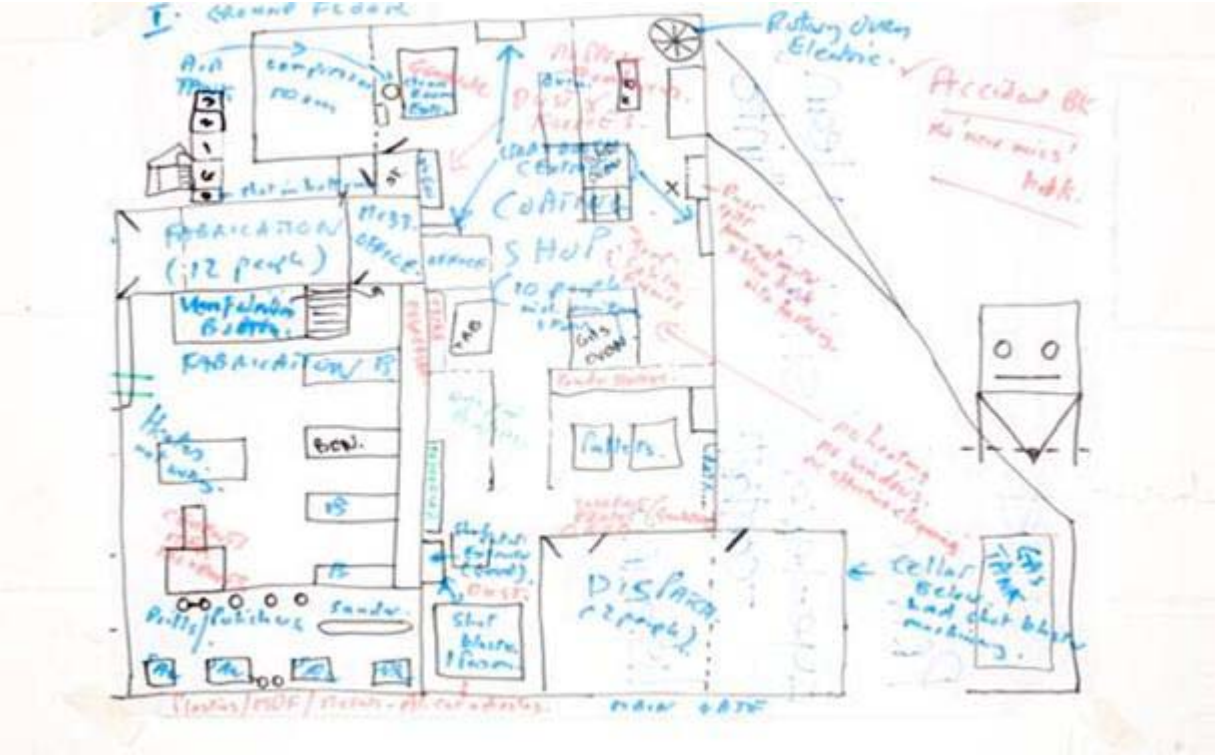
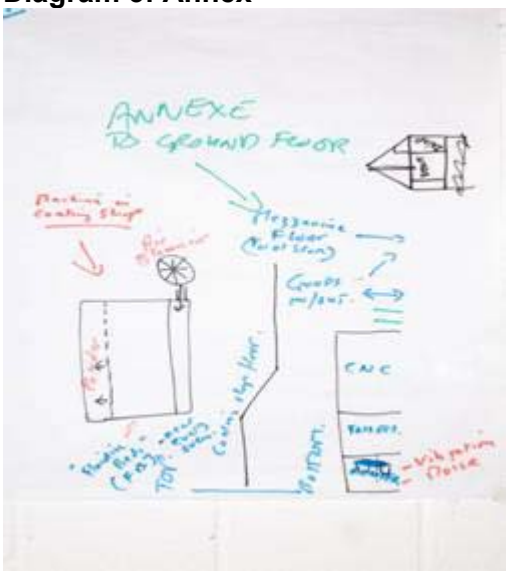


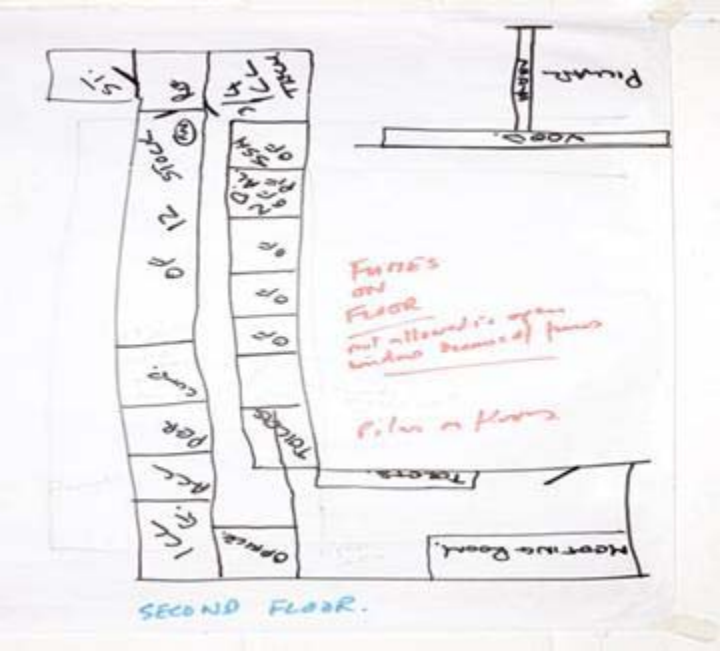
Diagram 3: Annex



The first floor contained a variety of store rooms, racks, pallets, lockers, tools, forklift trucks, CNC milling machines, ovens, a canteen, a sink, toilets, an additional room with a second lathe and grinding and milling equipment.

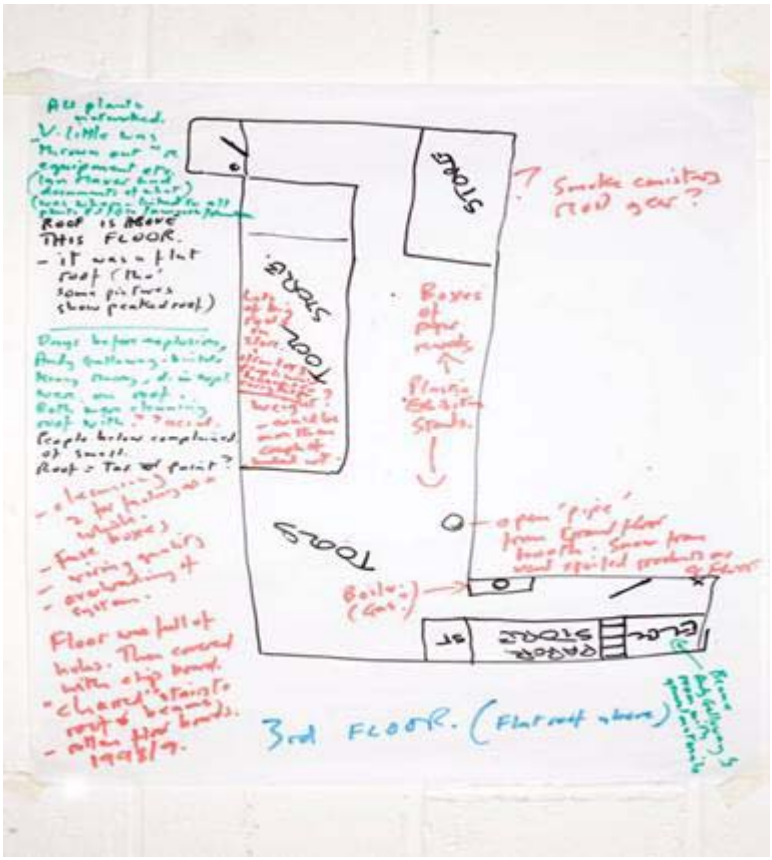
Diagram 4: First Floor

Diagram 5: Second Floor



The second floor contained the general offices of ICL and Stockline, the personnel offices, accounts, computer rooms, storage space, toilets, a meeting room and a large open area. The third floor housed more storage areas - including more tools – a paper store, plastic exhibition stands and paper records. At one time there used to be an electrician's room on this floor which then became a store room for Andy Galloway's materials. A gas boiler was also situated on this floor. Above this floor there was a flat roof.

Diagram 6: Third Floor



3.4 Manufacturing Processes

Academic studies have attempted to classify small and medium sized firms according to various criteria. Following Scott et al's (1989) classification, ICL/Stockline undoubtedly falls within the 'low technology' category which, as the authors emphasise, follows a relatively predictable pattern of low wages and few opportunities for the development of employees. There was a consensus amongst the workers that the principles driving management priorities were two-fold - the minimisation of costs and the maximisation of profits. As one worker expressed succinctly,

> They were looking to get the production out as quickly as possible and as soon as possible, no matter at what cost. (W1)

3.4.1 Fabrication

Fabrication took place in what the workers describes as an annexe, or attachment on the side of the old building. Fabrication consisted of batch production of variable volume, ranging from the most common small runs lasting only a few hours or over a day, to the infrequent larger quantities lasting several days or weeks. Variability could mean that orders could be repeats or alternately could involve one-off products. In the words of one fabrication worker,

> Generally, it was all different things. You could be working with different materials, anything from a tank for a fire brigade, for the inside of a fire engine to some wee, tiny things, you know, like a cassette case. There wasn't a single product. It was really just whatever the customer was looking for. We did thousands of different things (W2).

The consequence of this dominant pattern of short batch production was that workers usually did not know from day to day what they would be working on.

> The products changed on a daily basis; you could be doing machine guards one day, sheets the next, stuff for Marconi and GEC. You could even be doing half a dozen different things even in the one day. It was not very often that we did high volume stuff. We did work for hospitals, the oil industry, the computer industry, the car industry. We were making safety guards for machines in other industries, which was a bit of a joke, when there were no guards on some of our machines! (W2)

Characterised by these jobbing production methods company policy at ICL/Stockline, in common with many small firms, appeared to involve taking all the work that was offered, irrespective of whether the production system could cope with the demands. In this sense, the outcome was that ICL/Stockline approximated Lawlor's (1988) depiction of this type of undertaking, as a 'do-it-all plant which satisfied no strategy'.

Around a dozen worked in the main fabrication area on the one shift, from 8am to 5pm. A couple more were attached to fabrication worked in an outbuilding where there was a vacuum forming machine and a CNC router.

The fabrication process began with sheets of plastic material, which were either cut to the required size or remained a full sheet of dimensions such as 10x6 or 8x4. These sheets would then be worked upon in various ways - sawed to a specified size, placed in an oven to format, machined, cemented or welded together – depending on the particular material and the nature of the product. Other cutting processes took place in the fabrication section, including the cutting of MDF. Chemicals were used to bond, or cement, pieces together. It was not just in the coating shop that ovens were used. In fabrication, electric ovens were employed to finish off the product.

3.4.2 Coating

Six were employed in the coating department, in which a number of specific processes took place. First, incoming parts would be blasted with fine aluminium powder, prior to being dip-coated. Second, the parts would be degreased using a chemical whose proprietary name is Genklene (Trichlorethane). Third, products would be coated. Fourth, they would be cooked in gas ovens to harden.

One long-serving coating shop worker described some of these processes in his section of the factory.

> [The material coming in] has to be degreased. What happens is that it gets cleaned, and if needed you shot blast them. The blasting machine has got two arms. You put rubber gloves on, and you put your hands in the two holes, hold the hose and look through a window at the part. You press foot pedals and the shot comes out at high pressure. You've got to hold on to the hose or it's away. And then you turn the part over and whack everything you see. Once you've done that you open the door, the dust hits your face, you take the part out and see if it is all blasted. If it is then you blow it down with high pressure air to get all the shot off it because you can't coat it when it's full of shot. (W3)

> Once you get the parts shot blasted, you need to put them in the oven to heat them up, you can't spray them cold. You would heat them up to a certain temperature and then you would have this wee box that took the temperature of the part. It has got to be spot on to spray it because if it is too cold you will get runs on it and if it is too warm it will burn…when it came to the right temperature, you took the tray with the parts on them to your spray booth, put in on a pedestal and turned the thing so you could spray the whole lot. [You would spray] standing at a booth, with an extractor in that booth. (W3)

3.4.3 Despatch

A small department of two workers was responsible for examining materials that came into the factory, checking specifications, colour, size, thickness etc. This department was also concerned with sending out parts that were to be subcontracted, and then having these parts uplifted and returned to the factory. These tasks were combined with the general housekeeping of the stores areas.

3.5 Employment Relations at ICL/Stockline

The absence of consultation - whether formal or informal - with the workforce over health and safety issues appears to have been a reflection of the wider industrial relations practices. The conclusions, that the management style was highly autocratic and that the overall character of industrial relations stemmed from the legacy of personal ownership and control by Campbell Downie, seem inescapable. Although it seems clear that the Downies did divest authority to the Managing Director, who was responsible for the day-to-day running of the establishment, it would be mistaken to regard the MD as having significant autonomy. Ultimately, the style and substance of decision making, and the exercise of authority, appears to have rested with the Downie family.

The consequence was a mode of unilateral workforce management that permitted no employee voice, let alone consultation, to say nothing of formalised negotiation. Employees provided numerous examples of this managerial style.

> If you went to Personnel, which is supposed to be personal right, the way you had to do it was if you left fabrication you went up onto the first floor to fabrication and you went up two flights of stairs, you walked along a wee corridor, maybe 10 yards, you went into Personnel. You would speak to Personnel and tell them whatever was wrong, or what you weren't happy with. So you would say, 'Cheerio, I'm away downstairs'. When you got to the fabrication door, they would be standing waiting for you coming down to send you back up to Stewart McColl's office because you had been in and complained about something. (W4).

ICL/Stockline: An Example of Management's Authoritarian Style

> [A manager] died. Now he had been at my partner's funeral and when he died I took a white shirt and a black tie in to go to his funeral that day and I was getting ready to go and Stewart McColl's secretary came in and said to me 'You're not going to Colin's funeral'. I said, 'What are you talking about? I have brought a white shirt and black tie in, [The deceased manager] was at my wife's funeral. I'm going to respect him for being there'. I lost the rag with her and started shouting…she went back up the stair and told Stewart McColl. Stewart McColl said 'Up the stair'. I went up the stair and there's Bill Masterton who didn't know what to say, you know, he is sitting there and the secretary is sitting there and I'm sitting in front of him. 'Who told you about [the manager's] funeral? I said, well he went to my wife's funeral, I thought I could go and pay my respects to him because I knew him well'. 'No, we need you for production, Bill Masterton is going and [another worker] is going, you're not going'.

> I says, 'Well, I think you're out of order Stewart' and he basically said, 'No, you're out of order' and he said 'That's my decision, you're not going'. I had to get up and walk out. I took a grievance against him. I didn't like him for what he done to me. And they all went to the funeral and they all came back in. I had words with Stewart again. I said, 'I don't think that was very fair what you done with me'. 'Aye, but production comes first' [McColl replied]. I said, 'But a colleague died and we were all talking about it in the work. What Stewart should have done was shut the factory down for a few hours, hired a bus and took us to his funeral and then all went back to work again, happy we had been to his funeral and paid our respects. (W5)

3.6 Cost Minimisation and Labour Utilisation

Clearly, cost minimisation was a central underlying imperative linking the production process, market niche, managerial style and labour utilisation. In terms of the latter, ICL/Stockline attempted to introduce job rotation, a form of what is known as functional flexibility, in order to contain labour costs.

> Stewart McColl told Bill Masterton, the manager of the coating shop, that he wanted everybody trained to do everything so if anybody was off on holiday or off sick somebody else could step in and do all the jobs. So I started spraying [which hadn't been my job]. (W1)

Workers reported increasing pressure on them to complete production, which they believed was the company's specific response to an increasingly competitive marketplace. This pressure took the form of injunctions by the Managing Director to work more efficiently.

> There was a push by Stewart McColl…He kept going on about the European market and how hard it was to keep the customers happy [and that] we were only there to work (W1).

Apart from exhortations to increase effort, workers faced increased monitoring in the attempt to raise productivity. Each was given a sheet on which they were to enter the time taken to complete a job, which then provided Stewart McColl with the necessary data to challenge individual workers. This represented a move towards intensification and an increase in formal control, replacing some of the more informal practices that had previously governed labour utilisation. Hitherto, as long as production targets had been met, it was not considered necessary to micromanage worker output. Of course, this is not to underestimate the degree of hierarchical compulsion and exercise of unilateral authority that had always been a part of employee relations, but is to emphasise that the prevailing ethos of 'just get on with it', reinforced by the authoritative culture, had been sufficient to achieve desired levels of output.

3.7 Determination of Pay and Terms and Conditions

Concomitant with the unitarist philosophy that underlay employee relations, were an individualism and unilateralism that underpinned managerial policy and practice in the area of pay and rewards. There were no procedures for raising pay, nor for deciding who would receive bonuses, nor for the level at which additional payments would be set. Workers complained of heavy-handedness, arbitrariness and favouritism by management in questions of pay determination.

At the global policy and financial level Downie appeared to exercise total control. At an operational level authority for the day-to-day running of the factory was delegated to the Managing Director, although even here Downie was heavily involved in operational matters. Workers recalled a meeting at which management communicated their intentions on pay.

> Stewart McColl came down one afternoon…with a sidekick who sat in the background while he more or less preached. We were down below and he was at the top of the stairs, and was giving the big man talk, 'There'll be this and that'. (W1)
> There were conditions attached to a pay rise. Work harder, and 'you must agree to do a certain amount of overtime a year' and all that. (W5)

On occasions, individual workers would approach managers to request a pay increase, although some perceived this as a pointless exercise given workers' perceived powerlessness in the face of an inflexible management.

> If you had the balls to ask for a pay rise you would go for it but you would know the answer anyway. It was irrelevant. I don't think [the pay rise you received] was about the work you were doing. I think if they liked you and you didn't cause any problems you got something. If you were a problem you got nothing. (W1)

There was no structured engagement with the workforce in the form of consultation, nor any agreed annual pay date when pay would be reviewed or increased. One worker recalled the time when,

> Stewart McColl came down himself and he took us all individually into Bill's office and he said, 'Right, I'm reviewing the pay rises, blah, blah, blah and this is what I am intending to give you. Do you agree with it? I replied 'But I have got terms and conditions here'. He said, 'You work harder and you try and do production quicker and you will work so many hours overtime a year'. And I disagreed with him on that and said, 'I can't do overtime [because of domestic circumstances] which would mean being out of the house from 7 in the morning till 8 o'clock at night. (W5)

Bonuses were discretionary and, similar to the awarding of pay increases, reflected favouritism and capriciousness on the part of management.

> When it came to Xmas there would maybe be a bonus. It would cause friction because he [McColl] would give a bonus to some folk and not to others and the people he would cut were the people he didn't like. It was paid into your wages and the amount of bonus people got was different. He was the man who would sign, it was at his discretion. Again it was bully tactics. (W5)
>
> It was like, 'You do it my way or you don't do it at all'. That was the way I thought Stewart was working. And if you have not got a trade union what can you do? (W1)

The pay of new starts was just above the national minimum wage, but the highest paid manufacturing worker was reputed to earn £9.00 per hour gross. Workers could not be certain of the exact levels of pay of their fellow employees, largely because of the lack of transparency and openness in the method of pay determination. However, according to the testimonies, most workers were closer to the bottom of the range than the top, and for some this was not due to the fact that they were new starts, but because of arbitrariness on the part of management.

> …if you were in favour you got a higher amount…I never got a week's rise since Stewart McColl came to the place (W2).
>
> Neither did I. (W4)

Workers also reported a reduction over time in the amount of money workers could earn through bonuses. Evidently, bonuses, historically, had formed a sizable proportion of workers' pay packets. However, it was reported that during the period when Peter Marshall was Managing Director of ICL Tech the practice of paying relatively generous bonuses ceased. Some workers detected a Machiavellian motive in his appointment.

> It changed you know, that was one of the big things. Peter Marshall was the MD, he was only there for two years and I think it was calculated. I really do think he was brought in as an excuse to chop and change and it was during this time that the bonuses went. He tried to change our hours. He tried to do all sorts of different things. And then they said, 'We had to get rid of him' and they made out that he was wrecking the place…Peter Marshall was put there to do us, right. He was just a puppet that was controlled by Campbell Downie and the rest of them. Peter Marshall could make no decisions about anything. He couldn't buy anything. He couldn't do anything. So he was just there to come up with this master plan that was going to go wrong and they would jump up and say, 'Look we can't see any of your bonuses, we can't see any wage rise and we are really, really sorry, but it's all his fault and we'll get rid of him'. (W4)

Symptomatic of the company's preoccupation with minimising labour costs was the decision taken to reduce holiday entitlement. Ironically, the trigger was the introduction to UK employment law of the European Working Time Directive in 1998. The principle underlying the regulations in respect of holidays was that they would provide workers with a minimum allowance that, in practice, would lead to an increase in time-off in those cases of poorest provision. One worker recalled,

> See when the holiday thing came out – you must get a minimum of 20 days holiday a year – we were actually getting 28 days and they started cutting it to 20 days…They gave us this form to sign, and I refused to sign it. I said, 'I don't get 20 holidays a year, I get 28 days', and I gave it back. So he then came up with a draft that was even worse'. (W2)

In fact, management's interpretation, that these regulations could be used to dilute employees' existing holiday entitlement, was mistaken. Section 7 of the regulations explicitly states the following,

> This entitlement is not in addition to any annual leave given to a worker under an employment contract. One is set off against the other, so that the amount of leave a worker gets is whichever of the two kinds of leave is longer. (Accessed at http://www.dti.gov.uk/er/work_time_regs/wtr7.htm#section7)

In short, to reduce holiday leave entitlement from the provision laid out in an existing contract is contrary to the Working Time Regulations. According to workers, this mistaken interpretation of an important aspect of a new set of regulations was not a one-off, but a reflection of a more general lack of competence in, and understanding of, employment law and appropriate procedures.

> Lorna [Downie] just did not have a clue about any sort of rules and regulations regarding employment. She would tell you a pack of lies. (W2)

3.8 Company Attitudes to Trade Unionism

The fact that no trade union exists at ICL/Stockline is the outcome of several factors. The most salient of these is not so much the lack of support for trade unionism by the workers, but rather the company's overt opposition to any form of collective employee organisation. It was reported by longer-serving employees that attempts had been made several years previously to form a trade union in the plant.

> And the MD at the time, Frank Stott, said more or less that if it ever happened whoever was responsible would not be there for long. Something along those lines…(W4)

Employees contended that this deep-rooted managerial antipathy to trade unionism had been sustained over many years by senior management. When asked the question whether ICL Stockline was non-union simply because no union had ever been formed, or anti-union, the consensus among the workers interviewed was that it was the latter. For example, as this worker graphically explained, anti-unionism was inextricably related to the autocratic and highly personalised form of management.

> Anti-union. Stewart McColl was anti-everything. It was him. He was the most important thing to him. He was everybody. He was the lawyer, jury and judge. He was the lot. He told you what he done. He made the verdict. (W4)

A number of the interviewees understood that there was a close relationship between the failure of management to respond to workers' concerns and the absence of trade unionism. For example, one expressed the following view.

> I don't know whether it was because there was no trade union in the place, you couldn't complain to a trade union, you know what I mean. And basically, if you complained up the stair they would say 'Just get on with it'. You were basically scared to complain because you got bullied. (W5)

Section 4 Hazards at ICL/Stockline

This section reports on the hazards associated with the plastics industry in general and the hazards workers were exposed to at the ICL/Stockline Maryhill factory in particular. The substances and materials used by ICL/Stockline and workers' experiences of exposures to those substance and materials will be considered in detail.

4.1 Hazards in the Plastics Industry

Plastics production covers 'resin manufacture, plastic processing and combustion' (Lewis in Ladou 1997:514). By 1977, the United States National Institute of Occupational Safety and Health (NIOSH) guide to occupational diseases included dozens of references to the adverse health effects of the plastics industry. The health hazards facing plastics workers have been recognised for several decades and have included skin, neurological and respiratory problems (PRI, 1980; Tosti 1993; Lewis 1999; Wong 1999). In addition to chemical hazards, plastics workers often face other dust hazards, noise and vibration hazards, hot and cold working conditions, transport and manual handling hazards, machinery hazards and poor welfare arrangements.

Chronic bronchitis in workers exposed to plastics compounds such as isocyanates and phenolics has been well established as has exposure to hepatotoxic chemicals and non-specific central nervous system effects linked to organic solvent exposure (Levy and Wegman 1995:273,453,593). High occupational asthma rates have also been widely recognised in the UK for plastics making and processing and for those exposed to isocyanates (O'Neill 1995: 111). Others have noted that solvents such as trichloroethylene and methyl methacrylate, widely used in the plastics industry, have caused peripheral neuropathy (Markowtiz in Rosenstock and Cullen 1994: 495,787). There has been some debate about the possible carcinogenicity of methyl methacrylate, especially colo-rectal cancer, which was downplayed by an ICI study (Tomenson 2005).

The various chemicals and processes – with over 50 different forms of plastics produced into the 1990s- used in the industry, both for thermoset (TS) and thermoplastic products (TP), have caused a wide range of diseases (Greenberg 1997: 373-376). However, determining which plastics, additives and breakdown products - and in what combinations and in what processes and conditions – caused particular adverse effects in plastics workers has often proved far more challenging. The production of effective engineering controls to prevent worker exposure to such chemicals has also proved highly problematic.

ICL/Stockline made vacuum moulded products by cutting, moulding and finishing sheet plastic. The last stage involved solvent use. Stockline used TP and TS materials and several additives. Peroxides, used as hardeners, can cause skin irritation and MEK peroxide was used at ICL/Stockline. In addition several types of curing agent were apparently used at ICL/Stockline.

Flame retardants used in plastics present a different set of risks as do filler and pigments. Isocyanates used in polyurethane and other polymer manufacture have long been recognised as very serious sensitisers and causes of occupational asthma at very low exposure levels indeed and some, like TDI and TDA are now classified as carcinogens. MDI, a potent asthmagen, was apparently used at ICL/Stockline. Polymer plastics that are methacrylate-based may cause sensitisation and are powerful irritants to eyes, skin and mucous membrane. Methyl methacrylate was used at ICL/Stockline. As early as 1976, internationally used toxicology guides were pointing out the hazards of this chemical and indicating preventive measures should include chemical cartridge respirators (Plunkett, 1976:273). Epoxy resins, also used at the plant, were well known sensitisers, and suspect carcinogens. Styrene, a major solvent and monomer in the plastics industry was present in commercial products used at the plant too. Styrene affects the CNS, can cause dermatitis and is also known to be genotoxic. By 1997, occupational health professionals had documented a wide range of chemical and physical hazards attached to materials, processes and machinery in the plastics industry. One occupational doctor noted in the 1990s that,

> …workers this industry face many health hazards and require proper medical surveillance and workplace controls. Specific engineering controls that are needed include adequate ventilation and exhaust systems with regular air monitoring and properly fitted personal protective equipment. (Greenberg, 1997:376).

From the accounts provided to us by the ex-Stockline workers and the evidence encapsulated in HSE correspondence and statutory notices, it is difficult to identify such measures in force, year on year, in the ICL/Stockline plant at Maryhill.

4.2 Stockline 'Plastics'

The most comprehensive independent data about what substances were used in ICL/Stockline, how they were used and with what engineering controls and personal protective equipment (PPE) should lie with HSE audits of the plant. The lack of availability of this data is partly due to the apparent destruction of the company records in the disaster. In addition, the HSE declined to disclose information about the plant whilst the investigation of the causes of the multiple fatalities and related legal actions were under consideration. It is not possible to ascertain with any certainty exactly what exposure levels to what substances occurred in the plant. Where there were engineering controls in the plant, again data do not exist over several years to establish how effective or ineffective those controls were. We do, however, possess the worker accounts of the state of the engineering controls and some reports from HSE indicate where, at a particular moment in time, ventilation systems were or were not in place and operating.

Many of the chemicals used at ICL/Stockline presented potentially serious threats to human health. As early as 1983, EU guides indicated that those working with dichloromethane (methylene chloride), used at ICL/Stockline, should have a complete medical history taken and examination conducted to ensure employees did not have pre-existing conditions that might be aggravated by exposure to this chemical. Hazards in September 1986 flagged the possible carcinogenicity and other effects of this chemical. (Similar undertakings were specified for isocyanates also present at ICL/Stockline). Such tests for dichloromethane would include liver function and nerve conduction tests. This should be followed by at least yearly medical examinations (Roi, 1983:55-56). Similar medical exams were advocated for those working with styrene and trichloroethylene, again both present at Stockline, in terms of CNS system, skin, blood, liver and kidneys. Selection of safe or less hazardous substances, use of effective, well sited and maintained and inspected engineering controls, enclosure of hazardous substances and processes, availability of effective, well maintained, well fitted and carefully stored PPE all form part of the HSE's sound hierarchy of decision-making to control, substances hazardous to health under COSHH and related health and safety legislation.

At ICL/Stockline, known highly hazardous substances, materials and processes were used and former employees provided accounts that indicate, in many different respects, such substances at various times were not controlled at all by engineering methods. Indeed in several instances, there was no extraction or proper local exhaust ventilation systems available. Later visits by HSE inspectors reveal that enclosure of some dangerous processes to prevent exposure to fumes and dust were entirely absent as evidenced by HSE requirements for such enclosures to be introduced. In several instances also, workers were initially provided with no protective equipment and later only with masks or gloves but not apparently with associated information, instruction, training and supervision to make sense of the decision to purchase and use such PPE in a suitable manner. There is also, from an external health and safety professional perspective, little sign in the accounts provided of a systematic approach to health and safety within the plant. We have seen no health and safety manuals, no group or plant specific safety policies, and no technical guidance that allow us to assess how effective the control of substances hazardous to health was in the plant from the 1970s onwards, notwithstanding attempts by the research team to obtain them.

What we do have are some data sheets held by the company or available from manufacturers and suppliers indicating a range of hazardous substances which could present a range of acute and chronic, short-term and long-term adverse effects to those exposed to them. We also have an extensive set of accounts from former workers who list a wide range of signs and symptoms that they experienced when operating various production processes and when exposed to a range of dusts and fumes often in hot and very poorly ventilated workrooms. Workers also reported the presence of asbestos in the building and in manufacturing. The following segment of a discussion between two workers identifies one particular colleague as responsible for cutting asbestos.

> They would send 'Big x' up the roof, up to the top flat to get asbestos. Mind that? (W2)
>
> Aye, cutting asbestos strips up there. Used to send x up to do it. (W4)
>
> Used to send big x up there. (W2) Everyone else told him where to go. (W4)
>
> X used to go up with his bottle of Irn Bru, his alarm clock and his book. And the reason he did that was he knew nobody would go up there. (W2)
>
> But the thing was, see when they were doing that asbestos up there the floor in the top flat was full of holes and you could actually look down the holes and see the people working below you. Seriously! (W4)

This reported use of asbestos raises fundamental questions regarding ICL/Stockline's health and safety practices. Furthermore, as this section will detail, there is particularly serious evidence of acute asbestos exposures in the coating process.

In a plant such as this, it clear that potential exposures to diverse combinations of substances associated with a wide range of health effects could have been inhaled, ingested or absorbed by production workers. The nature of the often strenuous work activities and high temperatures may have led to particularly high inhalation of fumes and dust and possibly greater than expected skin absorption of some substances or mixtures of substances.

In addition, we have evidence from workers' testimonies of a range of serious injuries that occurred in the plant as a result of health and safety incidents in the plant over the years. From the evidence in the interviews, it appears that over a decade or more, at least 13 employees were admitted to the Western Infirmary for emergency treatment and at least 6 people were off with accidents for three days or more; one being off for around a year.

4.3 Substances and Materials

Glasgow Technical Services produced a report on the site of the factory immediately after the disaster and listed the chemicals and materials that they could identify on site at that time. The table below is based on the Glasgow list, correspondence between HSE and other parties prior to the major incident and information received from several ex-employees.

The conditions of use of the substances in this list appear to have varied considerably over the many years of the plant's existence. Elsewhere in this section are details of the health and safety systems at the plant and the working practices that prevailed with regard to using many of the materials in this list. The working practices, the engineering control measures, the training and supervision of operators and the availability and use of PPE including RPE that were used in the plant do not, according to observations of former employees always tally with the directions laid down in the data sheets and apparently reported by the company to agencies such as the HSE in their later visits.

Table 1: Substances used at ICL Stockline or those to which ICL Stockline workers at Maryhill could have been exposed

Substance	**Trade/other Name**	**TLV/OES/ MEL**	**Adverse effects** **1. data sheet/label** **2. Tox ref** **3. HSE**
asbestos – chrysotile		Various	Known to cause lung diseases and several types of cancer.
1-butanol	Found in Canadian Rilprim 2002	Canadian TLV 2002 = 20ppm	See Rilprim appendix below. Recognised at acutely toxic and irritant (Gosselin 1984)
Calor gas		No specific TLV	Explosive
Diaminodiphenyl methylene diamine			
Dibutylphthalate		1978, 1985, 1991 UK TLV: TWA = 5m/m^3 STEL = 10mg/m^3	Known since at least 1980s to be an irritant to nasal passages, upper respiratory tract, stomach Incompatible with nitrates, strong oxidisers, alkalies and acids. ACGIH TLVs 1999 noted reproductive effects. This is a synthetic oestrogen
Dichloromethane or Methylene chloride		1978,1984, 1991 UK TLV: TWA = 200ppm STEL = 250ppm	By 1980s well known that high levels of inhalation lead to sleepiness and light headedness. Ingestion led to numbness in limbs and tingling and skin contact led to irritation, vertigo, worsens angina. Affects CNS, CVS, eyes and skin. 1983 Roi. Mutagen and suspected animal carcinogen
n-n Dioxyethyl p-toludin	Bayer product		
Diphenyl-methane			ICF TLVs 1975 noted that the effects of this chemical were not known but not believed to be hazardous because it was not volatile
Diphenyl-methylene-diisocyanate			

Substance	Trade/other Name	TLV/OES/ MEL	Adverse effects 1. data sheet/label 2. Tox ref 3. HSE
2-ethoxyethanol	Found in Canadian Rilprim 2002. This is an ethylene glycol ether	Canadian TLV 2002 = 5ppm (skin)	See Rilprim appendix below. NIOSH in 1977 listed acute and systemic effects of this chemical including liver and kidney damage and fatigue, lethargy, headaches, nausea, anorexia, tremor and anaemia. Acute toxicity hazard. Affects CNS and kidneys, absorbed through skin (Gosselin1984). Adverse reproductive effects
Formaldehyde	Present in MDF		IARC human carcinogen. Irritant to eyes, nose, throat, cough, bronchial spasms, nausea, vomiting. Asthmagen
Furfural alcohol		1978 and 1985 UK TLV: TWA = 5pm STEL = 10m (STEL in UK in 1986 recommended to be increased to 15ppm as it was. 1991 - 15ppm also)	Known since at least 1980s to cause, by inhalation, dizziness and nausea. Diarrhoea and vomiting and by skin contact depression. Irritant (ACGIH 1999). Respiratory hazard. High toxicity rating. CNS effects. Dermatitis. Severe bronchitis.
MDF			Contains wood dust and formaldehyde: both IARC carcinogens. Offgassing of formaldehyde has also been reported to cause respiratory problems not only in MDF manufacturing workers but also workers storing and cutting MDF
Methylated spirits			
Methylethyl ketone	Butan-2-one	1985 and 1991 UK TLV TWA = 200ppm STEL = 300ppm	Irritation and CNS effects(ACGIH 1999)

Substance	**Trade/other Name**	**TLV/OES/ MEL**	**Adverse effects** **1. data sheet/label** **2. Tox ref** **3. HSE**
Methyl ethyl ketone peroxide	2-butanone peroxide, MEK peroxide	NIOSH 2005 0.2ppm 1978 and 1985 UK TLV: TWA = 0.2ppm STEL = 0.2ppm (1991 no TWA given)	toxic to eyes, skin, respiratory system, liver kidneys. May cause cough, throat irritation, blurred vision, blisters, scars, abdominal pain, vomiting, diarrhoea. Irritation and CNS (ACGIH 1999)
Methyl isobutyl ketone	Found in Canadian Rilprim 2002	Canadian TLV 50ppm	See Rilprim appendix below
Methyl methacrylate		1978 ,1985, 1991 UK TLV: TWA = 100pp STEL = 125ppm	Irritation and dermatitis (ACGIH 1999)
2-methyl -1-propanol	Present in Canadian Rilprim P23 V40	2002 Canadian TLV = 50ppm	See Rilprim appendix below
Monopropylene glycol		No specific TLV. Little research is available on this chemical	
Paint		No specific TLV	Painters are exposed to a range of neurotoxic and carcinogenic chemicals
Petroleum naptha	Heavy aromatic in Canadian Rilprim 2002	Canadian 2002 TLV = 10ppm	See Rilprim appendix below
Petroleum distillate	Gasoline	No specific TLV. US ACGIH 1999 TWA – 300ppm STEL – 500ppm	Irritation an CNS effects (ACGIH 1999)

Substance	**Trade/other Name**	**TLV/OES/ MEL**	**Adverse effects** **1. data sheet/label** **2. Tox ref** **3. HSE**
Poly-tetrafluoroethylene	PTFE	1978 UK TLV: Decomposition products. No TLV but airborne levels should be minimal 1985, 1991 UK No TLV	Pulmonary oedema (ACGIH 1999) 1997 USA National Toxicology Programme reported evidence of animal carcinogenicity in PTFE exposures.
Propane			Explosive gas
Styrene	Present in Tensol 70	Australian NOSHC TLV 1985 TWA – 50ppm STEL – 100ppm ACGIH 50ppm 2004 data sheets onTensol recommend RPE vapour cartridge	NIOSH 1985 classify as hazardous. Affects CNS, respiratory system, eyes and skin. May affect gait, cause drowsiness. See Tensol entry in appendix
Synthetic resin	Polyester resin	No specific TLV. 2004. Australian NOSHC dust TLV TWA = 10mg/m^3.	
Talc	Present in Tensol 70 2004	Australian NOSHC TLV 2004 TWA = 2.5mg/m^3.	Respiratory hazard
Tetrachloroethylene	Perchloro-ethylene	OSHA TWA 100ppm 1978 ,1985, 1991 UK TLV: TWA = 100pp. STEL = 150ppm	By inhalation, irritant to nose and throat, by ingestion causes nausea, flushing face and neck, by skin contact causes vertigo, dizziness, incoherence Can damage liver, kidneys, CNS. Evidence of carcinogenicity (NIOSH 1988). Irritation and CNS (ACGIH 1999)

Substance	**Trade/other Name**	**TLV/OES/ MEL**	**Adverse effects** **1. data sheet/label** **2. Tox ref** **3. HSE**
Tetrahydrofuran (THF)		200pm in USA late 1980s 1978 ,1985, 1991 UK TLV: TWA = 200pp STEL = 250ppm	MSDS. Flammable. Precautionary measures needed against static discharges. Irritant, narcotic effects can cause kidney or liver damage. Harmful by inhalation, ingestion and skin absorption glasses, nitrile gloves, effective ventilation needed. Irritation and narcosis (ACGIH 1999)
p-toluene sulphonic acid solution	Johnburn product		
1,1,1- trichloroethane	Genklene or methyl chloroform	USA.: TLV: 350 ppm; 1910 mg/m3 (as TWA); 450 ppm; 2460 mg/m3 (as STEL) (ACGIH 1994-1995).	Ataxia. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness. Dry skin. Redness. May affect heart and CNS and cause chronic liver damage
Trichloroethylene	Trike	USA TLV 1985 ACGIH 50ppm	Dizziness, drowsiness, headache, weakness, nausea. Affects respiratory system, heart, liver, kidneys, CNS and skin. Listed as an animal liver and kidney carcinogen
Wood dust			Both soft and hard woods listed as carcinogens by IARC

(NB Substances italicised in bold relate to chemical active ingredients found in commercial products reportedly used at ICL/Stockline)

Table 2: Carcinogens

Substance	Cancer site
Asbestos – chrysotile	Lung cancer, mesothelioma, kidney . IARC Group 1. Known human carcinogen
Dichloromethane	Lung, liver. IARC 2b carcinogen – inadequate evidence of human cancers.
Diesel exhaust	IARC Group 2A. probable human
Perchloroethylene	Oesphagus, lymphoma. IARC Group 2A. probable human
Petroleum distillate	Kidney, leukaemia (linked to benzene). IARC 2b carcinogen – inadequate evidence of human cancers.
PTFE	
Styrene – styrene oxide	IARC Group 2A. probable human
Trichloroethylene	Liver , lymphoma. IARC Group 2A. probable human
Welding fumes	Lung related to nickel, cadmium, chromium. IARC 2b carcinogen – inadequate evidence of human cancers.
Wood dust – soft and hard	Nasal cancer

Sources.

International Agency For Research on Cancer. List of Carcinogens. IARC, Lyons, France.

Rugo in Ladou J (ed) (2004) Occupational and Environmental Medicine. 4th ed. Appleton Lange . Connecticut. Pp224-261.

Table 3: Reproductive health hazards of substances reportedly used at ICL/Stockline

Substance	Evidence of Reproductive effects (F=female;M=male effects)
Acrylates	Inconclusive
Carbon monoxide	Miscarriages, low birth weight babies (F)
Dibutyl phthalate	Endocrine disruptor (M and F)
Dichloromethane	? sperm damage (M)
Glycol ethers	Various
Isocyanates	Adverse animal effects (M,F)
Methyl ethyl ketone	Insufficient human data
Perchloroethylene	Reproductive hazard (NIOSH) (M)
Trichloroethylene	Decreased libido (M) at high levels; menstrual disorders (F)
Organic solvents	Menstrual disorders, fertility, miscarriages birth defects (F)
Styrene	Affects sperm (M).

Sources

Windham and Osario in Ladou J (ed) (2004) Occupational and Environmental Medicine. 2nd ed. Appleton Lange . Connecticut. pp 384-412

Frazier LMF and Hage M (ed) (1998) Reproductive Hazards of the Workplace. Van Nostrand Reinhold. New York and London.

Table 4: Immune effects of substances reportedly used at ICL/Stockline

Substance	Effect
Diisocyanates	Rhinitis and asthma
Epoxy resins	Rhinitis and asthma

Source: Kishyama in Ladou (2004: 185-207

Table 5: Neurological effects of substances reportedly used at ICL/Stockline

Substance	Effect
Methyl acrylate	Possible neuropathies
Organic solvents	Chronic behavioural symptoms
Styrene	Chronic behavioural symptoms; chronic toxic encephalopathy
Trichloroethylene	Cranial neuropathy (trigeminal neuropathy), Demyelination and tremor

Sources: Rosentsock and Cullen (1994); Baker in Levy and Wegman (1995) 3rd. ed.; Yuen in Ladou (2007) 4th. ed.

4.4 Risk and Body Mapping

Risk mapping and body mapping are increasingly being used in occupational health and safety to build up a fuller picture of workplace hazards, practices, procedures and impacts based on worker assessments. 'Mapping has been used successfully as an occupational health and safety awareness-raising technique; it has had more limited, but successful use as a research tool' says Dr Margaret Keith, a leading international expert on mapping. The ILO and other international organisations have developed the technique since 2000 to assist workers to use participatory action research to identify and address health and safety problems in their workplaces. Body mapping is a well established technique used over many decades in conventional occupational health practice to build up a picture of the impact of work on the bodies of workers in terms of reported and recorded occupational and occupationally related diseases and injuries. As Keith (2004) has noted,

> Mapping can be a valuable tool for data collection in an occupational health and safety participatory action research study. The overall process proved to be empowering, enlightening, and effective.

As noted, the HSE declined to provide the authors of this report any documentation about their recent visits to the ICL/Stockline plant or the methodologies used in such site visits to identify hazards and risks. We understand that after the disaster, Glasgow Technical Services were provided with risk assessments and COSHH sheets given by the company to HSE on its recent visits. Such sheets and assessments, according to the employees we interviewed, were not made available to the workers.

4.5 Risk Mapping

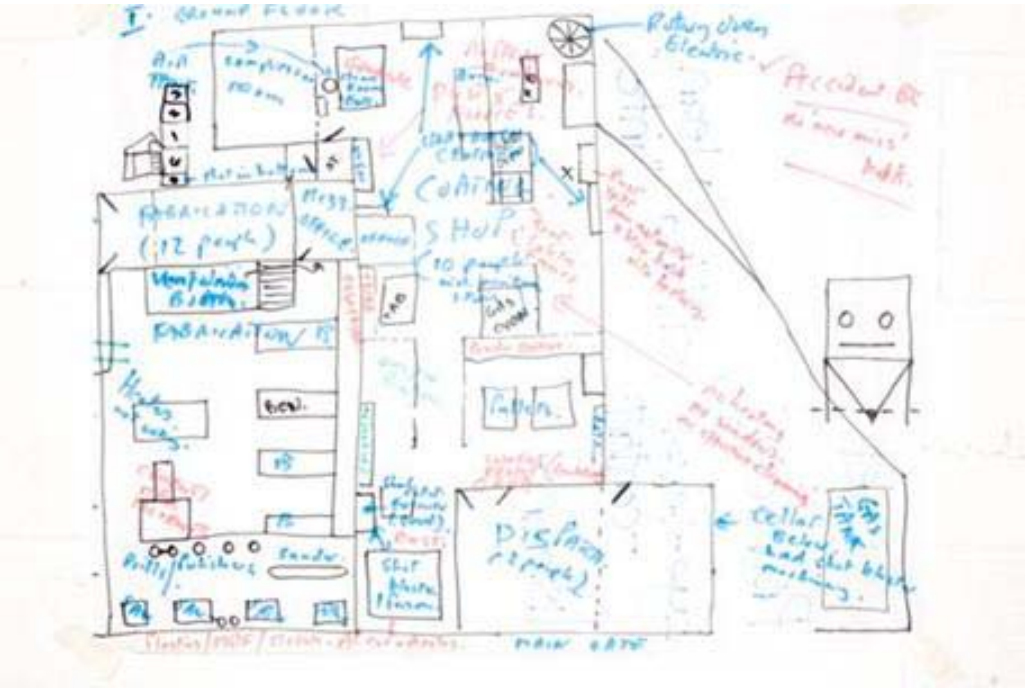
Risk mapping may therefore relate to building up a physical and organisational picture of a workplace, processes and materials to identify where hazards existed, what risks were attached to those hazards and what the employees recall about the impact of those hazards on themselves and workmates. Mapping could provide a picture of a workplace at a moment in time, over a day or even over a number of years. What is provided by the accounts given below of some ICL/Stockline employees is a consolidated collective view of the plant over several years starting when they began work at the plant and ending just before the disaster. The material relates to their observations and assessments of the plant health and safety and work organisation.

The Basement

All the employees we spoke to were aware of the cellar which contained the shot blasting machinery. They were also aware of the state of the cellar and, to their knowledge, were not aware that any HSE inspector had visited the cellar. In the cellar were various support devices for the floor. As one of the workers noted about the shot blast operator,

> Big G. was in a hell of a state. He used to work that all the time. And you used to hear big G. up in the toilet coughing his guts up. (W2)

The Ground floor



As noted above, the ground floor and annex contained many processes and much machinery: the fabrication sections, coating shop, a degreaser which apparently used trichloroethylene and 'genklene', compressor room, shot blasters, electric and gas ovens, pallet and powder storage, gas tanks, heaters which did and did not work, various offices, drills, polishers, sanders, areas where solvents were used, dispatch rooms. A wide range of chemicals and materials were used or present across the floor and in the structure, including solvents, MDF, metals and asbestos. Dust and fumes were present. Extraction on the sanders, degreasers and solvent processes varied from good to very poor. As one worker observed about the ovens

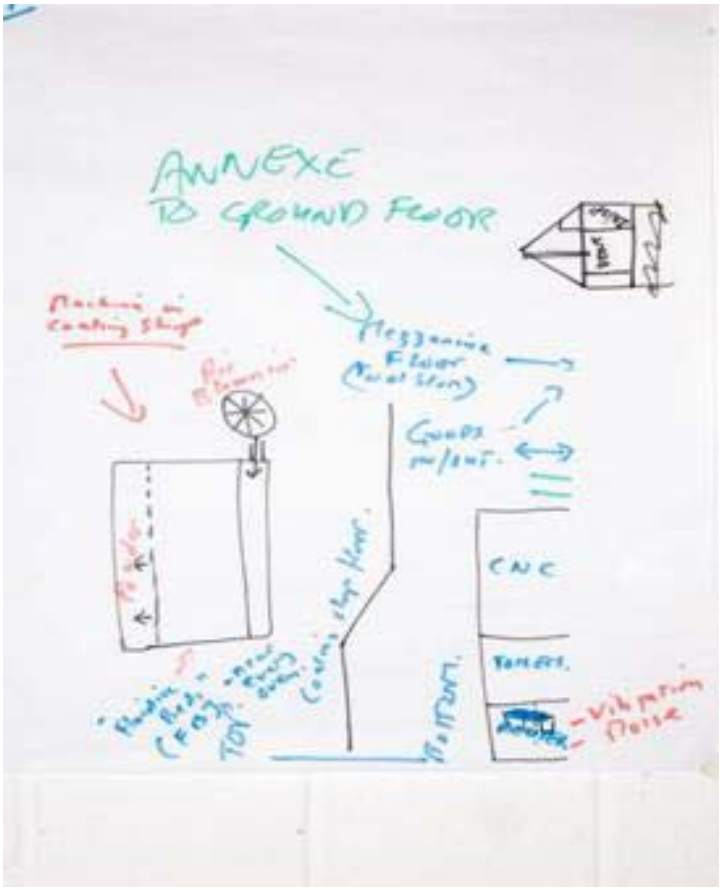
> You had dust and fumes from all the ovens – you had the wee sort of – this is going to sound silly – you know the clean room? (*laughs*) The Wendy House. It was one of the most disgusting places in there, it was so filthy, but they called it the clean room. This is what they called it didn't they? It was the clean room. Nobody ever used it, it was full of junk. Paper and dust and all that. (W3)

With regard to the wider effect of the shot blasting activity in the early days in the factory, one worker noted,

> Right next to my office there was a blaster for any parts that came in, they would get blasted off before they got dip-coated and when the blaster door was open the dust just went everywhere. There was no extraction for it. The only extraction was the main entrance where the goods would come in. There wasn't any fan or anything like that to extract the dust. Me, personally, I felt as if it affected my respiratory system. And there were other chemicals, I mean, when you went into fabrication you could taste it as soon as you walked in, you know, all this stuff was airborne. (W4)

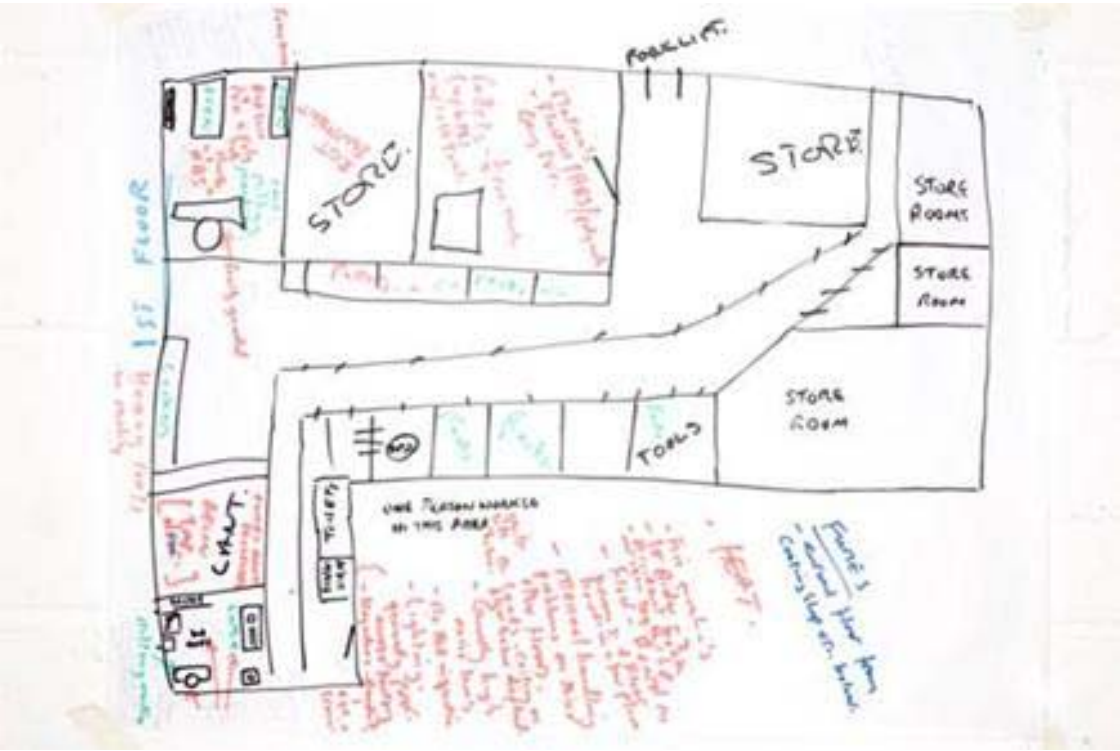
The accounts of the workers elsewhere in this report document the adverse effects of many of these substances more fully. The workers indicated that just one pair of gloves had been made available when using equipment such as the degreaser. This is important because gloves used with degreasing chemicals quickly saturate, lose their effectiveness and can hold solvents against the skin. Hence the need for a regular supply of clean glove liners and so on as well as rim ventilation. Workers in the coating shop also ate and drank in the shop. It is clear from the risk map of the ground floor that workers in many sections on that floor were exposed or could potentially have been exposed to dust and fumes problems, to heat and cold. For example, those using the polishers, sanders and drills would have been potentially exposed to the highest dust levels but conditions were such in other areas of the ground floor that meant many other workers would be exposed to various dusts used in the product manufacturing process.

Annexe



In some parts of the ground floor, according to the employees, there was no effective heating, no windows and no effective cleaning. These sorts of problems would not necessarily requite sophisticated occupational hygiene monitoring devices but would be obvious in a walk through survey if all parts of the factory building had been visited. The workers recall the presence of an accident book in the plant but cannot recall any incidents other than injuries being recorded such as, 'near misses' or 'dangerous occurrences'. There were a number of injuries in the plant that required hospital treatment at an Accident and Emergency department.

First Floor

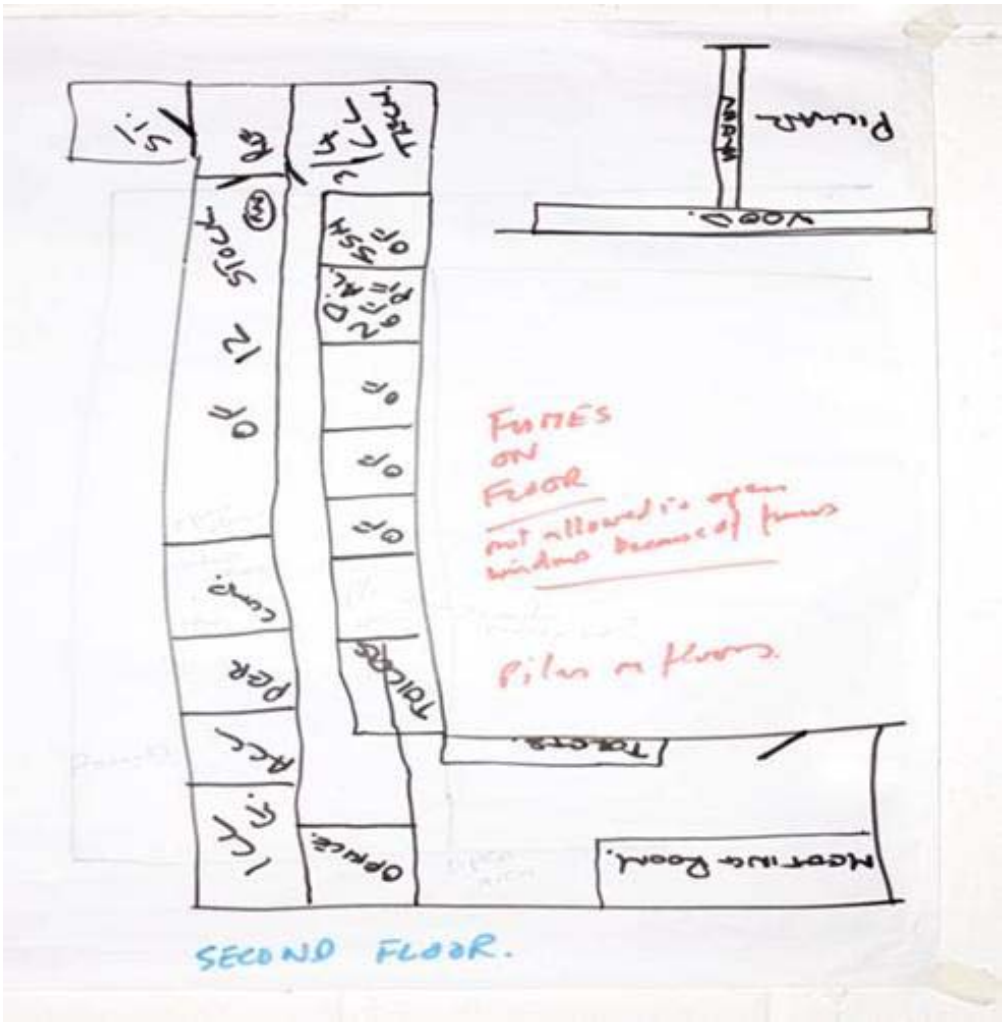


The first floor contained a variety of store rooms, racks, pallets, lockers, tools, forklift trucks, CNC milling machines, ovens, a canteen, sink, toilets, and another room with a second lathe and grinding and milling equipment. On the second lathe, employees machined 'steel, aluminium, brass, plastics and PTFE'. Workers considered there was a noise problem in this area and noted one of the milling machines had been eventually 'condemned' by Stewart McColl because of a lack of guards. Many workers operated the ovens on this floor in the fabrication process. Apparently there was no extraction as such on at least one of the ovens on this floor.

> ….round the fabrication, and you would maybe be doing a job, maybe cementing like the clear acrylics, you would actually go to start work and you could actually see the dust landing on it and you would have to tell him to stop sweeping up because all they were doing was agitating all the dirt in the place and you had to tell him to stop while you got your job done. Because of them having no windows and no extraction, there was nowhere for it to go. (W2)

There were fans in the oven section where acrylic (and other sheets), PVC and poly carbonated sheets were processed. The milling machine was also viewed as poorly guarded by the workers. Heavy tools were stored on the racks and there was a practice in the company of rarely throwing out old equipment. Also stored were the plastics materials. Pallets stored in these rooms could be up to ½ ton, the employees reported, and there could be up to 12 in the store room. Workers thought that up to 10 tonnes of pallets could be stored in one room. One person only worked regularly in the racks area. Boards were laid on beams on this floor and there were floor boards in a few places. Manual handling was a problem for the workers on this and other floors. The ceiling on the floor below this storage area 'seemed displaced' according to one worker's testimony. There were also 'generally high' noise levels experienced by workers on this floor. Lighting was also described as 'generally poor'. The employees we spoke to were not aware of any HSE inspection of the floor. Fumes entered this floor from the floor below which contained the coating shop and other processes. Heat on this floor was considerable. The floor did have a fire marshal and first aiders. No accident book was seen by the workers interviewed on the floor.

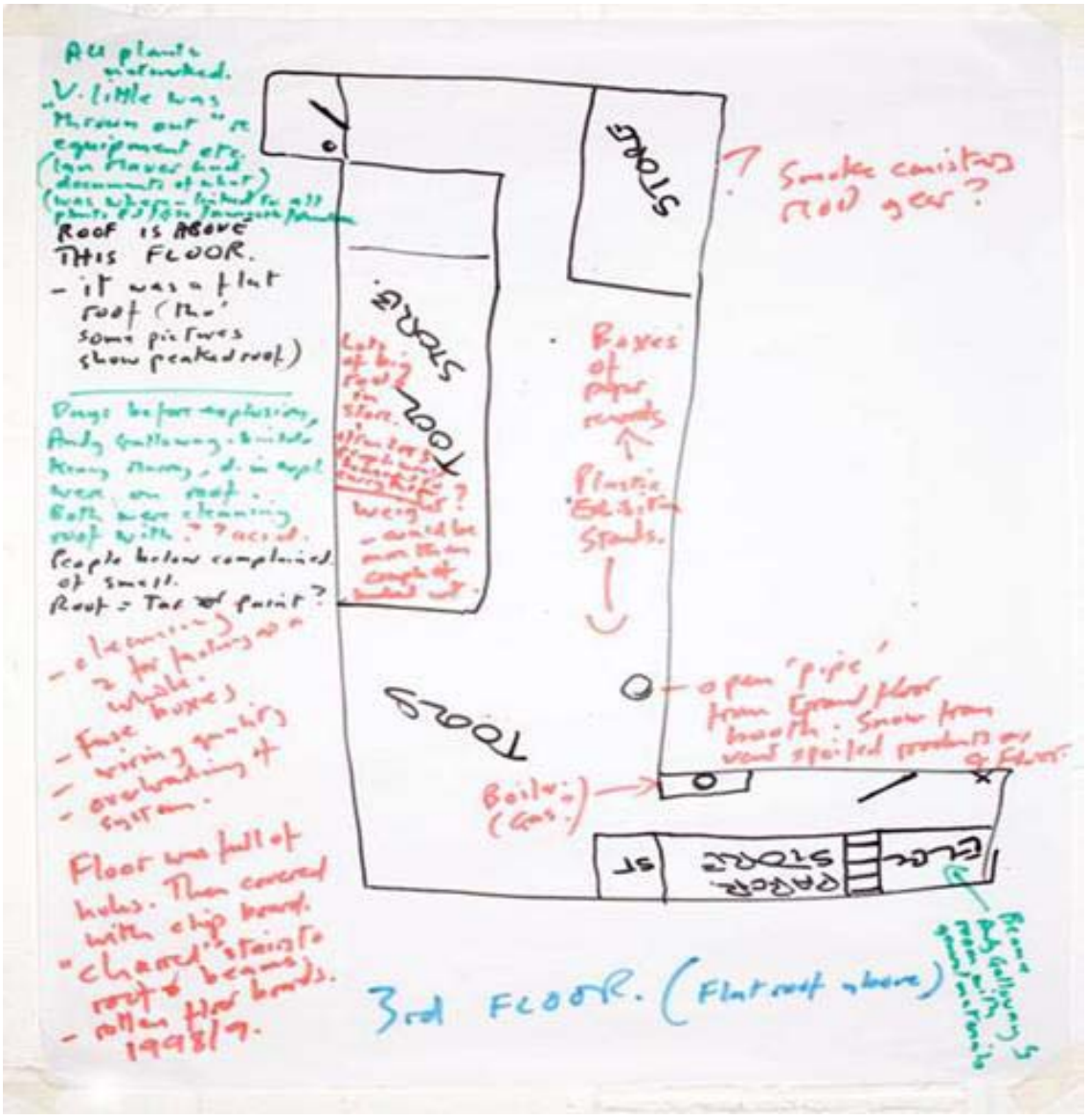
Second Floor



The second floor contained the general offices of ICL and Stockline, the personnel offices, accounts, computer rooms, storage space, toilets, a meeting room and a large open area. The computer room contained a fan. There were pillars on the floor. The employees who visited this floor reported fumes and noted that windows were not opened because of the fume problem from elsewhere in the plant. As one worker noted about the structure.

> But the thing was, see when they were doing that asbestos up there, the floor up in the top flat was full of holes and you could actually look down the holes and see the people working below you. Seriously. There was a couple of sprayers in there (W2)

Third Floor



The third floor contained more storage areas which housed more tools, a paper store, plastic exhibition stands, paper records. There used to be an electrician's room on this floor which then became a store room for Andy Galloway's materials. A gas boiler was also situated on this floor. The tool store contained lots of 'big tools' which often required 2 or 3 people to carry them in or out. It was reported that the third floor was full of holes, covered in chip board and that there were 'charred' stairs to the roof and beams.

Above this floor was the flat roof. On this floor was an open 'pipe' from a ground floor booth and, when it snowed, snow from this vent sometimes spoiled products on the ground floor. A few days prior to the disaster, Galloway and another person were cleaning the roof and people below complained of the smell from these cleaning substances. The roof was coated with tar or paint.

Fabrication Department

General operators in the fabrication section noted major ventilation problems. They sneezed from wood dust. Woods used included poor quality plywood from Brazil.

> We used to come in and cut MDF. There was only one saw that had an extraction on it. (W2) That didn't work properly. (W3)

Workers provided vivid examples of the extent to which the fabrication department was suffused with particles from cutting (both plastics and MDF), which combined with the vapours. They also noted a problem with extraction and other fans at various times especially when using solvents, cleaning agents and plastics. At least 6 employees reported flu like symptoms consistent with polymer fume fever when using PTFE in processes. They also noted various signs of respiratory distress when cutting plastics on occasion and observed that extractors sometimes did not work or did not work properly and there was an absence of any extraction in the dispatch area despite fume/dust problems. Gloves had melted on occasions when exposed to chemicals and the employees here found no gloves were completely adequate. Some 15 workers had apparently reported eye problems when exposed to various chemicals and dust or to foreign bodies in their eyes. The workers' accounts below reveal the full nature of work in that department

> There were no windows in the place. There were two vents on the roof but he got them blocked up because they were letting too much heat out. (W2)

Chemicals were used extensively in fabrication. One worker described how he applied the liquid tetrahydrafuran in order to cement together pieces of plastic.

> The chemical would be poured from the 5 litre drum, the big blue drum, into any kind of container you could get your hands on. There were containers put aside for that but if they weren't there, it was like plastic cups out of the drinking machine, pour it in, depending on the job and the quantity you needed. (W1)

Frequently, during pouring, liquid would spill over workers' hands. 'You would probably get a paper rag and give a quick clean and move on'. With the chemical in the container a worker would then take it to the workbench and apply it there with a brush or additional tools depending on the nature of the job. A number of workers believed that the biggest hazards they encountered in fabrications were the chemicals in their raw state and the fumes given off when they were mixed with plastic and heated.

> My concern was that the chemicals were openly used. Some people would be using different chemicals at more or less every bench. And when some of the ovens were on with no extraction, that was another complaint. I felt my eyes with the heat and the fumes building up – it was almost unbearable. (W1)

What compounded the problems with fumes was the fact that sheets of MDF were used in the oven to lay the materials against. This created a burning smell that hit the back of the throat and stung the eyes. Also, the pipe coming out of the oven was covered by 'a bit of cloth and a jubilee clip' (W1) to stop the fumes diffusing throughout the workspace.

Coating Shop

Workers in the coating department reported serious problems with dust, which resulted in part from the blasting process.

> …when the blaster door was open the dust just went everywhere. There was no extraction for it…There wasn't any fan or anything like that to extract the dust. Me personally, I felt that it affected my respiratory system. (W4)

> When I look back on it now, the chemicals I was working on, the shot blasting, I was breathing in the actual blasting. When you blast stuff the shot turns to powder and you have to open the door to take the bit out that you have blasted. So you opened the door to the blaster and all this stuff came scooting out. There was supposed to be an extractor inside the thing but I don't think it was working right. (W1)

> The hose that went from the high pressure air pipe into the machine, the actual rubber hose, I don't think was up to handling the force that was going through it because the shot was always basically making holes in it and would break up and the machine wouldn't work right and you would have to trace back this whole hose to find out where the hole was. And then when you found out where the hole was you had to press it again so you knew exactly where the shot was coming out. And then the maintenance man would come down and cut the hose and put a bit of metal piping inside it and then put jubilee clips on it and tighten them up. And that did until the next time a hole appeared which was pretty regular. It would happen basically every day that there were holes in these pipes. I think it was because it wasn't the right hose for that high pressure shot blasting. They wouldn't do anything about it. They wouldn't buy a new hose. They just let you get on with it. (W3)

Yet the safety concerns that the workers had with regard to the blaster were not confined to dust and its effects. Evidently, there were problems in respect of exposure to electricity.

> Some of the boys that were using the blaster used to get electric shocks off it when they were using it. I think one actually got blown across the room. (W3)
>
> Sometimes we would be in at night and it was almost like a wee fireworks display, you know, with static…if it was maybe dark or the lights weren't working, you could see it. Like a spaceship taking off! Static charge. And it would only be when somebody sort of put their arms into it that it was away, because there wasn't a guard on it. (W4)

When workers from other sections entered the coating shop they were forcibly struck by the serious problems with the dust and vapours.

> Sometimes you would go into the coating shop and when you opened the door, you would get a 'yuuugh' and you were gasping to get out of the place [because] you couldn't breathe…They were spraying stuff and they were coating. What they used to have was these big tubs of powder, they attached a blower to it so that there was air getting blown through it. As soon as you attached the blower it was all over the place…also they used to take parts out of the [back door] and burn the plastic off with a blow torch and all the fumes would blow in (W2).

Spraying was identified specifically by several interviewees as a process which exposed workers to harmful substances. Much of the spraying took place in booths, although this attempt to contain the hazard proved inadequate. This was partly caused by the ineffectiveness of extractor fans.

> My booth extractor fan was up there [at the highest point], which I though was funny because what was it doing up there, it should be there [adjacent to the spraying]…See my overalls, they used to be covered in red primer…(W3)
>
> There was only one good extractor – I's extractor – when he was spraying that was his booth. (W1)

Frequently, though, spraying took place in the open workshop, an occurrence which caused no little concern amongst workers.

> People would be spraying there and I was walking to fabrication the pathway would be designated, but sometimes people would be spraying and you were walking, so you were in contact. Although there was an extractor there, there might be three or four people spraying, whoever was walking about would get it. They would breathe this in. (W1)
>
> …they did electrostatic spraying and what that does is make a cloud of plastic dust that has an electrical charge in it. (W2)
>
> …the electro-static was just like a powder you did was you put your electrical charger on it and then you just spray powder and it's attracted to the component and then it was drawn out, up into a ducting and round the ducting into a box outside. Obviously this was just a home-made box, basically a wooden box and it must have been when the fan was on you got to a point when no more air could get in. So everything was coming out of the sides of the box and blowing back in through the roller shutter door into the factory. (W4)

In addition to these processes, dirt coated parts were openly cleaned with a hose in the coating shop. The result was not just an atmosphere full of particles but also floors and surface areas covered with dust and powder. To one worker's mind this constituted a serious hazard,

> If you flipped a dout (a cigarette butt) on that it could explode because the dust was like custard powder. (W3)

Historically, there had been no restrictions on workers smoking next to these chemicals until, latterly, McColl called a halt to this practice.

> Believe it or not, you could smoke where you stood in the factory at that time and we were all smoking beside these chemicals – Genklene, other chemicals, the paints and all that. We were standing smoking. And then it was when Stewart McColl took over he realised and he said that we would need to stop that. He must read up on it or something. That was when he started the smoking ban. And basically what he did was put signs up 'No Smoking'. (W1)

Curing in the gas ovens in the coating shop led to PTFE being burned off and the fumes would cause great discomfort and short-term acute illness. Workers reported on the effects of PTFE polymer fume fever 'flu'.

> It was really horrendous. F. Didn't bother about PTFE [flu] and he didn't tell us when he was putting parts in the oven to cure them. It was only when we smelt the fumes and shouted, 'F, have you put something in the curing?' and he would go 'Aye'. Wee I. would go like, 'Get out of the road until it's cured'. When the oven cools down it means that the fumes are going to stop. (W5)

The ovens themselves were regarded by workers as hazards. One had apparently been fabricated out of parts of a bin lorry.

> I think they got one of these skips you'll see at the back of supermarkets. If you have boxes you put them in, press a button and it squashes into it, you know that sort of thing. They converted it into an oven. [It was converted] in-house by Mr McC. They got gas people to bring gas ovens in. (W2)
> But that isn't as sinister as it sounds…I would have been more concerned about the other oven. If somebody was to say to me about the ovens, the one that was home-made and the bought one, I would have been a lot more concerned about the bought one, because it was from the dark ages. I don't know how old it was. The door did not fit properly. You could put your hands round about the door. So this thing wasn't sealed. The door rattled all over the place. And what they used to do was this door would lift up and then they would drag the parts out and spray it on the front trolley while the oven door was open and the flames were there. And what they used to do in the winter because there was no heating at all in there…was put the gas ovens on and have the doors open while they were working…in the coating shop it went from one extreme to the other – it was either so hot you couldn't breathe, because of all of the different ovens (gas and electric) or it was absolutely freezing. (W4)

The ovens also emitted particles which caused the workers considerable concern.

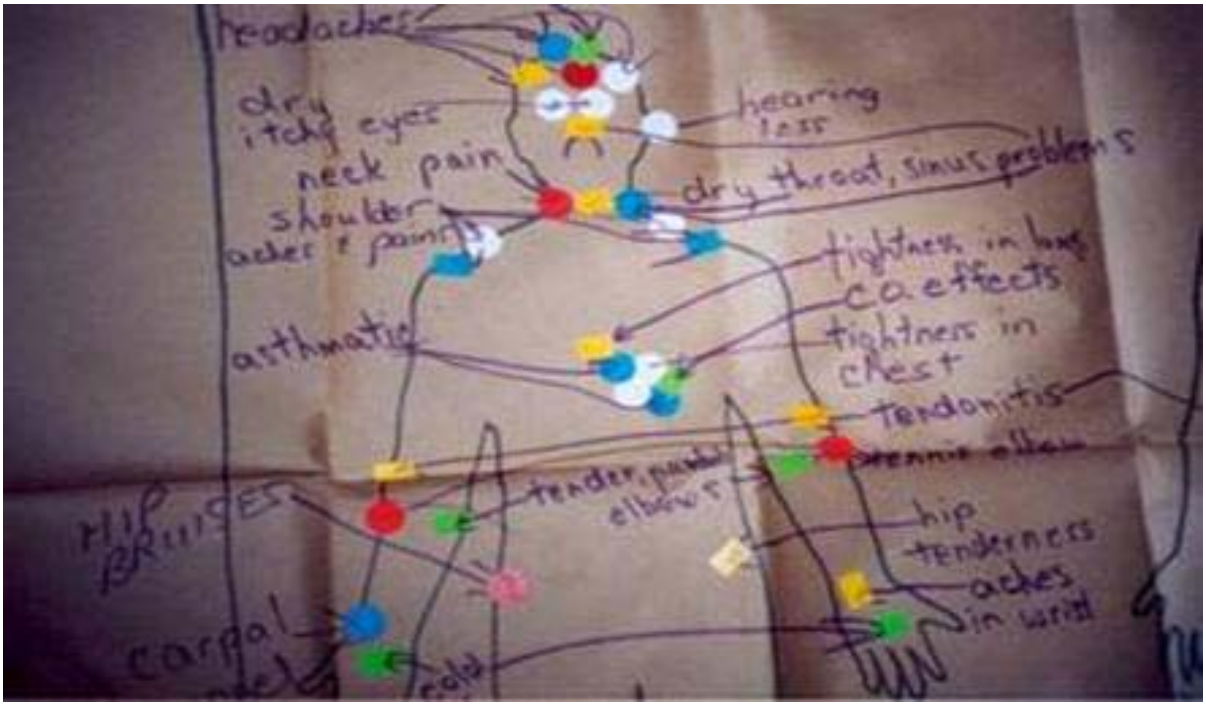
> There was a rotary oven, it was like a circular oven. It's got wee dookits and a wee handle and it goes to each dookit and you used to put your parts in there, like nine dookits. You would heat the parts up and then put in powder and it melts the powder and it turns it into a plastic coating rather than spraying. And it's got to be a certain temperature before it melts, you know…There was a vent up on the wall next to this rotary oven which was supposed to be taking the powder away, you know, the powder that was floating about. See when the sun shone, that's when you knew what you were breathing in. We used to go, 'Oh no, look at that! I'm breathing that in'. (W5)

This same oven apparently exposed workers to particularly serious risks of exposure to asbestos.

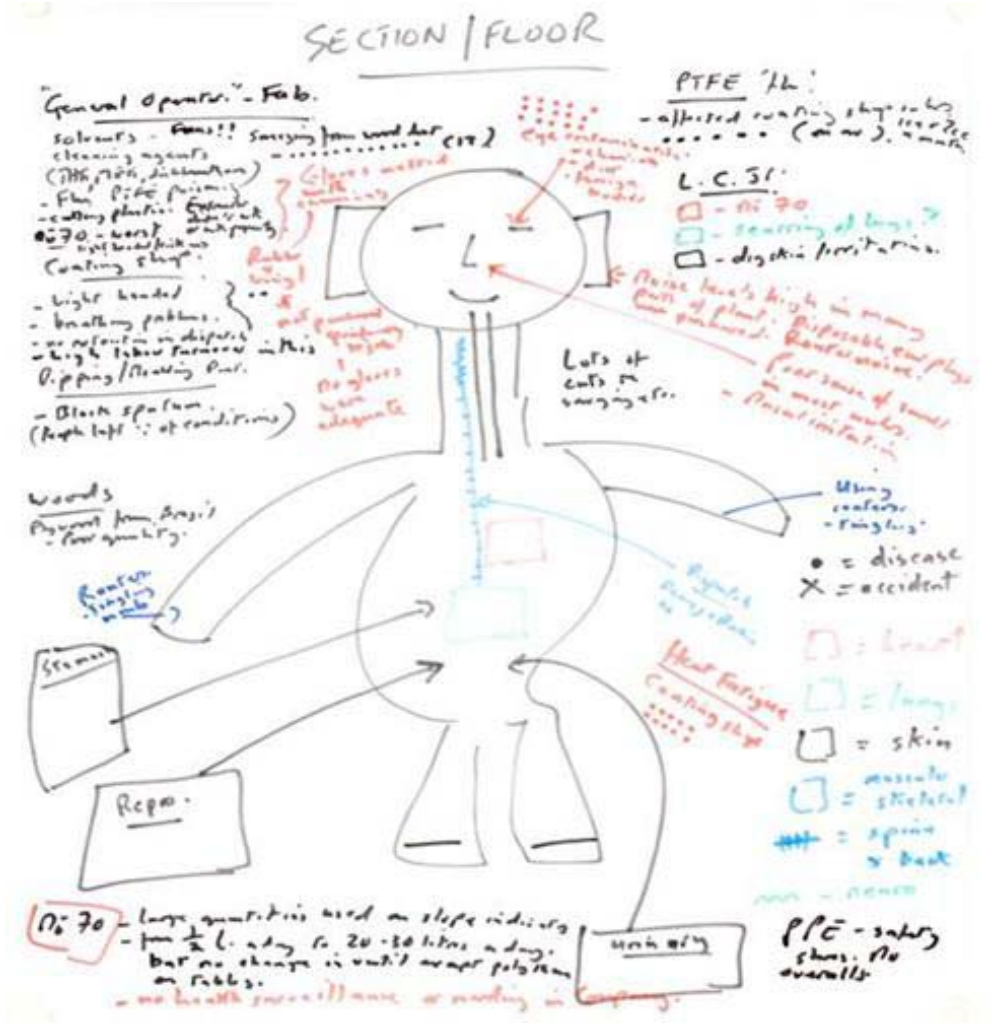
> There was no front door on that [oven], it was just a big square of asbestos sheeting to keep the heat in. There was a door on it at one time but when I started working there it was just a bit of asbestos sheet in front of it. You used to lift the sheet up, take the part out, shut the sheet down and dip your part and hang it up. It was hundreds and hundreds of parts you were dealing with and you were always lifting the flap up. (W1)

It is difficult to see how this repeated action of lifting and dropping the door would not have led to the asbestos being fractured or frayed. If this was the case then the release into the atmosphere of potentially lethal asbestos fibres was highly likely. Two workers report musculo-skeletal/back problems in the dispatch area. Those workers engaged in sawing activities had lots of cuts. Noise levels were high in many parts of the plant especially on the routers machinery and these workers specifically mentioned tingling hands. Disposable ear plugs were purchased. Most workers reported a poor sense of smell in the plant and nasal irritation. None of the workers involved in the mapping exercise were aware of any health surveillance or occupational hygiene monitoring activity in the plant at any time.

4.6 Body Mapping



A short body mapping activity based on the recollections of two employees provided the following information about adverse effects on employees that the workers had noted.



Ex-workers described signs and symptoms consistent with exposure to some of the above substances and the known adverse effects related to those substances that exist in the scientific literature. Workers interviewed reported widespread health problems that are quite consistent with exposure both to individual substances, mixtures of substances and working practices found within the plant. Such descriptions also relate temporally to work in the plant and exposures on a particular day or week. Many are acute effects and others are chronic effects that disappeared or were initially ameliorated by absence from the plant on longer holidays.

> What I found was that, it was like maybe when you left the place and you started to get some fresh air, you started spitting up. I was coughing up a lot of black stuff. And when you got home at night, you had to spend a good while cleaning out your nose and your sinuses. You sort of had to blow your nose…where I used to find it worst was at the weekends because you weren't in, and it seemed like your body was trying to get rid of it. (W1)

The most commonly cited effects were on the respiratory system. Some interviewed workers reported a series of health problems that they believed were related to the working environment. These accounts can, in several instances, be cross checked with the risk mapping and body mapping accounts of work in the factory provided elsewhere in this report.

> Just trying to get a deep breath, trying to fill my lungs to capacity was pretty hard. My eyes got affected by I don't know what it was, but when I started in there I found my eyes going yellow. I went to the eye clinic and I can only describe it as like my skin peeling from my eyeball. Like a film. I would try and take it away and I would put my finger in it or a cotton bud and it was just peeling off the eyeball. I would say [that I had been working there] about eight or nine months, something like that. I was pretty fit when I started there but I felt as if my health went downhill. (W4)
>
> …I went to get my eyes checked. I got two globes in my eyes. And the optician said that he had never seen this for ages and he went through the book and he said that it was highly unlikely, it's only people in contact with UV light [that get this]. It's usually elderly people living in Australia and that it was the first time he had seen anything like this. He said that it could go over the pupils...(W5)
>
> Well, personally, I had tightness in my lungs. Then I started getting pneumonia-like illnesses and then I started getting pains in my lower back which would probably have been my liver or kidneys. My back is sore just now, my back is killing me…I had asthma, but since I've not been there I've recovered from that and use my inhaler very, very seldom. (W2)
>
> I don't have the same problems as (W2) but when I used to leave there at night, you went outside and if you had fresh air you would have this feeling of dizziness. And then when you are off, you are spitting up stuff and constantly coughing and barking away. The biggest thing I noticed in there was a guy who worked the blaster in the coating shop and he was often in the toilet boaking his guts up. He looked the unhealthiest guy you had ever seen in your life – and his eyes. They were always red and watery. If you saw him now, he's been away from there for about five years, you would never recognise him. Totally different guy, looks a different colour, looks healthier, even sounds different, he actually sounds different. (W4)

Workers reported a variety of symptoms in the coating shop included feeling light headed and having breathing problems and they noted a high turnover of labour in this shop. In the dipping and moulding plant, they were aware of coughing up black sputum when production was underway and again people left because of the working conditions. Two workers report major problems with lungs and with dry skin and irritation. Workers in the coating shop also reported heat fatigue. Some workers also report tingling and numbness in hands after some processes.

> The thing was as we were saying the last time we were here, anything that was painted in there, even more so in the coating shop, the fumes ripped it to shreds. You couldn't keep anything painted in there. If they painted anything in there, all the fumes that were kicking about the place, it just rotted them. So all the pipes in there, all the lockers, anything at all that was metal, was rotten. It's like if you put a brand new locker in the coating shop within a couple of months it was bright orange with rust …..but see in the coating shop, if you went above head height the fumes were horrendous. Absolutely horrendous.
>
> So when we used to do that you would walk into the coating shop, and see when you opened the coating shop door, you just went Ugh – it was almost as if somebody had grabbed you by the throat. You know, when you walked in it was like somebody grabbing you by the throat. And I've seen it many times, you are in that door and just turning and walking back out because there was no way I think I could have made it to that side

Workers recalled how they and their fellows were affected by fumes from paint hardening in the oven in the coating shop. They described the effect of using PTFE and polymer fume fever from the fumes.

> The first time I got it, it started at my ankles and crept up my legs. It's a feeling that you are not well, that you are getting the flu…It comes up, up, up and then you feel stiff, you start to sweat and you start to get the shakes. And see when you get the shakes, you are going like that, you can't stop yourself. Basically I was told it was because I smoked. It always me and I. that got the PTFE [flu]. And one day the two of us got it at the same time. And Stewart McColl found out about this and he said to Bill, 'Any time anybody gets PTFE [flu] get them a taxi and take them home, no quibbling'. And then one day I caught it and had to get out of the building, I couldn't handle it, you know, what's happening to me, you know. And I just walked out and went home myself. You know he pulled me up the next day and said, 'Why did you go away?'. I said, 'I wasn't feeling well, that's why I went away'. 'I told you to wait for a taxi'. I said, 'I just wanted to get out of the building, I wasn't sitting there shaking and sweating. I just wanted to go home'. It makes you feel you just want to go to your bed. And that's what I done when I went home. It wears off after a couple of hours but the effect of it is horrendous. I. will tell you. If you ever speak to I. about it, I'm telling you, he's caught it that many times. I've had it maybe three or four times but I've maybe had the symptoms of it and not realised I've got it. Some days I didn't feel well. I think that probably what it was. I caught PTFE [flu] but not the full PTFE. And I felt quite a lot of times during the day. (W5)

This section identifies major occupational health and safety problems in the workplace that concerned employees and led to attempts at the workplace to remove hazards. They have since used innovative methods such as mapping to describe and analyse those hazards in this report. Millions of workers are made ill every year by stress, musculo-skeletal disorders, asbestos-related diseases, cancer, asthma. Government and employers should prioritise the prevention of work related ill-health and establish an adequately funded worker-controlled occupational health system, available free of charge to all workers. Workers injured or made ill by work get a raw deal and what is needed is "a just and effective system of civil and state compensation which maintains workers standard of living and addresses the burden of all illnesses caused by work, addresses gender inequalities and increases opportunities for the rehabilitation of those disabled by work" along the lines advocated by the Hazards Campaign Charter (http://www.hazardscampaign.org.uk/charter/newcharter.htm).

Workers also depicted the condition of the factory cat which had been exposed to the same internal environment as they had.

> There used to be a cat in there, I don't know if the cat was bought to scare the mice or rats – it's an old building, that's a possibility. But the only way to describe that cat was that it fell to bits, and that's not exaggerating. The cat ended up with lumps of hair falling off. It had problems with its eyes, with its ears and you couldn't touch it but it would scream in agony. It wasn't that old. It was quite a scary looking cat. It was as thick as that pen, just skin and bone…(W2)

Section 5 The Management of Health and Safety at ICL/Stockline

5.1 Introduction

We have seen no health and safety manuals, no group or plant specific safety policies, and no technical guidance that allows us to assess how effective the control of substances hazardous to health was in the plant from 1970s onwards, despite efforts by the workforce and the research team to obtain them. This is precisely why the extensive evidence from workers themselves set out in this report is so crucial to understanding the extent of the risks that they were exposed to and to understanding the management of those risks.

This section reproduces evidence from the testimonies of workers, which taken together, identify major problems with the management of health and safety at ICL/Stockline. Following an introduction to the general legal duties of employers with regards to health and safety, the section explores the general approach to the management of health and safety in evidence at the plant. A discussion of the more specific problems created by this general approach then follows. Those problems are structured under the following headings: health and safety representation and communication, induction and training, risk assessment and personal protective equipment.

5.2 Legal Duties of Employers

Under the Health and Safety at Work Act (1974) every employer has criminal legal responsibility, so far as is reasonably practical, to ensure that nothing that happens at work that makes an employee ill or causes injury. Employers must have an explicit policy, explaining how they will manage health and safety, and which specifies which manager is responsible for a specific area. In addition, it is a legal requirement that the employer prepares a statement of general policy on health and safety, ensures that minimum standards are being met and brings these to workers' attention. Additionally, employers must identify the hazards employees might face at work, assess the risk these hazards pose and detail the steps to be taken to prevent those risks as well as informing the workforce.

The previous section detailed the range of hazardous chemicals and substances workers at ICL/Stockline were routinely exposed to. The regulations that are in place to protect workers exposed to such hazards are very clear about the monitoring and control measures that need to be in place, and about the health surveillance of workers that is necessary where there is a likelihood of such exposures. Regulation 10 of COSHH stipulates that "the employer shall ensure that the exposure of employees to substances hazardous to health is monitored in accordance with a suitable procedure". Employers also have a duty, under Regulation 11 to ensure that the effect on employees is carefully monitored: "Where it is appropriate for the protection of the health of his employees who are, or are liable to be, exposed to a substance hazardous to health, the employer shall ensure that such employees are under suitable health surveillance." Where risks to health are identified as a result of exposures, employers must, according to Regulation 7 "ensure that the exposure of his employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled"

Employers are legally required to have in place effective health and safety policies, organisations, systems of work, risk assessments and control measures to remove or control the many hazards that are well documented in the plastics industry. Health and safety systems of work, policies and practices must be appropriately documented and include proper audit and review mechanisms and a well defined and monitored health and safety supervisory system. It is the legal responsibility of employers to ensure that staff are provided with adequate, appropriate, and regularly updated training, supervision, resources and time, to enable them to carry out work in accordance with the management systems, policies and practices set up by their employers.

5.3 General Approach to the Management of Health and Safety

The following recollections taken from workers' testimonies together present a powerful indictment of the general approach to safety management at ICL Stockline and of the routine disregard to health and safety legislation and statutory regulations. Most clearly of all, this section indicates routine serious breaches of COSHH regulations.

Cases of Management Failure to Respond to Health and Safety Complaints

Case 1: Exposure to Chemicals

There was a certain job we used to do. It was like hand-held computers [and] we used to spray gold paint inside them. It was to stop any interference when they put all the glass into them. This gold paint was supplied by Trimite. I would plug them all up, put plugs on certain parts that he didn't want coated. And then I used to give them to [a fellow worker] and he would spray them, put them on the table, let them dry and then what I would do is take all the wee bits off them. Then we'd send them back to the company and they would put all the parts inside the hand-held computers.

But I was working with this stuff one day – I never had any gloves on – and all this paint was getting stuck to my fingers and up my nails and in my hair. I never thought of looking at the actual tin that [this fellow worker] was using and it was only when I seen a skull and crossbow on the tin that I thought, 'There's something wrong with the stuff we are using'. So I took a closer look and I complained to Bill Masterton that I was getting a tingling feeling in my hands. I complained for weeks and weeks. Bill's like this, 'Och, it's just work, go and wash your hands every time you are finished using it. I said 'But I'm still getting the tingling sensation' [after I wash my hands].

So I read the actual thing on it and it says, 'the downside effect of this paint is if it comes into contact with your skin is that you could get a tingling sensation, which is irreversible. Irreversible on the tin! I'm like that 'I've got this and it's irreversible'. So I pointed that out to Bill. I said, 'Look at the back of that tin, you should have told me before I started even touching that paint that I had to have gloves on, or special gloves, and see the smell of this stuff'. (W5)

Case 2: Ventilation

What used to happen was, to start with, someone would raise a complaint [about dust, fumes, chemicals etc.] with whoever was there on the shop floor, the manager or the foreman. They would try and quieten it down because I think they were honestly frightened to go and approach the management. And you know, more often than not, it never actually got to the management because they were frightened of him because he was a bully. (W2)
So the foreman would try and pacify whoever it was. You know, 'here's a wee fan and do this and that'. (W4)

I started raising concerns because of [a fellow worker's] health, and I spoke to management about them and I got told 'The factory is the safest it has ever been, you don't need to worry about these things'. I would say 'Go and let me see the chemical sheets and stuff like that'. They would say 'You don't need to see that, I'm dealing with that'. So I started looking myself, and then we all started looking and we found lots of things that we didn't know at first. All these things that are used and stored here and every single one of them said ventilation, either 'in a well ventilated area' or 'a point of extraction'. Every one of them mentioned this ventilation. (W2)

I raised concerns about the [lack of] ventilation in the coating shop. Nothing was ever done about it…I spoke to Peter Ferguson and I said 'I feel as if it is affecting my breathing'. H e said they would look into it and get something done, blah, blah, blah. About four years ago. (W3)

Several workers detailed how management responded to problems with the temperature inside the building by blocking air vents.

…somebody phoned the health and safety because they were freezing. We had three little overhead heaters at our side of the building and absolutely nothing anywhere else. And these three heaters were maybe only 2 feet wide but the building must have been 40 feet wide. This was a building that had no insulation either, so any heat just went out the roof, so he got the two vents in the roof blocked. (W2) There was no windows in the place. There were two vents on the roof but he got them blocked up because they were letting too much heat out. The thing was there was one of the guys actually went to the health & safety about the heat. I got the blame for it, you know. It was me that got the blame. It was nothing to do with me. But somebody phoned the health and safety because they were freezing. So you had three heaters that maybe covered at one wall and you had nothing else. This was a building that had – there was no insulation either, you know, so any heat just went straight out the roof. So there were two vents in the roof and he got them blocked up. (W2)

Workers were forbidden from opening doors to create a draughts on the grounds that the fumes would rise from the factory floor to the offices above. One reported that a fire door specifically was locked in order to prevent the circulation of fumes, until a manager kicked it in. Another worker, insisted that the lack of ventilation and the presence of fumes was the main hazard.

> All the years I was there…the fumes of the whole place, when that fan was on, got pumped up the stair and into the top floor. They pumped out of one part of the building and into another part of the building. The windows were actually sealed when the fumes were pumped. There was no ventilation, the windows wouldn't open, you couldn't open the windows. (W2)

> Maybe a light wasn't working and I. said he would go up and put a tube in. On a light fitting, before you could change the thing, there might be two inches of dirt on top. (W3)
>
> Like the dirt that was on it was on it was kind of sodden as well because it had so many fumes. If you laid something on a bench, say you were working on something, there was like a moss kind of thing, like a mixture of ply, MDF, plastic dust, fumes like aquamethane and all in a mush. (W4)

Interviewees also reported that working with some of the machinery proved dangerous. One recalled a serious injury that had happened in 1999 or 2000.

> …what happened was the machine was just so old it had cracked. So I was using a sword blade like that, it hit the table, the sword blade shattered and it went in there in my hand. So it caught an artery and it was skooshing blood all over the place...I ended up in the Western Coronary Care because my heart went into shock because I bled so much. (W2)

Another recalled how a fellow worker had his finger 'clawed to bits' when he was 'wiping stuff off a drill without any guard or anything'.

> When I started there [the chemicals] were just out in the open, then after a while we started getting in metal cabinets and he [McColl] was asking for them to be stored in these metal cabinets. The Genklene we just left. It sat outside [the door to despatch] in big barrels. And they used a trough, like a cow's trough, to put the parts in and degrease them. That was just left there all the time, you know. They would cover it, but the chemicals were still there, just cardboard on top of it. (W4).
>
> The troughs [two of them] would be 8 foot long…and maybe 18-24 inches wide and about 12-14 inches deep, something like that. And they were half full, maybe even more. (W3).

Workers also reported that there had been serious problems with the gas pipes that ran throughout the factory.

> Somebody came in and condemned the gas pipes. For about a week or two we had no gas. The thing is we were led to believe it was the Health and Safety (Executive) because I know for a fact that somebody did complain because they were having odd job men [working on them]…one of the guys actually phoned the Health and Safety and pointed out that they had odd job men working on the gas pipes, shouldn't it be somebody who is CORGI registered working on the gas pipes. I'm not 100% sure if they came in, if they contacted them or what they did, but there was talk they came in around that time as well. (W2)

What had prompted management to repair the pipes was the fact that they had rotted, in the opinion of workers, because of airborne corrosive pollution.

> The thing was that anything that was painted in there, even more so in the coating shop, the fumes ripped it to shreds. You couldn't keep anything painted in there. All the fumes that were kicking about the place, it just rotted them. It's like you put a brand new locker in the coating shop and within a couple of months it was bright orange with rust. (W4)

Workers believed that the trigger for condemning the gas pipes was the installation of the gas oven that was built out of 'a skip', which has since been reported as being composed of parts from a bin lorry.

> The guys that installed the gas for that told us that there was something wrong in there. (W2)
>
> They built the oven themselves…And then they had to get people in for the gas burners and I think that's what it was. I think it was them that noticed that something was wrong. They condemned. They actually cut the gas off. They said, under whatever regulations they work under, that they found dangerous pipes, so they were going to disconnect them. So they disconnected them and left. Then what happened was it was like the two handy men in the place, they were called out. They started working on them to sort the leaks. So it was like a spray they got and what they did was they would put the gas on and they went along the pipes spraying it all and identifying leaks. And then they would fix them. But the pipes were never replaced (W4).

Those respondents with a detailed memory of the events surrounding the repair of the pipes, insisted that these pipes were in use up until the time of the disaster. When asked 'Is that pipe still there as far as you know?' one worker replied,

> Aye. So they went through it trying to repair all the leaks and the people were in and out about a dozen times or something because they had to get these people back in to say there were no gas leaks. So they would get the people back in, they would check whatever way they check them – still leaking, go away again. They [the handy men] would start working again. So eventually, they found there were no gas leaks. They painted the [pipes and put stickers on them and they got whoever it was back in again and they checked the pipes for no gas leaks and then started using the gas again. So, I am assuming that, because of the people condemning it initially, whoever they were, they would have to be the people that OK'd it. But in the meantime they were using somebody else to check for the gas leaks. (W2)

One worker, when he commenced employment, was asked to drive a forklift truck, even though he did not have a licence. In what appears to be a flagrant disregard for the law, the Managing Director insisted that he operate the vehicle.

> I told them that I didn't have a fork lift licence and Stewart McColl says to me, 'Carry on, it doesn't matter'. I said, 'I'm a bit concerned, do you want to put me through my licence because if you have an accident I'm going to get prosecuted for it'. On numerous occasions I was asking him to get the brakes on the forklift fixed. I t was forever breaking down and the brakes were always going…the maintenance people would come in and sort it. One of these guys told me that the truck I was using should have been condemned, but it was costing him too much money to replace fork lifts, so he would rather replace small parts on it. But on numerous occasions, I expressed my concern about the safety of the fork lift. I was the guy who was having to drive it. (W3)

According to several testimonies, it was only in the two years before the disaster that any attempt was made to improve health and safety practice.

> …there was no health and safety in the coating shop until Stewart McColl (Managing Director) took over. I think he recognised that if anything went wrong here, he was going to get big claims against him. So he tried to rectify health and safety matters… he used to send memos down…but it was not all that long ago that he started doing that. Before that time when the Downies were in charge there was no health and safety in there (W5).

Apart from the bare minimum, it appears that protective equipment, however inadequately, came to be supplied only when Stewart McColl became Managing Director.

> Aye, when Stewart McColl came I got them. [Before then] I used to go to work with my denims on and I would get home and they would be covered in paint, my jumper would be covered in paint. We had no overalls and we wore trainers. (W5)

Although McColl apparently became 'obsessed' with health and safety matters, this preoccupation was never in response to the most serious concerns and complaints of employees.

> It was always, 'What's that lying there? Get that moved away. Stupid wee things like a pallet lying, you know. He used to walk around the factory every morning and he would say to us, 'It's your problem, you do something about it. (W5)
> It was like maybe if somebody had dropped an empty crisp packet they were eating at lunchtime, he would say 'What is that, why is that there?' (W1)

Workers insisted that this belated attention to health and safety practice did not lead to action over vapours, gasses, dust, temperature extremes or the effects of chemicals. Instead, in the words of one worker it amounted to instructions such as, *'Keep the place tidy! Get things up on the walls!*' Other workers maintained that these measures were instituted only after the visit of the Health and Safety Executive which they recalled had taken place in June 2003.

> I think that after all the problems he [McColl] was having with health and safety he was trying to ensure that was happening. Now he was trying to implement some things, but it was just cosmetic…He would put up signs saying "You must wear goggles", "You must wear ear protection", "You must wear gloves", "You must wear visors". But if you've not got them how can you wear them? If you walked in the place and you would see all this stuff – it was cosmetic (W2).

According to workers, the provision of necessary safety equipment was very often connected to HSE visits.

> Even more recently they built a fumes cabinet, you know, when the Health & Safety came in, which I think was 2003, the paint was still wet on it [when they visited] and she [the HSE Officer] actually commented on that (W2)

5.4 Health and Safety Representation and Communication

Employers have legal responsibilities to ensure the provision and exchange of information and instructions that enable employees to be properly informed about risks and health hazards, and to provide the training to allow employees to understand information and instruction. Those legal responsibilities are detailed under section 2 of the Health and Safety at Work Act 1974 and are repeated in many other subsequent health and safety regulations. The Management of Health and Safety at Work Regulations 1999 specify requirements on risk assessment (a more detailed consideration of risk assessments follows), and the information that employers are required to provide to workers from the findings of any assessment. In addition, employers have legal responsibilities to put formal mechanisms of consultation on health and safety matters in place.

There are two principal sets of regulations that require workers to be consulted on health and safety matters. The Safety Representatives and Safety Committees Regulations 1977 is for workplaces where trade unions are recognised for collective bargaining purposes. The Health and Safety (Consultation with Employees) Regulations 1996 cover workplaces with no trade union recognition. Given that there was no trade union recognition agreement at ICL Stockline in Maryhill, it appears that the factory would fall into the latter category. Under the 1996 regulations it is the responsibility of the employer to ensure that a system for consulting workers on health and safety is in place. In such a case, the regulations allow for the company to choose between a system of consultation through a safety representative elected by the workforce or a system of direct consultation with employees. According to workers' testimonies, there was no elected representative of employee safety at ICL/Stockline. This means that the company was obliged to consult directly with the workforce. Section 5(1) of those regulations stipulates that:

> Where an employer consults employees directly he shall, subject to paragraph (3), make available to those employees such information, within the employer's knowledge, as is necessary to enable them to participate fully and effectively in the consultation.

This information, according to HSE guidance must include information from accident books, and any assessments that have been made under COSHH regulations. Workers' testimonies provide clear evidence that ICL Stockline's organisation of health and safety representation fell well short of legal compliance.

At various times, different directors appeared to assume both direct and indirect responsibility for various aspects of health and safety as the accounts below demonstrate. At a 'supervisory level' Ian Mavers appears to have been the person given responsibility for numerous varied tasks including consulting the workforce on occupational health and safety but all power seemed to be exercised by those above him and from whom he had to gain approval for action. According to workers, Ian Mavers was,

> …the first contact and then it was more or less up to him to pursue it, or if you felt it was a matter that you wanted to pursue you would have to go to the management upstairs. (W1)

Mavers was described as a jack-of-all-trades 'the quality cum first aid-health guy'. Informality of practices, the absence of procedure and the lack of expertise and authority on Mavers' part, led to idiosyncratic and highly questionable responses to worker complaints. Workers frequently objected to the excessive fumes and vapours which caused serious discomfort. One recounted,

> I was actually breathing it in. It was like hitting the back of the throat and the eyes and I complained a few times about my eyes. The answer I got [from Ian Mavers] was, 'You should go outside for five minutes and come back in'. (W5)

Being instructed to leave the building allowed workers some relief, albeit briefly, from unbearable fumes. One other remedy proposed by management served merely to exacerbate the problem workers experienced with fumes.

> …if anybody complained about the fumes what they were given was a fan, you know a desk-top fan, and what that used to do was blow the fumes away from them to somebody else. So if I said 'this stuff stinks', he would give me a fan and it would blow over to someone who wasn't complaining, so you didn't mind. (W2)

According to workers, the factory's accident book was kept by Margaret Brownlie, the company's Financial Director who was killed in the disaster and she 'was the only one allowed to see it or go near it'. (W1) Workers' testimonies also indicate that, contrary to the minimum legal requirement, management apparently failed to provide its workers with a prepared statement of general policy on health and safety.

It is common practice in occupational hygiene studies that wish to establish what past practices and conditions were in a plant to draw on management, technical and worker observations of those conditions. No occupational hygiene monitoring was done in the plant according to several former employees. No records of any monitoring exist anywhere else as far as we could ascertain. Occupational health services in the UK are limited. HSE's medical division has been heavily depleted across the UK. In many workplaces, a part-time occupational physician, usually a GP, is employed. Workers recalled how they only ever received warnings about the dangers of contact with certain chemicals from fellow workers and once they were on-the-job, but never in advance and as a precaution from supervisors or managers.

In overall terms, management of health and safety appears to have been characterised by an informality and laxity that left workers vulnerable to the vagaries of those responsible for its implementation. There was clearly no system of health and safety consultation in place that could be regarded as complying with the 1996 Regulations. One worker summed up the lack of representation and adequate communication of information from management:

> There was absolutely nothing [in the way of formal consultation between employer and employees] no health and safety committee…If I remember right, there was a notice on the wall about Factory Acts or something, you know, but that was about it really. If the company had a policy regards safety or [specific hazards] in all the years I was there nobody ever said to me anything about it. (Interview Laurence Connolly Snr. 16 January 2006)

5.5 Health and Safety – Induction and Training

The health and safety training, instruction, supervision and communication systems and practices operating appear to have been seriously deficient. The external training record of the senior managers in occupational health and safety has not been disclosed. Yet HSEs Managing Health and Safety Guidance 2003 leaflet, widely available to employers, explicitly states that the employer, with regard to competence should 'provide the means to ensure that all employees including your managers, supervisors and temporary staff are adequately instructed and trained'. This principle is underpinned by the responsibilities specified in all of the main health and safety laws, including the 1974 Act and 1999 Regulations. HSE advice on health and safety training was produced in a user-friendly leaflet for employers and managers in 2001 and this was reprinted in 2004 (INDG 345 reprinted 8/04 C235). The leaflet, with regard to who needs health and safety training, states that employers "do!" (ibid p.3). The leaflet adds that an employer's managers and supervisors 'may also need training in the specific hazards of your processes and how you expect the risks to be controlled" and that training records should be kept and monitored (ibid p.3 and p.7).

During induction, at the commencement of employment, it is a legal requirement under COSHH regulations for employees to receive training on the nature of the chemical and substance hazards that will be encountered in task performance. Regulation 12 of COSHH stipulates,

> Every employer who undertakes work which is liable to expose an employee to a substance hazardous to health shall provide that employee with suitable and sufficient information, instruction and training…. the information, instruction and training provided under that paragraph shall include -
>
> (a) details of the substances hazardous to health to which the employee is liable to be exposed including -
>
> (i) the names of those substances and the risk which they present to health,
>
> (ii) any relevant occupational exposure standard, maximum exposure limit or similar occupational exposure limit,
>
> (iii) access to any relevant safety data sheet, and
>
> (iv) other legislative provisions which concern the hazardous properties of those substances…

In addition, instruction and training must provide significant findings of the risk assessment; the appropriate precautions and actions to be taken to ensure the safety of the employee and other employees at the workplace; the results of any monitoring of exposure and health surveillance.

Regulation 13 of the 1999 Management of Health and Safety at Work Regulations requires every employer to 'ensure that his employees are provided with adequate health and safety training'.

The testimony of former employees working in fabrication indicated that management provided very limited, if any, guidance on the nature of hazards, protection and appropriate health and safety procedures. For example, when asked whether he was given a specific health and safety talk on commencement, one replied.

> No, not towards any of the chemicals. Health and safety would involve the machines and how to operate them, but it had nothing to do with the materials or anything like that we were working with. (W1)

Workers' testimonies revealed an absence of health and safety instruction both on commencement of employment and thereafter throughout the period of employment. .

> [A month in] 2003 was when I started. No, there wasn't any induction… I never got any training for anything in the powder coating bit. We were supposed to but x, who had been there for [many] years, he was just showing me what to do… There was a First Aid guy, Ian Mavers, you went to him if anything happened but that was all we were told. (W6)

> My concerns were with the chemical side of things, you know, you were given whatever chemical it was, "this is what you use to stick these bits together". That was as much information that you got. And you would say "how do I use it" and they would say "Well, I'm not sure". It was just a case of you had to sort of get on with it. There was no training on the hazards and what you had to do to protect yourself. None whatsoever. The only training – it would be a case of like if they started somebody new and it was a job that I had done before they might set you to show the person how to do that job. How could I give anybody advice on hazards when I didn't know they existed?' You got a pair of steel toe-capped boots and that was the only protection you got. (Interview, Laurence Connolly Snr. 16 January 2006)

5.6 Risk Assessment

Employers have a duty to ensure that formal, recorded, risk assessments are made. The Management of Health and Safety at Work Regulations 1999 require employers to assess the risks created by working so as to identify the measures they need to have in place to comply with their duties under health and safety law. As such, the assessment provisions of the Management Regulations are superimposed over all other workplace health and safety legislation including the general duties in the Health and Safety at Work Act. In practice this means that employers have to assess risks before they begin any new work. In ICL/Stockline this requirement might cover the fabrication or coating of a 'new' product, where the processes involved might differ from others that had been assessed. For example, a 'new' one-off product may involve chemicals or paints not used in other products and for which no previous assessment has been made.

Many of the other specific regulations such as COSHH stipulate that work cannot be started using hazardous chemicals and substances (including many of the substances highlighted in the previous section) work before the risks they carry have been assessed and the means to control those risks have been put in place, and the risks have been properly communicated to the workforce. Supplementing responsibilities under these overarching regulations in place at the time were requirements to do specific things under the other regulations - Manual Handling Operations Regulations, 1992/2002; Personal Protective Equipment at Work Regulations [PPE], 1992; Display Screen Equipment Regulations [DSE], 1992/2002; Noise at Work Regulations, 1999; Control of Substances Hazardous to Health Regulations [COSHH]; Control of Asbestos at Work Regulations, 2002. Whilst all of these can be seen to apply to the ICL/Stockline factory, given the nature of the production process, those regulations pertaining to hazardous substances (COSHH) have particular significance.

Employers, then, are legally responsible for assessing the risks in a workplace and ensuring that this process is adequately carried out. In the main, a risk assessment will be carried out be employers themselves, but in circumstances where employers may lack the confidence to do so, then competent, external sources can be utilised. It is instructive to draw attention to a factor involved in risk assessments that the HSE considers is important for their effectiveness.

> Remember to consult and involve your workforce. Your employees and their representatives know first hand what the risks in the workplace are and will often be able to offer practical solutions to controlling them.

Under the Management Regulations and COSHH Regulations, a record of every assessment is required in circumstances where five or more people are employed, while in relation to the Noise and Asbestos Regulations there is no limitation by workforce size. In cases where there may be delays after the assessment before the significant findings can be recorded as, for example, in the case of air quality which would certainly apply to ICL/Stockline, the regulations state that there should be no undue delay in recording.

At ICL/Stockline all the workers interviewed were unaware of any risk assessments being undertaken by management during their years of employment. Not only, as we have seen, was there an absence of workforce consultation on the identification of risks and hazards, but no workers recalled ever having been involved in the specific process of risk assessment. Even after the HSE visits workers saw no evidence that a risk assessment had been undertaken, let alone that daily or weekly lists of activities had been prepared. On at least one occasion employees put specific requests to management under the regulations.

> I asked for them [the documentation that the company was required to keep under COSHH regulations] because I was not well. I went up to them and said 'Could I get copy of the COSHH assessments of these sheets?' 'What do you want them for?' 'Well, it's just to help my doctor in case one of these [chemicals] has gone to my lungs'. 'I'll have to see Peter'. 'Right, no bother'. 'Peter will get them organised for you'. He never did it so I badgered and badgered him. 'Oh, these things take a couple of days to run off a copy'. That was over three years ago. 2001, probably around August/September. And he never gave me them. (W7)

5.7 Protective Equipment

The key piece of legislation in relation to the use of protective equipment in the workplace is the Personal Protective Equipment at Work Regulations 1992. The main legal responsibilities codified by the regulations are the duties employers have to supply personal protective equipment and that it used at work wherever there are risks to health and safety that cannot be adequately controlled in other ways. The regulations specify the PPE that must be provided to guard against the following hazards that were typically found at ICL Stockline: chemical or metal splash, dust, gas and vapour, temperature extremes, spray from spray guns, skin infection, disease or contamination. PPE should be appropriate for the task and for the substances to which it is applied. Those standards are detailed in the Personal Protective Equipment Regulations 2002.

Employers also have the legal responsibility to ensure that workers are adequately trained in the use of PPE, that equipment is well maintained and that suitable replacement PPE is always readily available. Notwithstanding the obvious hazards, particularly in the coating and fabrication departments, all respondents insisted that management for many years had neglected to provide important items of protective equipment.

> Well, when you started you got a pair of steel toe-capped boots and cotton overalls and that was the only protection you got. (W2)
>
> At the start, there was no gloves, no visor, no gloves. Again, you were just sitting down, people walking about. Depending on what chemicals and what kind of plastics other people were using, you would stay clear because it would affect whoever, with the vapours off the chemicals and the plastics. (W1)

Workers noted the consequences of working without the provision of basic personal protective equipment.

> When they were dipcoating the parts, the tank that was used to dipcoat was just brought into the main area. It wasn't like put into a room where it was sealed off from everybody else. They just dipcoated in the middle of the coating shop. So that stuff was airborne as well. (W4)
>
> When I started in there, I wasn't spraying then, I was just cleaning the metal materials that came in with a chemical called Genklene. It is pretty nasty – when you breathe it in, your eyes water. If you splashed that in your eyes then you would know all about it. (W1)
>
> It's like a long burning sensation in your eyes. And then after a while, I don't know what happens, but it wears away. But I don't know if that's done me any damage to my eyes. You know, you think you are OK till later on. (W3)

It was only in the years immediately preceding the disaster that management started supplying equipment, and even then workers raised questions regarding the effectiveness and comfort of items.

> If you worked on a timescale and me being there 13 years, once I started to complain then one or two things did start to creep in. Like you were given a mask [but this was after] about 10 years. But I might as well have been given a Halloween mask because I didn't know what I was using and I didn't know if the mask was any good for it. I think it did make a difference because I felt before I had the mask and I was using the chemicals, I used to go out sometimes feeling sickly, feeling light-headed, not feeling too well, and when I wore the mask I didn't have these symptoms. You know, not as bad, as there were some days I did, but not as bad. It would depend on what chemicals you were using. So I did feel the mask did help but I don't think it eliminated it because a lot of times you could be in there and I might be six feet away and have my back to people working with chemicals…you would have your mask on but I wouldn't know what chemicals you were working with, so I would be only six feet away from these chemicals behind me, with no protection. (Interview Laurence Connolly Snr. 16 January 2006)

According to workers' testimonies, those in the coating shop only received masks 'at the tail end', that is only in very recent times. They reported also that some colleagues never wore goggles and used gloves only occasionally.

Over and again workers commented on the shortcomings of the limited protective equipment that was provided. The gloves supplied apparently were deficient in a number of respects.

> They had cotton gloves for the heat, but when they were painting or that they used to take their gloves off…I can never remember I. having goggles on. (W4) The only person I ever saw with gloves was the fellow using the blaster. (W2)
>
> Even the gloves they used for blasting, the blaster buffed them away in no time at all. It used to blast holes in them. Everybody used to wear the same set, like gauntlets…if you wanted to go in and blast a wee bit of a job you were working on, you would wear the same gloves that somebody had been sweating in for hours. (W4)
>
> There was a lot of heavy lifting…like the valves. As well as lifting them these things were like 300 degrees hot. So they would be put in an oven to get to temperature and then you would have to grab them and carry them out, it might be 6 feet or less, but you had to grab them, turn and put them onto this spray bit, spray them and then lift them and move them to somewhere else. No insulated gloves – cotton gloves, like gardening gloves, and no other protection (W2).
>
> Then they gave us gloves and they weren't even chemical gloves. They used to melt, all the fingers used to fall off them. Put the gloves on and you would be working with whatever and then maybe you would be using the cement for the glue and the finger had been stuck to the part…So they just made life awkward. More hassle. They were just melting onto your hand. (W2)

As has been demonstrated in detail, working conditions should have caused management to pay close attention to ensuring that workers were sufficiently protected from hazards. An important aspect of this would have been to have both provided effective protective clothing and to have provided the necessary conditions that allowed the wearing of protective clothing comfortably. However, illustrative of the deficient practice was management's tolerance of workers 'stripping off' in an environment where the heat became intolerable instead of taking steps to ensure comfortable working conditions.

> Remember it was so warm at that back bit [of the coating shop] that people used to strip to the waist – mind x, y, wee z as well. (W5)
>
> X used to come out with a pair of shorts on because it was so warm it was the only way you could sort of get through the day. (W1)

On the rare occasions that workers were provided with personal safety equipment, the working environment of the plant often made the use of this equipment unbearable.

> Well this mask that I was asked to wear, I'm not joking, when I was spraying it was like a bumble bee mask. That's what it reminded me of, the face of a bumble bee. Sticking away out here, two vents to take the fumes away, something like that. The sweat is actually running down your face and it's going in your eyes, you can't see what you're spraying. And I complained to Stewart McColl about it. I said, 'I can't wear that, I'll just wear the wee white mask or just a wee painter's mask'. 'Health and safety says you can't wear it, you'll need to use this bumble bee mask'. I was forced to use it. (W1)

As recounted above, workers using the degreaser Genklene frequently experienced the chemical splashing into their eyes. It should be stressed that this exposure to this chemical hazard was entirely preventable.

> But, as I say, I don't know how many times I've splashed this stuff into my eyes, simply because I had no safety glasses. (W3)

One interviewee provided an instructive suggestion for verifying worker claims of the general lack of protective equipment.

> I don't know how much of the footage that you saw of the actual day the blast happened. If you ever get a chance to see any of that you look and see how many people came out there with safety equipment. A fireman commented, 'Did everybody say "Oh there's a blast, wait until I take all this safety gear off before I run out"'. Nobody came out with anything on, absolutely nobody. When a building blows up you don't have time to go and change. You will see, I think, X and Y had a pair of cotton overalls. (W4)

5.8 Summary

In practice many of the procedures (and the lack of safety critical procedures) detailed in workers' evidence are likely to have constituted serious breaches of the ICL/Stockline's legal responsibilities. Those likely breaches can be summarised as follows.

First, at ICL/Stockline, known highly hazardous substances, materials and processes were used and employees have provided accounts that indicate, in many different respects, such substances at various times were not controlled at all by engineering methods. Indeed in several instances, there was no extraction or proper local exhaust ventilation systems available at all. Later visits by HSE inspectors reveal that enclosure of some dangerous processes to prevent exposure to fumes and dust were entirely absent as evidenced by HSE requirements for such enclosures to be introduced.

Second, legal requirements to provide the PPE necessary to protect workers appear to have been seriously neglected. In a number of instances, workers were initially provided with no protective equipment at all and then were provided with masks or gloves but not apparently with associated information, instruction, training and supervision. Neither was PPE maintained nor used in a satisfactory manner or suitable for the purpose.

Third, whilst management may have provided the regulator with COSHH assessments and risk assessments, workers' testimonies indicate that risk assessments were not conducted. Indeed, none of the workers we interviewed recalls ever having been involved in a former risk assessment to their knowledge. Workers reported that, even when the results of COSHH assessments were requested, management failed to supply them to workers.

Fourth, and following the previous point, the lack of provision of basic health and safety information and the lack of formal mechanisms of consultation with workers indicate on-going lack of compliance.

Fifth, there appears to have been a complete lack of training provision that would have provided workers with the necessary knowledge and awareness of the hazardous substances and environments to which they were exposed.

There is from an external health and safety professional perspective, little sign in the accounts provided to us of a systematic approach to health and safety within the plant. Indeed, the evidence we have strongly indicates a systematic absence of legally compliant formal health and safety procedures at ICL/Stockline which cumulatively exposed the workforce to a wide range of serious risks to their health and severely compromised safe working practices at the plant.

Section 6 Regulation - Health and Safety Executive

This section begins by introducing the wider context for the regulatory role, in particular drawing attention to the pressures that the HSE currently find itself under, before exploring issues of inspection and investigation, with reference to the detailed account of one former worker at the plant.

6.1 The Health and Safety Executive

The HSE has never been granted the resources to act as any kind of police force for the UK workplace despite being the lead enforcement agency for a criminal Act, HASAWA, and related regulations. Breaches are crimes, however, and should be treated with the same seriousness and subject to the same scrutiny as other criminal acts.. Indeed, there are currently fewer HSE inspectors in the UK than traffic wardens in central London. 4,545 staff were employed in 1994. Since then, numbers have fluctuated, but total staff has never surpassed this high point. Over the decade between 1994 and 2004, budget pressures forced resources even lower. On 1st April 2004, there were 4,019 HSE staff in post. However, only 1,483 of those were front line operational inspectors. Resources are therefore spread thin for an inspectorate that is that it is now enforcing in more workplaces than previously, but with fewer resources (Hazards August 2006). Inspections, meanwhile, are in freefall. Figures obtained by *Hazards* show the provisional 2005/06 inspections figure for FOD has reached a record low, down from 55,195 in 2004/05 to just 46,032. This is almost 40 per cent lower than the corresponding figure for 2001/02. At the same time At the same time the number of workplaces enforced by HSE has risen dramatically, up from 525,841 in 2001/02 to 598,385 in 2004/05 with a corresponding impact on the frequency a workplace can expect to see an HSE inspector. In 2001/02 that would suggest a workplace inspection frequency of once every 7 years. By 2004/05 this had dropped by over a third to barely once every 11 years. In 2006, this was set to dip below once every 13 years. (http://www.hazards.org/commissionimpossible/comeclean.htm)

This is why premises such as the ICL/Stockline factory are very rarely subject to routine inspections. As O'Neill (2006) has noted, the rate of inspection in the Field Operations Division of the HSE has reduced dramatically so that premises that could have expected on average one inspection every 6.99 years in 2001/02 could only expect one inspection per 10.84 years in 2004/05.

When HSE are able to conduct investigations in the course of routine, active inspections, or following incidents that have been reported to them, their primary, often sole, concern is with locating source problems and recommending remedial measures, if they deem any are required, in order to prevent future occurrence of such an event. It is widely accepted in HSE policy and practice that inspectors neither enter premises in order to seek out violations of health and safety law, nor respond to the vast majority of observed or known offences by resort to formal enforcement action. Employers are, wherever possible to be offered advice, consultation and negotiation before enforcement action is taken. In other words, the work of the HSE is structured around a 'compliance', rather than a 'strict enforcement' model of regulation (Pearce and Tombs, 1990; Tombs and Whyte, 2007). This effect is amplified as investigation and inspection criteria have been tightened considerable as a result of recent policy changed and resource constraints, meaning far fewer serious incidents are now investigated and when routine inspections do occur, they are not entire workplace inspections, but limited to prescribed priority risks.[20]

Except in the case of the most egregious safety offences, enforcement action is invoked only where processes of persuasion, negotiating and bargaining, often over a very protracted period, have proven 'unsuccessful'. For the HSE, law is, indeed, the 'last resort' (Hawkins, 2002) when it comes to the discovery, investigation, and response to, health and safety offences.

The compliance approach has been consolidated by a government agenda that ensures the HSE's acceptance at a corporate level of the need to take into account regulated industries' commercial constraints and the need to balance regulatory goals with the economic 'health' of the nation (Tombs and Whyte, 1998). There are therefore important political pressures that have acted to construct HSE as a body which must cooperate with and advise industry rather than as a law enforcement agency (Pearce and Tombs, 1998).

Those assumptions that underpin the work of the HSE act to structure the day-to-day relationships that regulators have with duty holders. This is indicated in evidence from the research that inspectors consistently fail to examine the role of senior company officers in relation to deaths at work (Bergman, 1994: 97). Inspectors regard managements rather than workers as their primary point of contact in regulated workplaces. Inspectors are normally reluctant to meet with workers to discuss matters confidentially or to use workers' complaints as a basis for questioning employers' systems of safety management (Whyte, 2006). This approach often causes problems for workers who contact the HSE directly when their concerns are not being taken seriously in the workplace, since the HSE are reluctant to investigate complaints without revealing the identity of workers or the precise nature of the complaint (Whyte, 2000).

[20] See Hazards 99: http://www.hazards.org/enforcement/whatgorilla.htm

The compliance approach to regulation structures the regulatory strategies of front-line inspectors during visits to, and inspections of, premises. An approach that engages with workers rather than managements in the first instance – contradicts the 'compliance' approach that the HSE adopts to regulation, an approach that rests, above all else, upon securing the co-operation of managements.

6.2 Regulating Health and Safety at ICL/Stockline

Employees identified a range of serious injuries and incidents that had occurred at ICL/Stockline over the years which together indicate that the company had a record meriting ongoing monitoring and inspection. As this report has already noted, we have evidence from the interviews to show that over a decade or more, at least 13 employees attended the Western Infirmary for emergency treatment. In addition there have been at least 6 over-three day incidents. The injuries sustained at the factory that we know suggest a poor safety record for a relatively small undertaking.

We know that a worker's complaint about health and safety management at the plant was made to HSE in 1999. Our understanding is that HSE issued an improvement notice and two notices early in 2000s. In 2003, HSE visited the plant again in response to a request from an employee. From this evidence we can therefore conclude that the HSE was aware of the poor health and safety record of this plant and was alerted to poor safety practices on two occasions by employees in the 5 years preceding the disaster.

The anti-trade union stance taken by management at ICL/Stockline should also have made the HSE vigilant about the firm's health and safety management, not least since HSE research confirms the academic consensus that trade union organised workplaces are at least 50% safer than non-organised workplaces (for a discussion of this evidence, see (James and Walters, 2005). Indeed, the anti-trade unionism and lack of legally required consultation and open discussion evidenced earlier in this report provides good reason to suspect that there were likely to be particular health and safety issues worthy of investigation at ICL/Stockline. Those problems should have been picked up by HSE visits to the plant, particularly after HSE was contacted directly by employees about issues that they clearly felt they could not be resolved through existing safety management and consultation systems.

It is clear from the evidence of the workers that ICL/Stockline management received advance notice of visits to the factory by the HSE.

> When they told us to tidy the factory up that was when you knew they were coming. Half hour shut down and then it was a clear up. It didn't matter what you were doing – stop it. About 10-15 people would all be cleaning up. It wasn't a great workshop, it wasn't as if we had a huge area, it got cleaned up quite quickly. (W1)

On one occasion, an HSE Inspector noted when arriving at the plant, that a ventilation hood still had wet paint on it.

Although the HSE has statutory powers to make unannounced visits, it is common practice to give such warnings to managements, typically justified by HSE as allowing a more efficient use of time and resources. Workers' experiences reported in other industries, however, is that managements use this opportunity to deal with the most visible evidence of breaches before the HSE arrive (see for example, Watterson and LaDou 2003)

It appears that the HSE did not apparently conduct any field testing of exposures to fumes and dust at ICL/Stockline but, according to workers' testimonies', apparently carried out a walk through survey of certain parts of the plant on its various visits. HSE also, as we note in the previous section, relied on paper audits provided to it by the company. The lack of ongoing audit and assessment by the company indicated in this report is something that HSE inspectors would only pick up if this matter was discussed in detail in meetings with the workforce.

The lack of PPE equipment the HSE also stated that "a disposable paper dust mask would be suitable for work activities giving rise to small quantities of dust" yet made no reference whatsoever to the type of dust generated or its volume (HSE letter Bowie to Ann McKechin MP 24 September 2003). The evidence given in interviews was that for many jobs there was considerable dust and fume generated, and in circumstances were there were multiple hazardous chemical and dust exposures simultaneously.
The statement by the HSE that a paper mask was suitable for any type of 'dust' is extremely worrying and incorrect. It would surely not have been HSE's conclusion had they been fully aware of workers' experiences of the management of chemical and substance hazards at ICL/Stockline detailed in previous chapters of this report.

Those regulatory issues are explored in more detail now, with reference to the testimony of one ICL/Stockline worker who had particular experience of contact with the HSE.

6.3 A Worker's Experiences of the Regulation of Safety at ICL/Stockline

In this extended interview a worker, Laurence Connolly Snr., recounts in full his involvement with the HSE, beginning with the initial contact he made with the body when he raised concerns regarding the health and safety practices at ICL and workers' exposure to hazardous substances. It is important to emphasise that this is not the testimony of an embittered malcontent. Laurence was a committed and skilled worker who had served ICL Stockline for some 15 years, leaving the company's employment only three weeks before the disaster.

While in other sections of the report it has been necessary to preserve the anonymity of respondents, Laurence made clear his willingness to be identified. The interview is reproduced as a verbatim transcription except where indicated, and minor amendments have been made in the interests of clarity and in order to facilitate the flow of the testimony.

> 'Well, they (the HSE) had been in before I got in contact with them. I didn't know why they were in, we never ever got told why these people were in, they were just people, get the place cleaned up, people coming in we were told. It wasn't till after that we knew who they actually were. I couldn't remember the exact dates [I first made contact] but for me it was when Laurence [his son and fellow worker] started taking not well and it seemed to be every time he came back to work, the work made a couple of errors or something and he would be back off sick again and things like that. That was when I started looking into it, you know, the environment, the chemicals and the different stuff'.
>
> 'I found out through my contact with the MP, Ann McKechin, that the HSE had actually been in prior to me complaining and they had actually set some sort of notice on them, an improvement notice. None of us knew anything about that, that was all sort of news to us. But that had been a couple of years prior to me contacting them. I think it was 2003 [June 2003]. It was actually through her I got the letters and the dates and stuff, it was actually her that passed them on to me. [The improvement notice was] to do with chemicals at first. It was something to do with chemicals, something to do with the COSHH regulations. I don't know exactly why or what they had to improve on or whatever. It was 2003 when I got them involved, that's what it was, and it was like a couple of years before that, round about 2000/1, now when I think about it [the HSE's earlier involvement].'
>
> 'I didn't even know, as I was saying to you, that Health & Safety were coming in or anybody was coming in, it was like the day before we were told "clean up, get the place tidy, put things away, hide things away out of the road" for somebody coming in. But they didn't always tell us who it was, it wasn't maybe till likes of the people had been in, done their visit – as far as we were concerned it might just have been a new customer and he was wanting to have a look round the building just to see what it was like and see what we did. But then it would maybe be the day after that we would find out that was the Health & Safety were in, that was the Insurance people that was in, that was a customer that was in. It would only be after the people visited that we would actually find out who they were. We would never find out before who they were.'

Laurence's contact with HSE began in 2002 due to concerns about the health of his son, a fellow worker at ICL/Stockline.

> 'I decided to get the HSE involved because of my son's ill-health. That was the start of it. My son took not well and he took pneumonia and then he came back to work and then took it again and just had constant ill-health. I asked in the work, you know, about the stuff they were using and different things because, for me, there seemed to be a link. Every time he came back from work he took not well again. I couldn't find out anything in the work so I started looking on the Internet and I started finding out some bits and pieces myself. And then when I started reading it, it became very frightening because a lot of the problems that Laurence has had and is still having, you could actually read through these data sheets on all these chemicals and it's telling you some of the effects that they can have on you. At the same time, they are telling you that you should be wearing certain types of masks, certain types of gloves, impervious overalls, all these sort of things. We never got anything like that. The way it worked in the coating shop you got a pair of overalls and a pair of boots. This was just a plain pair of cotton overalls. We didn't get any protective clothing whatsoever. I mean, if I went to work I used to go to ASDA and buy three quid denims because they were ruined after a couple of weeks. A pair of steel toe-capped boots. Then gloves appeared, sort of latex gloves, but when you went near any of the chemicals the fingers used to fall off. They used to actually dissolve so they were actually more a hindrance than anything else. They were more problems than not having them'.

> 'To start with I phoned them up hoping to get some advice but I never really got any. This was somewhere around the middle of 2002. I don't know how many times I actually did phone them. I mean, Laurence (my son) was phoning them as well. So between the two of us there might have been a dozen, two dozen phone calls. I don't know. We just wouldn't let go, we just wouldn't leave it and eventually we did, in my opinion, shame them into coming in. It wasn't a case of me phoning up and saying "I find a problem" and them saying "We'll have a look at this and see what we can do for you". This went on for months. I had to keep contacting them and then there was that day, all of a sudden there was "Get this fumes cabinet built" and I got stuck in it. Then [in June 2003] two Inspectors walked in that day and that was how I found out the Health & Safety had come in'.

Not only did Laurence have no warning of the HSE visit that had been prompted by his contacts, but, without his permission, he was revealed as a whistleblower by the HSE inspector during the visit.

> 'One of them asked me my name and I told them. I was in the cabinet at the time and the Inspector said to me, "You're the one who phoned, I'm x and gave me their card and said to me that if there's any more problems in future just to give them a ring. The MD and sort of acting manager [Stewart McColl and Ian Mavers] were there at the time. I was gobsmacked that I had been identified. I had absolutely nothing to say at that point in time. I was just shocked'.

From the outset, HSE had tried to persuade Laurence not to remain anonymous and to allow them to give his name to management. After some pressure, and because of the seriousness of the health problems he was experiencing, Laurence's son decided to allow HSE to use his name.

> 'The thing was confidentiality was one of the problems I had trying to get them to come in. They said it would be a lot easier for them if they had a name that they could give to the company. And what actually happened was, because of Laurence's ill health, he decided that the only way he was going to find out anything was to give his name. He actually gave them permission to use his name. It's in one of the letters. They [management] decided, in their wisdom, that that was me. Stewart McColl just smirked. He had a wee sort of grin. He never said anything, which I'm quite sure he wouldn't have done in front of them. Mavers - it didn't seem to really make any difference to him'.

The assumption that the complaint was made by Laurence caused tensions in his relationship with management.

> 'McColl's general attitude towards me totally changed, you know, from 13 years of never once getting warned about my work, never once questioned about anything that I had done, more often than not the only question I would be asked was "I wonder if you could help us, do you know about this, do you know about that"? Then all of a sudden it changed and it was a case of anything they could find wrong, you know, they sort of started nit-picking and it could be the silliest of wee things. You would get a sheet of material through and it would have a chip, and this was coming from Stockline, nothing to do with me, but I would get the blame because it was chipped. And I'm saying "Wait a minute, I've not done anything to that yet". "You must have cut it" and I'm saying "It's a sheet of material, I haven't touched it"'.

‘It was just silly things. I ended up arguing one day with Nicky Downie [who] ended up as a sort of manager, perhaps Workshop Manager or some title like that. He decided that he was going to have a go at me about my work and I just wasn’t for that. I mean, I had worked in there for 13 years and I had worked in other places as well. 20 years experience. If I had done something wrong and somebody was saying like “You made a mistake there, you did this, you did that” then fair enough, I’ll stand and I’ll take the medicine. But I had done nothing wrong and I wasn’t having it’.

‘I think other people expected this to happen. People knew what Stewart McColl was like and I think they just expected it. It was total nit-picking. I couldn’t get my holidays when I wanted, it didn’t matter when it was, it was always clashed with somebody else or something. They put a chart up on the wall, so I checked the chart, nobody is off, I’ll take that, then he is going to change the chart because I put in for my holidays, he is going to change the groupings. Things like that’.

‘A couple of things occurred [that led to the HSE becoming involved]. One winter the heating was terrible, really, really bad, and one day I got dragged up to the office for some reason, and Stewart McColl, MD, decided to have a go at me about health & safety in the place. And he said to me “Tell your pals down the stair that they don’t need to worry about how cold or how warm it is in there, it’s within the regulations”. I didn’t understand what he meant. So I goes down the stair and I was talking to one of the guys and I was saying to him “He just had a go at me about the heating in the place” and he went “Oh, that’s probably my fault”. I said “What do you mean?” He said “I phoned the Health & Safety about the temperatures in here and told them the place was freezing”. So, going on the assumption of that, the Health & Safety phoned him and told him that one of his workers had complained and that was why he had a go at me. There were one or two coincidences. I mean, as I was saying to you about the fumes cabinet thing, I was there 13 years and never did they ever attempt to give us any sort of fumes cabinet to do any of the gluing or cementing. Then all of a sudden it became number one priority for the two builders to get this thing built. So, within an hour of me getting put in the place, two people came in from the Health & Safety and asked me personally “Was this better for me?”. So, you know, I mean, it’s strange how these things happen, likes 13 years of getting nothing and then all of a sudden you get this fumes cabinet’.

Laurence reported a lack of consultation between HSE and workers at the plant.

> 'There was no communication. The only way I found out about the visits was when I actually started speaking to Ann McKechin and she started sending letters to them and she was getting responses from them. They would never call a meeting with the workforce and say 'We had a visit from the HSE four months ago, and they've asked us to do *x*, *y* and *z*, and we have done this now'. They would never do anything like that. They would never consult the workers regarding any working practice or anything. There was no consultation with the workers regards health & safety, working practice or anything. Nothing. The only time they consulted the workforce was if they got a new job and they didn't know how to do it and they would try and nip your brains about how to do the job. That's the only time. That's the only way they would consult the workforce'.

The lack of consultation with HSE inspectors was of particular importance, due to the lack of communication by management of the outcomes of HSE visits.

> 'But we never received any communications from the company or the HSE before or after their visits. I tried after the visit of the Health & Safety, and even after I left the place to get information. I mean, I still kept, up to within maybe a week of the disaster, I was still phoning the Health & Safety trying to get them to tell me if it was safe for me, if these chemicals were doing me any harm. And not once did that ever get anybody from the Health & Safety to respond and tell me if the chemicals. Even after I left the place I still, you know, I tried to contact [named HSE Inspector] and I tried maybe within the three weeks of my leaving, up to the disaster, maybe three or four times I phoned the Health & Safety in that period and [this Inspector] was either at meetings or she was out or she was this or that and she never ever returned my calls'.

The only time Laurence did experience the HSE approaching him at ICL/Stockline was when they revealed his identity to management and asked about the complaint he had made.

> 'The only thing the HSE Inspectors asked me when they visited was, "Was it better for me?" when that fumes cabinet was built. That was all they asked me. I don't know if they were speaking to anybody else. To my knowledge they didn't speak to anybody else and they didn't call a meeting of the workforce. I don't know what the HSE inspectors asked management on their visits. I don't know if they asked about consultation between management and the workforce. I don't know if they asked the company because the company wouldn't tell us. And subsequent to that, in the correspondence between Ann and HSE, there's no mention of that. As far back as 2000/01, which is referred to, although they are not on inspection reports, there's nothing about any form of consultation'.

Apart from this meeting, the only contact Laurence had with HSE was following a request he made under the Freedom of Information Act.

> ‘The only time that they have actually tried to speak to me was after I put a letter in asking for details under the Freedom of Information Act. Then they did send me a letter saying that because all the information had been sent to the police, they did not have any to give me. Two weeks after that my son told me “Look, I’ve just had a letter from my lawyer” and in it there were all the details about me and the visit they had made. Bits had been blanked out, so it was very hard to read but it did have my name on it and other names. So I actually phoned Stewart Campbell’s office [HSE Director Scotland] in Edinburgh and tried to speak to him because I wasn’t happy about this. On the front of the letter they stated that the Data Protection Act was the reason why they blanked out people’s names but they had sent my details with my name to somebody else. Although it might be my son’s lawyer it was definitely about me. And the Health & Safety, in their letters, they did refer to me as Senior and him as Junior’.
>
> ‘So I contacted Stewart Campbell’s office and he was away on holiday at the time. So then I tried to contact Stewart North at the HSE in Glasgow. Within about half an hour of me phoning my mobile phone rang and it was Stewart North. He said “I hear you have been trying to contact me”. I said “Oh it’s not before time, I’ve been trying to contact you for months now”. And he went “We have been trying to get a hold of you and we couldn’t get you”. I said “Well, how long did you try today, how many phone calls did you make today to try and get me?”. He went “One”. I said “Funny how half an hour ago I phoned Stewart Campbell’s office and within half an hour of me phoning you phone me.” He said “Oh it’s about your complaint. All we were trying to do was do you a wee favour”. I said “But a couple of weeks ago you sent me a letter telling me you didn’t have any information.” “No, we don’t have”. I said “How can you send that out”. “I’ll have to look into this and I will get back to you but I would like to apologise”. But he never ever did get back to me. Somebody in there had made a mess of it and they were just trying to sort of see what I was going to do about it. That was it. That’s the only time I’ve ever got any response out of them, when I phoned Edinburgh. Any time I phoned the Glasgow Office they weren’t in, couldn’t talk, they don’t know. That was all you ever got’.

According to some ex-workers, the changes made after HSE intervention were by and large cosmetic changes.

> [As a result of the HSE's involvement] if there were any changes they were very minor, if anything, you know. Stewart McColl was, I would say, in the last sort of few years, it's not that he was safety-conscious, he was a great one for putting up signs for safety first, you know, wear gloves, wear this, wear that, wear the next thing. I would say it was more like a cosmetic thing, you know. There were lots of signs all over the place and for somebody walking in, whether it be a customer or whoever, then they would see all these safety signs or whatever. When he took over as the MD of – see he used to just be in charge of Stockline – but then he took over as ICL and that gave him sort of control of the whole place, the day to day running of it. Then he started to make things look better, if you know what I mean, a wee bit tidier and a bit cleaner'.
>
> 'I would say even in the coating shop, a lot was cosmetic as well. I mean, the practices didn't change, you know. Before Stewart McColl took over they were doing the same jobs as when he was there. You know, there wasn't a change in the working practice, if you know what I mean. It might have looked different. The thing was if you walked through the coating shop and there could be a canister there, and all the different things that could go wrong, that paint or whatever it was could be lying there, lying opened with whatever solvents lying about it. But then if there was an Irn Bru bottle then he would go absolutely bananas. It was things like that. Chemicals could lie all over the place and that wasn't a problem. But if you had a bottle of water or a bottle of Irn Bru on your bench then that was a major health and safety issue'.
>
> 'After the HSE visits things they did put in some storage cupboards, but they were never locked or anything – you could do whatever you wanted with it. I could take a 5 gallon drum [of x] out of the cupboard, and I could leave that lying on my bench. If there was a bottle of Irn Bru beside it he would come down and go bananas about the bottle of Irn Bru "Get that in the bin". This didn't change after the HSE visits'.

Laurence's recollection was that the 'walk throughs' made by HSE Inspectors on their visits were brief and lacked thoroughness.

> 'How do you look at something individually? Do you actually stop and have a proper look? You might have a glance and look at something on the way past. How many of the HSE inspectors knew that one of the ovens used to be a bin lorry? They must have walked past that. If they knew that was a bin lorry, I'm quite sure they would have said "Wait a minute, that's a bin lorry". They might have done something. Did these people actually know what they were looking for? The last time I saw the Health & Safety come in, it was in a wee room and that's the only place I saw them. If they were outside and they had a look at machinery I wouldn't see them doing that because of the layout of the building. It was like, if they were beside you, you could see what they were doing, but then they would move on to another part of the building, or they might not have gone into another part of the building, you wouldn't know, just because of the layout of the building. You would only see them where you were working. They were in our department for two minutes, that was all, absolutely minutes. They weren't there for any length of time'.

> 'To my knowledge the HSE never did an investigation of air quality. But that was one of the things I had asked them. When I spoke to the Health & Safety, when I started to read up on a lot of these chemicals, a lot of them will tell you about [the importance of] the point of extraction, you know, or general extraction. Well, we didn't have any extraction in there whatsoever. So I asked the Health & Safety about this. So they knew prior to coming in. To my knowledge they never attached or used a meter or monitored the air quality'. .

In the 10 month period between June 2003, when this HSE inspection took place and April 2004, when LC left ICL's employment, Laurence was not contacted by the HSE there were, to the best of his knowledge, no further visits made by the HSE to the factory and no obvious attempt to ensure the effectiveness of the fumes cabinet.

> 'I still wasn't happy and I contacted Ann [McKechin] who was still in the process of trying to get some details or answers or whatever out of them. She was just getting letters that weren't really telling them anything at all. In that period I contacted the HSE a couple of times and said that I wasn't happy. I said "Why won't anybody tell me was it safe, was it not safe or whatever?" I had asked them a few different things but they never ever contacted me. I can't remember them ever sending me any letters or anything or explanations. I wanted to know about the chemicals, which had been the whole idea of me contacting them to start with. I think one time somebody said to me that the proper things were in place or something along these lines. Well, I pointed out that I had read all the data sheets which called for at the point of extraction and impervious gloves and other different things. I said "There is no way that any of that was in use the day that you came in so how can you say that the proper practices are in place?" But I never got a response to that. Between when I left in April [2004] and May, when the disaster happened, I contacted Health & Safety because I was just livid with them and I wanted answers. I contacted them and – nothing'.

6.4 Summary

In summary, the evidence that we have from this testimony highlights several key problems with HSE's approach to regulating safety at ICL Stockline.

First, the HSE failed to recognise the nature of industrial relations at the plant and the potential problems that employees might face if management discovered that they had approached HSE with complaints about health and safety. This failure is summed up by the readiness with which HSE inspectors revealed the identity of Laurence in full view of the managers he had complained about. This episode revealed at best a staggering naivety on the part of HSE and, at worst, collusion with management that risked compromising workers' employment status.

Second, HSE failed to recognise the importance of keeping lines of communication open with workers as well as with management. Laurence Connolly's testimony demonstrates HSE's failure to have communicated with workers either before or after regulatory contacts with ICL/Stockline. This failure meant that workers were denied important information gathered by HSE relating to their employers' compliance with the law and relating to the risks to which they were being exposed. HSE's abject failure in this respect disempowered workers in their efforts to improve health and safety conditions at the plant.

Third, HSE inspections were, according to this testimony, too superficial to comprehend the complexity and gravity of the hazards that workers were exposed to in the plant. Thus, it appears that key features of the risks that workers were exposed to (air quality and the integrity of purpose built equipment in the plant itself) were barely investigated. The need for a more comprehensive approach to the ongoing inspection of safety critical features of safety management and the management of hazards is supported by the evidence provided by workers in this report. Only comprehensive testing of known process hazards and full communication with workers would have improved HSE's ability to identify the key problems at the plant.

Fourth, and following the previous point, the ability to identify health and safety problems during HSE 'walk-through' inspections would certainly have been limited by the advance warning that preceded visits and afforded management the opportunity to make a quick health and safety make over.

All of those features of HSE's approach to regulating safety at ICL/Stockline stem from the 'compliance' regulatory philosophy adopted by HSE outlined in the introduction to this section in which the trust and co-operation of managements is the primary aim of the regulatory process. This brief exploration of the regulatory issues relating to ICL/Stockline reveals the fundamental contradiction that exist in a system of regulation that is heavily biased towards the protection of managements' right to manage, even where this involves a serious compromise of workers' safety and health.

Section 7 Other Regulatory Aspects

7.1 Introduction

In this section of the report, we consider other aspects of the broader regulatory framework. Having examined the Health and Safety Executive's role, responsibility and actions in relation to ICL/Stockline it is necessary to consider those of other regulatory agencies. This section begins by considering the range of regulatory responsibilities that fall under the remit of the Scottish Environmental Protection Agency and Glasgow City Council, before exploring issues relating to building control in some detail.

7.2 The Regulatory Role of the Scottish Environmental Protection Agency

The Scottish Environmental Protection Agency (SEPA) is responsible for pollution prevention and control, and for the investigation of environmental protection laws and enforcement of breaches of those laws. SEPA is likely to be involved in factories where there are chemicals and substances being used or stored that may present a risk of major hazard, or if the release of chemical or the use of substances such as asbestos is likely to present a danger to public and environmental health outside the factory.

The only work carried out by SEPA in connection to ICL/Stockline in Maryhill appears to have begun and ended on the 11th May 2004, the day of the explosion. On this day, SEPA gave the emergency services permission to remove "special waste" [asbestos] before the necessary three day notification period. It also advised the emergency services that asbestos waste could be safely stored overnight in the containers they proposed to store it in and that an asbestos removal company would be able to dispose of the waste.

Over and above this advice to the emergency services, a SEPA memorandum dated 11th May 2004 (written by Douglas King, Waste Specialist II, Glasgow Team and sent to Malcolm Mathers, Directorate of Operations) records two telephone conversations on the day of the explosion. Both conversations took place between Dr Helen Irvine, Consultant in Public Health Medicine, Glasgow Health Board and Douglas King of the SEPA Glasgow Team. The first call from Dr Irvine was to inquire whether the SEPA had regulated or had been aware of Stockline Plastics.

The following extract from the memo gives the detail of the second call.

> Dr Irvine asked whether or not SEPA would investigate the site retrospectively to establish whether or not the activities undertaken by Stockline Plastics required some level of authorisation or not. D King suggested to Dr Irvine that she formally wrote to SEPA with the relevant information gathered during her investigation. Dr Irvine took exception to this comment, and stated in an abrupt manner that a letter was hardly appropriate when people had died and 50 people had been injured. D King tried to explain what he meant by recommending this course of action, however Dr Irvine became increasingly annoyed and would not allow him to explain.

Dr Irvine's inquiries raised an important point here in relation to the need for a retrospective investigation into ICL/Stockline and the environmental hazards posed by their storage of chemicals and harmful substances. The question has been answered by subsequent events. SEPA were not involved in the wider investigation into the disaster, were not kept informed of the investigation and were not asked to contribute in any way. In a Freedom of Information response dated 13th June, 2005, SEPA notes that,

> "[T]o date SEPA has not received a report on the explosion from the HSE nor a request for input. The HSE is the lead enforcing authority for the Stockline Plastics site as there has been a serious accident resulting in fatalities. We have not investigated retrospectively whether the activities undertaken by Stockline Plastics at the Maryhill site fell under legislation for which SEPA enforces. Our interest in such a site would be in relation to pollution control matters rather than health and safety which is the remit of the HSE."

This response raises wider questions in relation to the co-ordination of regulatory authorities generally. In fact, the investigation after the 11th May explosion took a normal course. It is very rare for SEPA to conduct joint investigations with HSE into such incidents. Perhaps more significantly, given the joint interest that those agencies have (for example both agencies are jointly responsible for enforcing some regulations such as COMAH) it is rare for investigation information and information that relates to enforcement activity and prosecutions to be passed between the agencies (Tombs and Whyte, 2007). ICL/Stockline provides a good example of the importance of closer collaboration between regulatory authorities. As this section has noted, the explosion at ICL/Stockline involved potential hazards to public health and environmental safety and SEPA were required to give advice on those hazards to the emergency services. Yet SEPA had no records on the chemical and substance hazards that might be contained within the site. SEPA would certainly have been in a stronger position to offer advice had it possessed some prior knowledge of the factory.

7.3 The Regulatory Role of Glasgow City Council

Relevant local authority regulatory responsibilities that apply to health and safety issues at the ICL/Stockline site are administered by two departments of Glasgow City Council. Environmental Protection Services are responsible for enforcing some public and environmental health regulations and Development and Regeneration Services are responsible for building control and public safety regulations and planning and development control.

Normally, Glasgow City Council would not have responsibility for enforcing public health and environmental health regulations or conducting investigations into a factory such as ICL/Stockline, unless it had received a complaint from a member of the public. In a response to a Freedom of Information request, dated 3rd August 2005, the City Council confirmed that the relevant sections (the Public Health Unit and Asbestos Unit) had no record of any complaints from the public or records of inspections and investigations in relation to ICL/Stockline.

Any significant changes to buildings would require the prior approval of Glasgow City Council to ensure that proposed building work complies with the relevant building standards regulations. A building warrant is required if alterations are likely to affect the structural soundness of a building, drainage, ventilation and health and safety aspects of the alteration. A warrant is also required for most demolition work and for the change of use of buildings. Planning permission is a separate procedure which covers more significant building work and is normally required when the alteration is likely to have an impact upon on the local neighbourhood and community.

In the same Freedom of Information response detailed above (dated 3rd August 2005) Glasgow City Council confirmed that it made no visits, inspections or investigations with regard to building control prior to 11th May 2004. There is no record of any building warrant applications having been lodged for the site and Glasgow City Council had no record of any previous planning history in the form of planning permissions or enforcements. This is confirmed by the investigations made by Dr. Stirling Howieson detailed below.

7.4 Research into the Factory Premises (Grovepark Mills) and Building Control

In this sub-section we examine issues relating to the built environment of the factory premises and to building control regulation. In particular, this sub-section draws upon the expertise and research of Dr. Stirling Howieson (Department of Architecture, University of Strathclyde). In the first part, Dr. Howieson presents a summary report of his involvement in the BBC Scotland programme 'Frontline Scotland' which was broadcast on 5 October 2004. On the basis of the extant knowledge, Dr. Howieson made a number of observations regarding the structure of the building and some of the reasons for its possible collapse. It should be emphasised that these comments do not pertain to the causes of the explosion but attempt to provide some insight into the possible reasons why the building collapsed so readily. In the second part, Dr. Howieson reports on research he conducted into the records held by various public bodies on modifications made to the building.

7.4.1 Why did this factory collapse?

'In mid-September 2004 I was approached by the BBC (Frontline Scotland) and asked whether I was willing to comment on the evidence they had gathered regarding the collapse of the Stockline Plastic factory in Maryhill. At a subsequent meeting on 20th September I was shown a 3D simulation that their graphic technicians had prepared and a set of building plans purporting to illustrate the layout and basic constructional techniques. The question was posed as to whether the factory could simply have collapsed under its own weight, given the amount of materials being stored on the upper floors.

The programme makers also presented anecdotal evidence from the factory workers' testimonies, suggesting that the building was showing evidence of being under considerable structural stress:

1. The ground floor joists had for many years been reinforced with a large number of steel supports (ACRO props) situated in the basement. These adjustable scaffolding poles had no foundations and were supported on the "bare earth" solum.
2. Several floors were reported to be "bowing" (mid-span joist deflection) and plywood sheeting had been laid in many areas to either spread the load or level the floors.
3. At least one slapping had been made in the external brick supporting walls to facilitate a new fork-lift loading bay.
4. Cracking to brickwork walls at an external corner on the top floor, suggested structural movement (external wall leaning out).
5. There was a suggestion that a water course ran underneath the factory and that the night before the collapse saw a high level of rainfall.

Given the above evidence I felt able to make the following comments :

1. The building (constructed before the advent of professional structural engineers) appeared to be of structural masonry walls with a number of mid-span cast iron/steel columns supporting a central row of beams which in turn supported half the load on the floor joists.
2. Anecdotal evidence strongly suggested that the building was under considerable structural strain from additional live loads (palletised materials/gas ovens etc) which were producing (possibly combined with high hygro/thermal fluctuations) significant mid-span deflection in the timber floor joists.
3. It was likely that mid-span joist deflections on the ground floor had led to additional temporary supports being installed in the basement to 'shore up' the joists which were struggling to cope with new applied live loads from materials storage and large scale gas ovens. The installation of ACRO props however, would normally be considered as a temporary measure.
4. Given the possibility of flood water entering the solum and undermining the ACRO prop footings it was possible that this, in itself -or as a contributory factor - could have led to progressive and catastrophic structural collapse'.

7.4.2 Further Investigations and Evidence in Relation to Building Control

'Following the Frontline Scotland broadcast on 5th October 2004 I was subsequently contacted by academics at the Universities of Strathclyde and Stirling, who were undertaking an independent investigation into the circumstances surrounding the disaster and was invited to make further comments on the structural integrity of the building and whether there was any evidence of problems that would have been sufficient to warrant pre-emptive remedial measures.

'Despite there being a paucity of information regarding the building's construction there was evidence from the workers' testimonies that relatively major structural alterations had been carried out to the building during the previous 20 years [16]. Such work was of a scope and scale that would require a Building Warrant. A search of the records held by Glasgow City Council, Environmental Protection Services, Building Control and Public Safety was then undertaken. A letter from Glasgow City Council dated 25th May 2005 confirmed that there was no record of any application for a Building Warrant being submitted after 1981 (other than an unprocessed application lodged in 1993 no.1310 which was for storm damage) and all drawings before this date would have been passed to the City Archivist located in the Mitchell Library.

‘A subsequent search on 6th June 2005 of the Mitchell Library archive of all applications pertaining to any work contained within the boundaries of Grovepark Street, Hopehill Rd and North Woodside Road failed to find any warrant covering structural slappings or any alterations to the Stockline/ ICL factory’.

Two conclusions can thus be drawn:

1. Any works to the factory were carried out without submitting for Building Control or Planning approval.
2. An application for Building Warrant was submitted but not recorded and all drawings/records have subsequently been lost’.

‘The implications of scenario 1 are profound. It is almost inconceivable that the managers of a major manufacturing company dealing in hazardous materials and processes would make major structural alterations to their factory - which was already appeared to show signs of structural stress - without commissioning an architect or structural engineer. Engaging a building professional would have provided the opportunity to assess the ability of the structure not only to accommodate any new load paths resulting from the alterations, but also to assess the current performance of the building in terms of existing load paths, excessive deflections and structural movement’.

‘Cutting and removing areas of external loadbearing brickwork results in the dead and live loads being redistributed via the new lintel to the surrounding brickwork. This may have required the brickwork surrounding any new slapping to be reinforced. As the new fork lift loading bay was reportedly two stories high, the redistribution of loads could have been a significant factor compromising any safety margins’.

7.5 Dr Howieson’s Conclusion

‘Although the specific trigger that resulted in the collapse of the factory has not as yet been made public [at the time the of Dr. Howieson’s investigations], the question remains as to why such a factory - which was clearly demonstrating symptoms of structural stress under increasing live loading conditions - was allowed to accommodate a variety of hazardous processes with a high explosion risk? The anecdotal evidence from the workforce points to the management adopting a "running repairs" strategy to floor joist deflections and cracking brickwork, rather than undertaking a detailed structural assessment of the building’s capability to support live loads from material storage. The reports that the ground floor had been "held up" with temporary ACRO props (scaffolding poles) for many years, provides further proof of this somewhat haphazard approach to structural safety’.

The most likely trigger for the collapse remains an explosion, which blew out an area of external wall. As all external wall areas are loadbearing (floors and roof loads) the loss of any wall area - particularly on the lower floors - would result in the progressive and catastrophic collapse of the entire building. Where there is a risk of explosion a framed structure is now required to ensure that in the event of such, the removal or displacement of an external brickwork panel will not result in similar progressive structural collapse'.

Dr. Howieson noted that the full enquiry which would examine the forensic evidence would no doubt provide a clearer picture of the mechanics of the collapse. His own investigations into the structure of the building and building control did however stimulate a number of observations and raise several questions which the inquiry would be expected answer, as follows:

'1. If relatively major structural works have in the recent past been carried out to the factory, why is there no evidence of a Building Warrant?
2. Did the management carry out any risk assessments as to whether the building structure could support the additional loadings from palletised materials and new processes?
3. Why were the repairs to the areas of the building that were clearly showing structural stress (floor deflections) of a makeshift nature?
4. Given that these structural problems were evident to many of the workforce why did the management not engage a structural engineer to undertake a use and condition survey?
5. Why was a factory, which was clearly demonstrating symptoms of structural stress, allowed to accommodate a variety of hazardous processes with a high risk of explosion?
6. Who was primarily responsible for ensuring that the structural integrity of the factory was regularly assessed and what statutory/executive agency is responsible for ensuring such inspections occur?'

7.6 Further Investigations

'After further investigations it appears that in 1993 an application for a Building Warrant (no. 1993.1310) was submitted to cover "storm damage" to the ICL factory. It does not appear that any warrant was however either issued or discharged (normally signifying completion of the works to the agreed standard). There is reportedly a file note saying that storm repairs do not require a warrant. I have requested that Building Control confirm that this is the case, in writing. No drawings can be found either at Building Control or at the Mitchell Library'.

The outcome is thus as expected. Building Control have no records of any warrant applications and thus any significant alterations to the factory (slappings for fork lifts etc) undertaken over the last 25 years, as reported by the workers [16] have been "illegal".

If this work had been done properly and professionals employed to undertake calculations it would have increased the likelihood of an Architect or Structural Engineer being allowed the opportunity to view the building and identify any shortcomings in the structural integrity re: the imposed loadings/ beam deflections and 'ACRO' props in the basement. Any alterations appear to have been done without any specialist engineering input that would have calculated the loads on the new steel/concrete RSJs/lintels.

The implication seems clear. If this was the cavalier attitude taken by the management to such an important area (statutory duties regarding building regulations) we can conclude that it is likely to have been symptomatic of their approach to health and safety in general.

Section 8 Conclusions and Recommendation

Introduction

In the years prior to the catastrophic and deadly Stockline explosion in May 2004 there was extensive and damning evidence of serious health and safety concerns regarding work processes, health and safety management and health and safety oversight at the plant.

Accounts from former workers reveal basic health and safety measures including training, personnel protective equipment, occupational hygiene controls and monitoring and provision of information were frequently either inadequate or entirely absent, creating serious risks of injury and acute and chronic work related ill-health. Injuries and occupational health problems including frequent cases of polymer fume fever provided concrete evidence that this was a real and ongoing concern.

The legally required health and safety consultative processes with the workforce were not in place. The management culture actively discouraged worker participation, including any attempt to raise concerns about health and safety.

The building itself was neither safe nor suitable for the purpose, amplifying the risks already inherent to poorly managed, high risk processes.

Oversight by statutory authorities was inadequate and allowed a continuation of work processes in unacceptably hazardous conditions. Problems remained unresolved and clear breaches of health and safety law remained unprosecuted.

The Need for a Public Inquiry

Regulation and Management of Health and Safety in Scotland

The systematic failures that led to the ICL/Stockline explosion raise key questions about the regulation and management of workplace health and safety in Scotland and the working conditions and employment relations in such companies.

- How can a modern system of health and safety regulation permit the routine exposure of workers to chemicals that are known to be deadly under conditions where they are denied basic information and protective equipment?
- How can those exposures be tolerated and even encouraged by managements in plants such as ICL/Stockline?
- How can the experience and knowledge of workers be treated with such disdain by a management that was clearly aware of the risks that they were exposing their employees to?

- How can the full litany of poor health and safety practices not have been understood properly and acted on appropriately by HSE inspectors when they visited the plant?
- How can whistleblowers such as Lawrence Connolly fail to be protected – and indeed be made more vulnerable - by HSE intervention?
- How can a militantly anti-trade union plant such as ICL/Stockline escape the scrutiny and surveillance to ensure that it is legally compliant with health and safety and employee consultation regulations and laws?

Those are questions that we should not expect to be asking in Scotland at the beginning of the 21st century, but they are questions that do need to be answered if we are to understand why Scotland has such a poor health and safety record. The authors of this report are aware that the problems we have identified in this plant are not unique or isolated conditions. The routine risks to which workers were unnecessarily exposed are particularly acute at ICL/Stockline, but collectively we have knowledge of similar conditions that are replicated at very many workplaces up and down the country. The questions outlined above, therefore do not only pertain to the circumstances surrounding the event of the 11th May 2004, but raise questions that are clearly in the public interest.

As this report has outlined, there are fundamental questions about the role that HSE played in the regulation and oversight of the plant that could not be investigated thoroughly in the criminal case brought against ICL. Since the HSE played a leading role in the investigation and subsequent prosecution, we would not expect a thorough inquiry into the role of the agency. Neither would it be appropriate for the agency to conduct such an investigation in the context of a criminal case. This may be something that is conducted subsequent to the completion of criminal proceeding, as an internal exercise by the HSE, but a full review of the HSE's role in the regulation and oversight of the plant can only be undertaken by a full public inquiry.

Prosecuting and Punishing Corporate Crime in Scotland

There are also fundamental questions about the decision to prosecute in the ICL/Stockline that bear upon the more general issues of prosecution for serious cases of corporate crime in Scotland. In our view, only a public inquiry can answer those questions. In the case of the ICL/Stockline prosecution, it is not known at the time of writing this report why, or on what basis the prosecution opted for charges under the Health and Safety at Work Act (1974), as opposed to a prosecution for the common law offence of corporate homicide. It is likely that this decision was influenced by the general pessimism in the Scottish legal profession about such prosecutions following the successful appeal against Transco's prosecution for corporate homicide in June 2003. In the Transco appeal the court ruled that although the offence of corporate homicide was admissible in Scotland, that in the case of Transco such a charge was inadmissible.

The case was also significant since the court ruled that companies *can* be prosecuted for the offence of 'culpable homicide' and indicated that the legal test that must be met was less strict in Scotland compared with England and Wales. Nonetheless the cost of the prosecution of Transco, combined with the crown's failure to secure a prosecution created a climate in government and in the wider legal profession that undermined support for the prosecution of such cases. Only a full scale public inquiry can investigate the following issues in relation to how decisions are made to prosecute corporations for committing the most serious offences.

First, why was there no decision to prosecute for the offence of corporate homicide in this case? The key problem in the Transco case was that the criminal actions or inactions of those in positions of sufficient authority could not be identified in a way that could trigger corporate liability. Yet in smaller companies like those prosecuted for the ICL/Stockline explosion, a charge of corporate homicide is more easily brought since the conduct of an individual with sufficient authority and responsibility for the offence can be used to construct corporate criminal responsibility. As we have detailed in this report, the level of knowledge of the day to day operation of the plant, and the degree of senior management/director negligence that this implies a *prima facie* case for corporate manslaughter. There may have been complications in relation to the death of key senior managers in the explosion. But this would not present a legitimate barrier to prosecution for such an offence.

Second, there also remain questions about whether the prosecution of individuals in positions of authority (either under the Health and Safety at Work Act or for the more serious offence of homicide) might have been appropriate in this case. Notwithstanding the fact that key senior managers in this case are deceased, the level of day-to-day oversight by other key senior managers/directors suggest that there should have been a prosecution for a homicide offence or under section 37 of the Health and Safety at Work Act. The key issue of public interest here is how to ensure deterrence when the owners and senior managers are able to hide behind the corporate veil to avoid punishment for very serious offences. The ICL/Stockline case raises once again the issue about whether it is appropriate to prosecute individuals and/or the company for serious safety offences.

There therefore remain wider questions of public interest about the way that more serious safety offences should be prosecuted. All of those questions identified above are made more significant in light of the government's new Corporate Manslaughter and Corporate Homicide Act that passed through Parliament in July 2007. It is crucial that we understand how the new law might be applied in relation to prosecutions for offences such as are found in the ICL/Stockline case. Those questions are complex ones and are of such immediate public importance that they are most appropriately dealt with in a full public inquiry.

Most offences that are prosecuted under health and safety law, will, no matter how serious, incur a fine. Fines following health and safety convictions are notoriously low. The average fine in the UK for a prosecution of a health and safety offence following a fatality is less than £45,000. This level was reflected in the sentencing of the two companies successfully prosecuted for the ICL/Stockline explosion. The total fine of £400,000 works out at £44,000 per human life, or much less if the number of serious injuries is taken into account in such a reckoning. The first problem, then, is that fines for health and safety offences use an 'inchoate' mode of reasoning; that is, they do not reflect the gravity of the harm cause.

Such fines are also often very small when taken in comparison with the profits of the companies they seek to penalise. So, even the £15m record fine levied on Transco Plc in August 2005 amounted to less than 0.16% of the company's turnover in 2004. This is the numerical equivalent of a fine of £40 to someone earning £25,000 a year, typically lower than the level of fines imposed by local authorities upon local citizens who allow their dogs to foul public spaces. The problem with the current system of punishment as it applies to companies such as ICL/Stockline is that fines neither reflect the gravity of the offence nor the ability of the offender to pay.

The Centre for Corporate Accountability has proposed a formula for a unit fine that would take account of the gravity of the offence and ability to pay. In this formula, the courts would set a percentage at a level that would reflect the seriousness of the offence. This percentage would then be applied to an average of either the turnover or the profit of the firm over three years in order to determine the level of fine. Such a system would be an obvious way to bring fines into line with the purpose of imposing punishments that are proportionate to the offence and to the offender's ability to pay.

Moreover, because fines are levied on the organisation generally, rather than targeted at a particular group within the company, those costs can be absorbed by the organisation as it sees fit. The costs of even the largest fine might be offset against a particular budget heading (they might result in cuts to running or maintenance costs that may even worsen the management of safety in an organisation), or they may be passed onto customers and clients in the form of price rises, or to suppliers by reducing the market value of a product. The costs of fines may even be passed onto workers - those most endangered by safety offences - in the form of wage cuts or adverse changes in working conditions. One solution developed by lawyers in the US is to impose fines upon the value of the firm, rather than upon its running costs. 'Equity fines' enable the courts to order offending companies to issue a set number of new shares in the firm that are place in a fund administered by a state-controlled compensation fund. This system punishes those that benefit the most from corporate offending (owners and shareholders) and avoids redistribution of corporate punishments to the most vulnerable groups. Such a system could greatly improve corporate criminal accountability, particularly when punishing small firms like ICL/Stockline.

We have set out here two options for the reform of the system of sentencing corporations that commit serious health and safety offences. There are a much greater range of corporate punishments that are in use in other jurisdictions that could be useful to the courts. The ICL/Stockline case starkly reveals the weaknesses in the limited range of option that are currently available to the courts. Again, those are options that we believe can only be explored adequately by a full public inquiry which has the remit to do so.

Only a Public Inquiry Can Explore those Questions

All of the questions that we raise here were not, nor could have been, answered in a court hearing that lasted a few days and was consumed by the fine detail of legal procedure. Neither are they questions that are likely to fall within the scope of a Fatal Accident Inquiry. In any case, the criminal court is not the place to explore such questions of wider public interest. We therefore conclude that it is imperative that the First Minister sets up Committee of Inquiry into the ICL/Stockline explosion with a remit to consider the regulation and management of health and safety in Scotland to establish the broader lessons that we can learn from this tragedy.

PROBLEMS AND RECOMMENDED SOLUTIONS

The key recommendation of this report is for a full public inquiry into the circumstances surrounding the ICL/Stockline tragedy that has a remit to explore more generally the management and regulation of health and safety in Scotland. We would not wish to pre-empt the findings of such an inquiry. However, the evidence from this report does allow us to draw some preliminary conclusions about some key general problems with the regulation and management of health and safety, and propose some solutions that should be explored by a full public inquiry.

1. Problem – the role of agencies such as the HSE in inspecting, regulating and enforcing health and safety laws has proved limited and inadequate in an agency lacking leadership, staff and resources as well as powers to do their job. The role of the HSE in inspecting all aspects of the plant that merited attention and effectively enforcing the legislation, on the basis of the employees' accounts, has been highly problematic

The Health and Safety Executive currently faces two forms of pressure from government that is likely to make routine inspections and regulatory contacts even less frequent than they are at the moment. First, as we have noted in this report, real terms reductions in the Executive's budget will mean yet further reductions in the number of inspectors and the number and quality of inspections and investigations they are able to make. Second, the introduction of the Hampton Report, based upon the idea that there remain too many regulatory burdens placed upon British businesses, will provide political justification for even fewer regulatory visits and a reduction in enforcement work. For example, the government's new Compliance Code, which, at the time of writing this report is out for consultation, states that it seeks to implement the Hampton principle that "no inspection should take place without a reason." In our view, the key problem with the regulation of ICL/Stockline was that the company felt no regulatory burden at all. Indeed, the evidence that we have leads us to the conclusion that in the absence of strong workforce representation, this is a company that could have been incentivised into compliance only with regular HSE visits and regulatory interventions.

Solution in Scotland and beyond –

- Contrary to the current direction in government policy, HSE should be adequately resourced and empowered to conduct its duties. At a minimum, we propose that HSE is funded to a level sufficient to ensure that each workplace employing 10 people or more can expect at least one inspection per year.
- Review of how HSE Scotland and the HSC in the UK operates. An urgent need for sufficient inspectors with the time, resources and training to inspect, monitor and effectively enforce the laws in factories like Stockline. There may be a powerful argument for the HSE field inspectorate to be devolved rather than reserved in Scotland to ensure full national accountability and scrutiny.

2. Problem – Our report reveals that in plants such as Stockline, workers are exceptionally well informed about the work they do and can identify both hazards and solutions to those hazards yet they often remain powerless. With no rights for trade union roving safety representatives to check on such plants and no effective means to ensure proper consultation between employers and non-unionised employees on health and safety matters, the workforce were effectively cut adrift.

Solution in Scotland and beyond –

- Rights of workers, in trade unions and non-unionised – need to be extended and their position more effectively protected when they raise health and safety concerns. Roving trade union safety representatives would ensure greater monitoring of SMEs like Stockline. Small and medium sized firms (SMEs) have been recognised by HSE itself in various reports as a sector where implementation of COSHH and other measures has been poor.
- Extended rights for safety reps, in line with the Hazards Charter, on stopping hazardous work processes are needed too including the right of such reps to issue provisional improvement notices. Improved and effective consultation rights on occupational health and safety – and related protection - for employees in non-unionised workplaces are also critical. Employment Tribunals should extend Interim Relief measures to workers dismissed for Health and Safety matters.

3. Problem – lack of clarity in relation to who should be prosecuted for serious corporate offences and how they should be prosecuted. The UK Corporate Manslaughter and Corporate Homicide Act is not specific to Scotland and fails to allow individuals to be prosecuted even when they are shown to be culpable of serious offences.

Solution in Scotland and beyond

- A Scottish Corporate Killing Act is needed with individual director, senior manager accountability. This Act should also ensure that assets reclamation is both possible and fully enforced for those employers who kill, injure and make their workers ill. The latter has been applied in England with regard to employers creating asbestos hazards and should be fully operationalised in Scotland.

4. Problem – Occupational health and safety in Scotland and beyond has been constantly downplayed in policy agendas. There are too few occupational physicians and occupational health nurses working in HSE in Scotland to pursue the serious occupational health problems reported by the Stockline workers. What resources there have been have all too often been diverted into workplace health promotion initiatives in Scotland or in the rhetoric of partnership working that has produced little evidence to show any impact.

Solutions in Scotland –

- An independent, securely funded and properly resourced Scottish Hazards Advice Centre should be set up, along the lines of the Greater Manchester Hazards Centre, to offer advice and information and advocacy to workers in all workplaces, whether unionised or not.

- The evidence in this report also suggests an urgent need for:

    - An institute to deal with toxics use reduction in UK along the lines of the institute in USA. This body would advise governments, employers and employees on how to reduce exposures to and use of toxic substances in workplaces thereby reducing worker and environmental hazards.
    - Improved systems for reporting and recording known and suspect occupationally caused and occupationally-related diseases including cancer registries that automatically recorded all the occupations of patients.
    - Further development of occupational health and safety education programmes for workers on action research and risk and body mapping. This research has demonstrated the value of worker participatory action research in exposing hazardous working conditions when governmental agencies - through a lack of time, staff, resources, commitment and policy - have failed to do so.
    - Independent occupational health services in primary care and NGO settings

5. Problem - the failure of key regulatory agencies to provide a co-ordinated approach to health and safety regulation at ICL/Stockline in a way that could have alerted those agencies to the serious problems at the plant.

Solutions in Scotland and beyond –

- Need for development of effective policies and procedures to link HSE with Scottish Government Health bodies specifically on occupational health and safety.
- Statutory requirements for information on workplaces where problems have been identified to be shared across agencies, particularly SEPA and HSE.
- Development of a proper, effective multi-disciplinary Scottish occupational health service that covers all employees in the country and had prevention as its core principle.
- End to dissipation of funds in wider workplace health promotion initiatives and re-orientation of such bodies to focus on major occupational disease and occupational injury activity in conjunction with a strengthened HSE
- Action to draw on lessons of ICL/Stockline. Data indicate a long history of injury and worker ill-health. Mechanisms to put in place to ensure such data and reports are picked up and acted upon, as a matter of course, by regulators and health bodies. This goes beyond acting on sentinel events as the scale of problems at ICL/Stockline indicated extensive problems.

6. Problem – opacity in the accountability processes within the financial information.

Solutions in Scotland and beyond –

- Small company audits
- Changes in Company legislation regarding the provision of useful information to al stakeholder groups.

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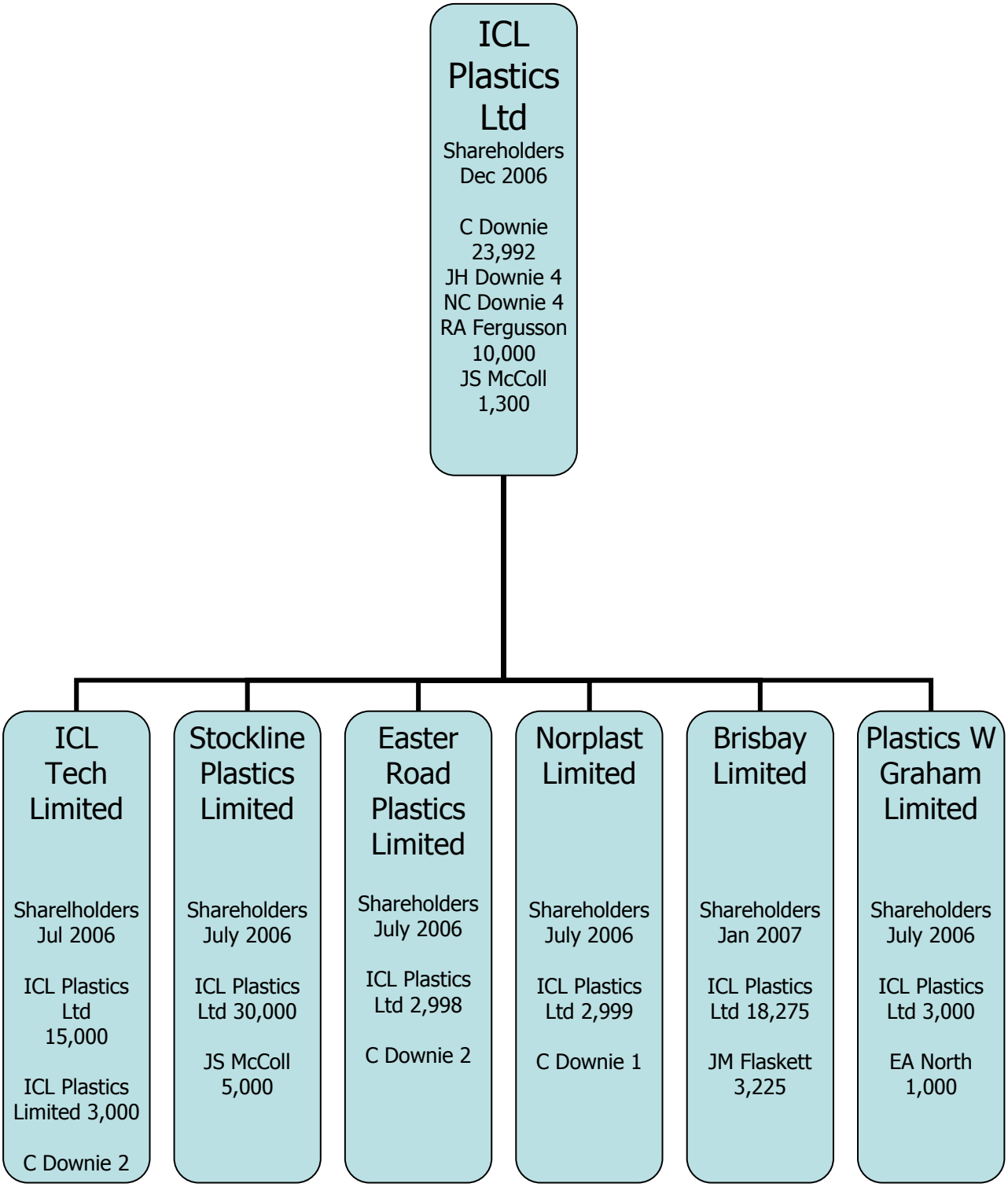
Appendix 1 Company Shareholders



Appendix 2 Trade Name of Products Reportedly used at ICL

Ciba Geigy DY 219
Durapipe Solvent cement
KoKleber HF 303
REN HY 97
Rencast Vantico – listed as an irritant
Rilprim 104 A/B – may be a primer. The product Rilprim P23 V40 contained 2 methyl 1 propanol; methyl isobutyl ketone; 2-ethoxyethanol; 1-butanol; heavy aromatic petroleum naphtha and epoxy resins. Canadian data sheet for 2002 notes that the product is a severe irritant, may be harmful through skin absorption, may cause respiratory tract irritation, allergic skin irritation, should be used with LEV and PPE needed included safety goggles and impervious gloves. Where airborne exposure is likely, a NIOSH approved respirator was recommended.
Tinuvin
Tensol No 70 UN 1133 (MSDS draft from Bostik Australia March 2004) contained styrene, polyester resin and talc. . Australian data sheet for Tensol noted need for use in a well ventilated area. “If mechanical ventilation is sued it should be suitable for use with flammable materials”. Australian labelling references to product as ‘harmful by inhalation, irritant to eyes, respiratory system and skin, flammable and do not breathe vapour’.

Appendix 3 Information Sheet and Consent Form

Information Sheet to Accompany the Consent Form

Project title:
'An exploration of working conditions, health and safety and related matters in the ICL/Stockline plant (Glasgow), based on interviews with workers, risk mapping and secondary research'.

Invitation paragraph:
You are being asked to consent to the use of your interviews in an anonymised form in the report being prepared on the above project. The report will be made publically available

What is the purpose of the project?
The purpose of the project – conducted by independent researchers based at Strathclyde and Stirling Universities and Scottish hazards groups - has been to examine aspects of the working environment, industrial relations practices, finances and health and safety conditions and policies in the plant, the company and wider plastics industry. The findings will be published in a report planned for 2006 which will be available to the public.

Do you have to consent?
No. It is up to you to decide whether or not to consent. If you do, you will be given this information sheet to keep and be asked to sign a consent form

What are the other possible disadvantages and risks of giving consent?
We are not aware of any risks attached to consent as any information you provide will be anonymised and your name will not be cited anywhere in the report.

What are the possible benefits of taking part?
The report will help to document more fully the conditions that existed in the Stockline plant prior to the explosion, and to put on record observations from those employees directly involved over many years in the operation of the factory. This may contribute to a better understanding of working conditions and better control of hazards in similar establishments in the future, and may also contribute to pressure for a public enquiry into the Stockline explosion and the role of the employer and government agencies in events leading up to that incident.

Contact details:

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After 1 February 2006:

Department of Human Resource Management, University of Strathclyde, Glasgow, G1 1XU
Phone: 0141-552-4400

Appendix 4 Timeline of Incidents/Complaints as Reported by Workers

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994												
1995		F. Stott (MD) 'anyone trying to start a union won't be here long'										
1996												
1997		ongoing employee requests for chemical gloves, overalls										workers fitting gas oven – told co. that gas pipe was unsafe
1998												
1999		complaints to HSE from employees locked & unusable safety exits			old m/c collapsed – fabrication employee cut - taken to Western Infirmary			fabrication employee phoned HSE re. cold				
2000		HSE served Improvem't Notice (COSHH assessment) & 2 Prohibition notices (saw guards			despatch employee, no licence told to use fork-lift by S. McColl			despatch employee sent to eye clinic ('skin peeling'). S. McColl involved			despatch employee raised concerns - coating shop ventilat'n with P. Ferguson	inspection of fans (by whom?) co. told 'useless'
2001								fabrication employee asked personnel manager to see COSHH Regs.				
2002						coating shop employee – doctor recorded his illnesses					fabricat'n workers phoned & wrote to HSE re. problems	
2003					fabrication employee to test if illness work-related – S. McColl refused to restart	unannounced visit by HSE to factory after employee 'concerns'		HSE visits factory (fumes cabinet just built) A.McKechin first writes to HSE (no. of letters Aug-Dec.)			HSE confirms 2000 Imp'm't Notice was self-assessed	
2004					explosion at factory							