

SAFETY CASE IMPLEMENTATION – AN AUSTRALIAN REGULATOR’S EXPERIENCE

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Each state in Australia individually regulates safety with the State of Victoria having a population of 5 million people. In June 2000 Victoria enacted the Occupational Health and Safety (Major Hazard Facilities) Regulations. These Regulations were made following the 1998 incident at the Esso Longford gas plant to further promote the safe operation of major hazard facilities in the state. As a result, approximately fifty Major Hazard Facilities had an obligation to develop and submit a Safety Case by 30 June 2002 to the Regulator, WorkSafe, (a division of the Victorian Workcover Authority) in accordance with the Regulations. The Regulator then has six months to assess the Safety Case, verify findings and make an appropriate licence decision regarding the operation of the Major Hazard Facility.

This paper discusses a Regulator’s experience and observations in Safety Case preparation, assessment, and licensing.

KEYWORDS: Safety Case, Implementation of Regulations, Major Hazards, Licensing Major Hazard Facilities, Victoria, WorkSafe, Australia

INTRODUCTION

On 25 September 1998, an explosion and fire at Esso Longford Gas Plant killed two workers and left substantial parts of the State of Victoria without gas for 10 days. A Royal Commission¹ investigated the incident and recommended the Victorian Government establish a Safety Case regime for major hazard facilities (MHFs) in the State. The Government implemented the recommendation through the Occupational Health and Safety (OH&S) Regulator, WorkSafe Victoria. After a period of intense stakeholder consultation, the *Occupational Health and Safety (Major Hazard Facilities) Regulations 2000*² (the Regulations) were introduced in June 2000, 19 months after the Longford incident.

The 50 MHFs range from four refineries operated by multi-national companies to privately owned warehouses storing material for the chemical industry as shown in Table 1. Many facilities were constructed over 30 years ago and some have changed ownership several times. The initial approach to the Safety Cases varied widely from a simple warehouse adjusting from prescriptive dangerous goods regulations to large multi-national complex facilities that were unresponsive to local regulation.

Two years after the incident at Longford, the Government had established Major Hazard Regulations with a dedicated WorkSafe Division to regulate these facilities. This paper discusses the subsequent three years when Safety Cases were prepared by Industry and assessed for licensing. The first section deals with major issues in chronological order with the second section identifying good practice from Safety Cases.

Table 1. Classification of MHFs into industry sectors

Industry Sector	Number
Chemical Manufacturer-includes explosives	21
Chemical User- includes water treatment and paper manufacturers	5
Warehouse	7
LPG and Gas Distribution	5
Petroleum Refining	4
Bulk Terminal	8
Total	50

THE REGULATIONS 1998 - 2000

The Regulations were based on the 1996 Australian National Standard for Control of Major Hazard Facilities³ which in turn was based on a draft of the Seveso II framework. The desire to quickly implement the Regulations required Industry and the Regulator to meet tight timeframes. Industry was required to submit their Safety Case within two years or by 30 June 2002 with WorkSafe allowed a further six months to assess and licence the facilities. The licence was to ensure a rigorous approach to safety and had a maximum term of five years.

Some parts of the National Standard were outside the power of an OH&S Regulator. Land use planning and environment were excluded, but the Regulations did include additional mandatory requirements such as worker involvement in the preparation of the Safety Case and performance monitoring of major hazard controls.

The Regulations are performance-based and mainly draw their power from the *Occupational Health and Safety Act 1985 (OHS Act)*. Parts of the Regulations do prescribe mandatory processes, for example the requirement to prepare an emergency plan in conjunction with the emergency services, or prescribe Safety Case content such as the requirement to include a management of change procedure. The major parts of the Regulations are shown in Table 2.

The major elements of the Regulations in Part 3 *Safety Duties of Operators* and Part 5 *Consulting, Informing, Instructing and Training* are shown in Figure 1. The Regulations outline a process for preparing the Safety Case, the safety role of employees, the requirements to review the Safety Case with an emphasis on the safety management systems and control measures.

PERFORMANCE STANDARDS UNDER THE REGULATIONS

Industry and Unions were consulted extensively during the preparation of the Regulations, but were uncertain of their performance rather than prescriptive nature, particularly the standards required for the licence. After Longford, the community and government had the resolve to refuse to licence a facility that could not systematically demonstrate adequate control of its major hazards and stakeholders wanted predictability of the outcomes.

Table 2. Major parts of the regulations

Part	Contents
Part 3	<i>Safety Duties of Operators</i> describes the requirement for safety management, identification of major incidents, safety assessment, control measures, emergency planning, and the safety role of employees in undertaking the Part 3 requirements.
Part 4	<i>Safety Case</i> describes the contents required in the Safety Case document. This includes ‘demonstrations’ in relation to the adequacy of control measures and the safety management system.
Part 5	<i>Consulting, Informing, Instructing and Training</i> describes the Operator requirements for consulting, informing, instructing and training with Health and Safety Representatives (HSRs), employees, non-employees, the local community, and municipal councils.

The licence standard could not be defined before the licensing phase. WorkSafe’s view was that the standard was set by all stakeholders and as such could not be determined before the licensing process. This dilemma of a defined standard seems to be a common problem with the first cycle of performance-based regulations. In the case of Victoria, there was a clear expectation that improvements in the control of risk at MHFs would be the greatest possible and any appearance of a minimum standards approach would have drawn criticism.

THE FIRST YEAR 2001

PLANNING AND RESOURCING

To meet the tight timelines, the Regulations required Industry to produce a project plan for the preparation of the Safety Case to be monitored by the Regulator. About 25% of MHFs planned to deliver their Safety Case ahead of the 30 June 2002 deadline with the remaining MHFs planning to submit immediately before the deadline. Emergency services personnel were also seconded to WorkSafe and formal coordination requirements would apply across all government agencies regulating safety at MHFs.

Although requiring considerable administration by Industry and the Regulator, this project plan did prove a useful tool in ensuring the tight timeframes were met. Early Safety Cases were delayed by up to three months but all Operators delivered their Safety Case by the deadline. The timeline for implementation of the Regulations is shown in Figure 2.

As the project plans were being received in late 2000, WorkSafe finished recruiting the Safety Analysts for the Major Hazards Division (MHD) Safety Case team. The Major Hazards Division was well resourced with one Safety Case officer per eight MHFs. The Safety Case Officer’s role was to ensure regulatory compliance during the preparation of the Safety Cases and then conduct Safety Case assessments. To ensure independence, the

assessor had to be an officer that had not been involved in the preparation of the Safety Case.

It quickly became apparent that to gain sufficient resources to meet the tight timeframes that the Division would compete for resources with Industry and with other state regulators. The shortage in expertise to regulate and consult for Safety Cases seems to be a common problem with the first cycle of this type of regulation. If all states had started simultaneously, expert resources would have been a crippling issue for both Regulator and Industry.

ADVICE AND GUIDANCE

In recognition of the timeframes and shortage of expertise, WorkSafe implemented a range of support programs for the two years which included two briefings for Chief Executives of MHFs to ensure their support for the process, 25 days of seminars for MHF Operators and HSRs, the preparation of 17 detailed guidance notes and three Exemplar Safety Cases to share early lessons across Industry. WorkSafe found the guidance work extremely time consuming. Generally, Industry feedback was that the seminars were the most useful guidance but sought specific examples that applied to their particular industry sector. Industry also wanted written guidance to include examples and for the guidance to be provided earlier.

COMPLIANCE AND INTERVENTION

During the first year of the Regulations, Industry and the Regulator both observed that the level of safety compliance assumed for the introduction of the Regulations was lower than expected. Many companies with good safety records were surprised at their own gaps in compliance. Rectifying these regulatory gaps found in the Safety Case process started to increase the overall cost of implementation of the new Regulations.

At this point a team of dedicated OH&S Inspectors was also provided for the MHFs to primarily ensure compliance with other safety legislation. The allocation of more compliance inspection resources to higher hazard industries was logical but at this point there was a risk of diverting Operators of MHFs from their Safety Case. The issues were resolved by prioritising what should be reviewed so that the two teams supported each other.

At this stage WorkSafe categorised the MHFs into six industry sectors and started comparing their OH&S performance and progress toward achieving the goals of the Regulations. About 25% of the MHFs had difficulty preparing their Safety Case and required a stronger regulatory intervention strategy. Further resources were focussed on these facilities with a system of escalating the Regulator's concerns to more senior management if progress did not improve. 65% of facilities required an advisory strategy with normal monitoring and 10% required little attention or an observation strategy. The number of MHFs in each category at the end of the first year is shown in Figure 3.

Most of the seven MHFs in the Warehouse Industry Sector were assessed as progressing slowly. These MHFs had less formal business systems than other MHFs and fierce competition reduced the possibility of working collectively. The Regulator and Industry associations tried a variety of initiatives to educate and assist this sector but all

proposals were unsuccessful. With hindsight, more assertive intervention was needed during this period to ensure the warehouses rectified their performance issues.

At the end of the first year, implementation was reviewed by a consultant. The major findings were that the Regulator had an aggressive approach that was disconcerting Industry; the cost was starting to exceed that forecasted and there was heightened concern over the standards that would be set for licensing. The report did indicate that there was no doubt that all stakeholders were fully committed to delivering quality Safety Cases by the deadline.

THE SECOND YEAR 2002

FEEDBACK

WorkSafe ensured that when administering the Regulations it was objective and independent and determined it would not fulfil the role of consultant for industry. WorkSafe was also concerned that it should not partially approve the Safety Case in advance or give specific advice that it would later assess. This approach of monitoring progress rather than providing direct and specific feedback caused Industry some frustration. WorkSafe's view was that the adequacy of the Safety Case was only apparent when most of the document was completed. Feedback at each stage of preparation would have given a false impression that may have dissuaded the Operator from revisiting early stages of the Safety Case as the process developed.

WorkSafe did respond to the need for feedback by introducing the Pilot Safety Case assessment. A Pilot assessment was an onsite review by WorkSafe of a vertical slice through the Safety Case that included sections from hazard identification, safety assessment through to control measures and relevant safety management system elements. Pilot assessments were well received by Operators and led to immediate changes. Some of the common improvements included clearly linking the elements in the process so that omitted items were easily detected, identifying blind spots in methodologies or work that did not challenge fundamental assumptions.

Industry feedback was that Pilot Safety Case assessments should be conducted earlier than the programmed 6–12 months before submission of the Safety Case. WorkSafe thought the Pilot Safety Case assessments were worthwhile both from the resources and the training benefit to WorkSafe as well as in anticipating the types of Safety Cases to be submitted. Other types of feedback, such as commenting on drafts, were not undertaken as much more time would be consumed by iterative exchanges of comments between the Regulator and Operator. The pilot assessment of documentation with the monthly on-site feedback and clarification meetings with the Operator was thought to be a more efficient and effective use of time.

During the second year, the first feedback on the effect the Regulations on the workforce was received. The involvement of HSRs from the beginning of hazard identification and throughout the process, rather than at the end in a training or review role, was found to be particularly effective. Feedback through the Unions indicated that, at some sites, their members were starting to see a fundamental turn around in safety at the site. This

is an important lesson for Safety Case development which can often be largely a technical process. Involving experienced workers added to the development of the Safety Case and facilitated implementation. Overall, worker involvement extended outside the Safety Case and led to more active involvement in safety at the MHF.

THE ASSESSMENT FRAMEWORK

During the second year WorkSafe began preparing its Safety Case Assessment methodology. A consultative group was formed with Unions and Industry to review documents being prepared. The first obstacle encountered was application of the legal framework formed by the Regulations to a strongly operational and technical process. The legal framework gave little discretion on the prescriptive contents of the Safety Case document including the process for its development. Such prescriptive requirements were less important than many other performance-based aspects of the Safety Case which had a more direct and specific impact on the safe operation of the facility. The final assessment framework proved to be more extensive than first intended. At this point, Industry was concerned that as assessment and licensing approached, administration of the Regulations appeared more legalistic.

The first draft of the assessment framework was available 12 months before the deadline for submission of Safety Cases. The framework was then trialled on early submissions to give a final form after a further six months. This timing was too late to contribute to the development of Safety Cases which further compounded the uncertainty of the standard that would apply for the licence.

THE EARLY SAFETY CASE SUBMISSIONS

Ten of the simpler facilities, such as water treatment plants using chlorine, submitted Safety Cases which enabled WorkSafe to test and develop its assessment framework. The assessment framework generated information for the licence decision, possible safety improvements and the inspection plan for the post-licence period of up to five years. The legal framework had emphasised the legal licence tests and reduced the emphasis on safety improvements and post-licence inspection plans. A strong vision in WorkSafe that major incidents would not be prevented through a minimum compliance approach had retained these important elements during the assessment.

Soon after commencing assessment of the Safety Cases, WorkSafe realised that the six month maximum assessment period might not allow an Operator the necessary time to rectify simple non-compliances that could lead to a licence failure. After consultation with stakeholders, the Regulations were amended to allow WorkSafe to extend the assessment period to 12 months for specific MHFs with non-compliances.

SUBMISSIONS AT DEADLINE

In June 2002, two years after introduction of the Regulations, all 42 MHFs had submitted their Safety Cases. From the original 50 MHFs, about 10% had decided to reduce their inventory and deregister as a MHF. An example of this category is a chemical salvage company which decided the recovery of arsenic did not warrant the expense of the Safety Case.

Of the remaining submissions, 50% of MHFs had their assessment period extended to 12 months. This group was reasonably well forecast from the progress monitoring during preparation of the Safety Case. These facilities can be divided into five groups in decreasing order of safety significance, as shown in Table 3.

Overall, WorkSafe was satisfied with progress made against the ambitious timings in the first two years. More development work was undertaken during the assessment period than intended, but this work supported substantial improvement at facilities. Feedback from Operators supported the overall view that the ambitious timings were met whilst achieving the objectives.

GOOD PRACTICE AND PITFALLS IN PREPARATION OF SAFETY CASES

Many of the Safety Case project plans showed that operators intended to use generic qualitative, semi-quantitative, and quantitative hazard and safety assessment methodologies. As work progressed the methodology became more specific for the facility. In many cases the benefit of worker involvement led to analytical or quantitative methods being modified to also show results qualitatively to allow employees to remain involved throughout the process. Managers of Safety Cases also reported the need to conduct both ‘top-down’ and ‘bottom-up’ approaches to comprehensively deal with their hazards. WorkSafe found that Operators who solely conducted top-down methods had serious omissions whilst a solely bottom-up approach led to a poorly structured Safety Case that was difficult to understand.

EMPLOYEE INVOLVEMENT

Employee involvement tended to be focussed around workshops such as hazard identification, safety assessment, and demonstration of adequacy of control measures. Employee involvement was particularly strong during the hazard identification and safety assessment workshops. The attendees at hazard identification workshops included HSRs and shop floor employees with ‘hands-on’ operational and engineering knowledge of the area of the facility under consideration. The workshops were often facilitated by a safety consultant or company safety professional.

Table 3. Category of facilities extended to 12 months

Group	Number	Comment
Systems below industry standard	2	Chemical manufacturers
Safety performance below norm	1	Complex facility
Industry sector performance issues	11	Largely warehouse and LPG/Gases
Document issues - comprehensiveness	2	Chemical Manufacturers
Minor methodological problems	2	Chemical Manufacturers

The majority of the hazard identification workshops were structured brainstorming sessions that focussed on a specific area, or activity at the MHF. The hazard identification

workshop methodology improved as operators gained greater skills in application of the methodology. For example, hazard studies that started out as a check on engineering codes and standards evolved into a systematic assessment of site-specific operational and engineering activities. This led to the identification and adoption of new and additional procedural controls that would not normally arise from a simple compliance check against codes and standards.

CHALLENGING THE NORMS

Hazard identification often showed very divergent views on the importance of the hazards. The workshops were able to combine the experience of the workers with the analytical approach shown by managers and engineers. The workshops also showed how different people operating under the same procedures had quite different understandings and perceptions of the hazards.

Operators have used the safety assessment to critically review their management of safety and the reliability of their assets. Such a review gave a clearer picture of what safety at the facility really depends on. In the wake of these critical reviews, generic systems have seemed inadequate and the need to start tailoring safety management systems has become necessary. Many facilities have now tailored their systems to meet the specific needs of their facility.

International companies face a particular problem with tailoring. They must maintain consistency across their facilities yet allow individual facilities to tailor their systems. WorkSafe's observation is that rigid systems imposed externally were not highly regarded by the workforce. They tended to reduce the possibility of a fundamental review during safety assessment and overall resulted in less site ownership of safety at the facility. There is a clear need for international systems to achieve both global consistency and allow for flexibility at the local level.

Other safety improvements that resulted from MHF operator's challenging their norms include improvements to emergency plans to deal with specific scenarios, the increasing effectiveness of existing controls and the adoption of new controls. Tracking and monitoring tools also evolved from the Safety Case process, such as hazard registers that capture findings and actions arising from workshops and other hazard studies. Most importantly, many operators have shown the most significant findings from their Safety Case in databases to allow easy linking and manipulation to support their safety.

SAFETY IMPROVEMENT PLANS

Many Operators produced action plans that identified planned improvements as they progressed through the process. The plan often identified the priorities for the next two years and the critical actions to be completed before the licence decision was made. Initially these plans caused some consternation to the Regulator because they had to be checked to ensure that necessary controls were not listed for future implementation and that interim controls met the standard of 'so far as is practicable'. But these action plans provided a clear perspective of how the operator is managing their safety and contributed significantly to the assurance that the maximum term of the licence should be granted.

COMMON PITFALLS

A number of pitfalls were observed when preparing Safety Cases. Some Operators under-resourced the Safety Case, or had difficulty in translating performance-based Regulations into practice, or appeared to be focused on the document rather than the practicalities of their facility's safety. Some Operators became over-reliant on consultants and contractor support or held unrealistic expectations on the effectiveness of control measures or excluded potential major incidents too early in the process. Many of these pitfalls were not apparent until the several months of assessment were conducted and often came to notice when the Safety Case documents were being tested for implementation.

COMMON GOOD PRACTICE

From the Regulator's perspective, good Safety Cases were produced when Operators used a systematic approach and clearly identified their basis for safety. These Operators planned and implemented a robust risk assessment process, involved the right people and underpinned the Safety Case process with a sound safety management system. The resulting Safety Case described the current situation to the desired goals rather than simply the desired goals.

SAFETY CASE ASSESSMENT AND LICENSING

After a Safety Case is submitted, WorkSafe has six months to make a licence decision for the majority of cases. The licence decision is made on the four tests of whether the document is complete, whether the Operator meets its Part 3 duties, whether the Operator meets its training, consultation and informing duties under Part 5, and whether the Operator has the 'ability to operate safely'. All tests must be met to be licensed.

TECHNICAL ASSESSMENT

The assessment and licensing involves a number of steps. The 'desk-top' technical assessment of the Safety Case ascertains whether the Operator is complying with the Regulations and is operating safely. Experience has shown that the desk-top study needs to review documentation not included in the Safety Case, particularly the safety management system. For example, assessors sample site-based manuals and safety management information on intranet and computer based systems.

The desk-top review has also involved considerable "clarification" of information in the Safety Case which is not understood by assessors or appears to be incomplete. It is not uncommon for clarification responses to exceed 10 substantial documents. This clarification assists the Operator to identify areas that cannot be understood by a third party. In general, the amount of time spent by the Regulator on assessment is more a function of the quality of the Safety Case than the complexity of the facility.

After the majority of the desk-top study is complete, the Safety Case is verified by the OH&S inspectors using audit techniques. Verification targets implementation, the safety management systems, possible weaknesses and critical control measures. One of the main findings from verification was that engineering control measures were in place but systems which relied on people were not well implemented. Training had clearly lagged the preparation of the Safety Case.

The desk-top assessment, verification and the regulatory history of the site are combined into a report which is reviewed by the Operator before the licence decision. The findings report aims to present a balanced view on compliance of the Safety Case document and safety compliance at the facility. Positive findings are reported as well as negative findings. Where deficiencies are apparent the report discusses options on how the deficiencies can be best addressed to secure a safety outcome. The preference is to extend the assessment period to rectify the non-compliances, but some licences contain conditions or limited terms. At the conclusion of the assessment of a large facility, up to 800 hours of assessment may have been conducted.

The report includes a whole-of-government approach with the emergency services, gas safety regulator, fire services, electrical regulator and environmental regulator being involved in the assessment and verification of the Safety Case. This involvement has not reduced the requirements of the other Regulators. Industry is advocating that the next step should be to produce only one document for all safety regulation.

SAFETY CASE ASSESSMENT OBSERVATIONS

Some common observations have occurred in many of the Safety Cases. The Safety Case document should not simply represent the final or desired situation at the facility. For instance, transition to new systems should be defined and planned and be apparent in the Safety Case. The verification of the Safety Case will show when transition has not been adequately addressed. The demonstrations have also often challenged the Operator. In some cases the Regulator may effectively make the demonstration for the operator when attempting to understand the Safety Case. The use of clarification and the ability to extend the assessment period have allowed the additional time for the Operator to make the demonstration if necessary.

LICENSING AND THE FUTURE BENEFITS

Victoria is rare in that the government has chosen to licence MHF facilities. The dangers of this approach were that assessment would focus solely on legal requirements including minimisation of legal liability. If such a legalistic approach had been adopted then technical and operational requirements at the facility could be overlooked and improvements in safety and the targeted inspection plans of the Regulator would not be identified. These dangers have been overcome with some unexpected benefits from licensing. The time limits on both Industry and the Regulator have forced resources to be committed and decisions to be made to achieve the outcomes, which avoids the risk of an iterative exchange of documents and correspondence without conclusion. Most importantly, it establishes a cycle where after the document is approved, the focus is clearly on the site and not the document.

A benefit expected from the Regulations is that measurement of improvement in control of risk should be possible because of the requirement for performance monitoring. Major Hazard Regulation is costly and often comes under community scrutiny and should show measurable results. The Regulatory requirement for performance monitoring of control measures should allow the development of measures which will monitor the overall performance of MHFs in Victoria.

CONCLUSIONS

After the incident at Longford, Victoria set out to install a Safety Case regime across 50 facilities in minimum time. Although the first licence cycle is incomplete, both the Regulator and Industry believe that substantial change has been accomplished in the two and half years since the Regulations were introduced. Table 4 outlines the effect on the industry sectors.

From the Regulator's perspective, the change has been possible because of the resources committed by stakeholders, the use of tools in the Regulations such as the Safety Case project plan and the successful use of the legal framework for large scale performance regulations. The community resolve to use sanctions contained in the Regulations and the tight timeframes have undoubtedly contributed to achieving the objectives. Missed opportunities included finding effective interventions for industry sectors that were not systems-orientated and bringing forward the publishing of much of the guidance by twelve months.

Table 4. The regulation's safety effect on industry sectors

Industry sector	Effect of major hazard regulation
All Sectors	Engagement of at least the HSR in the fundamental safety issues at site. The use of databases to link and implement the complex information from the Safety Case. A common understanding of the hazards at the MHF. Engagement of other government agencies to contingency plan for specific emergency scenarios rather than generic.
Chemical Manufacturer	About half of this group were at a high standard and used the opportunity to test the latest corporate safety techniques. The second part of the group has reviewed the balance between their procedural and engineering controls.
Chemical User	This group have established and tailored systems so that their safety does not rely on a highly experienced workforce.
Warehouse	The warehouses now manage their safety systematically rather than by exception. Warehouses whose operator also manufactures chemicals were at a much higher standard.
LPG and Gas Distribution	This sector has overcome a compliance with prescriptive standards approach.
Petroleum Refining	The refineries have assessed 30 years of modifications and reviewed their asset integrity to reach a comprehensive approach.
Bulk Terminal	Greater focus on emergency and incidents.

Industry did recognise the community resolve to regulate major hazards and has made a fundamental review of their safety. Industry found that some of their safety was of a lower standard and not as integrated as expected. Once started, Industry found the process self-sustaining and many are intending to gain corporate benefit from their development work outside Victoria. A number of Operators have commented that they would recommend this form of Safety Case because of its inclusion of workforce experience, the requirement to fundamentally review their safety, and the focus on implementation.

The Regulator, Industry and Unions must maintain and improve the standards over the next five years. The nature of the Regulatory framework and its relatively small size in Victoria does allow opportunities for innovation. These developments will be posted on WorkSafe's website at www.workcover.vic.gov.au.

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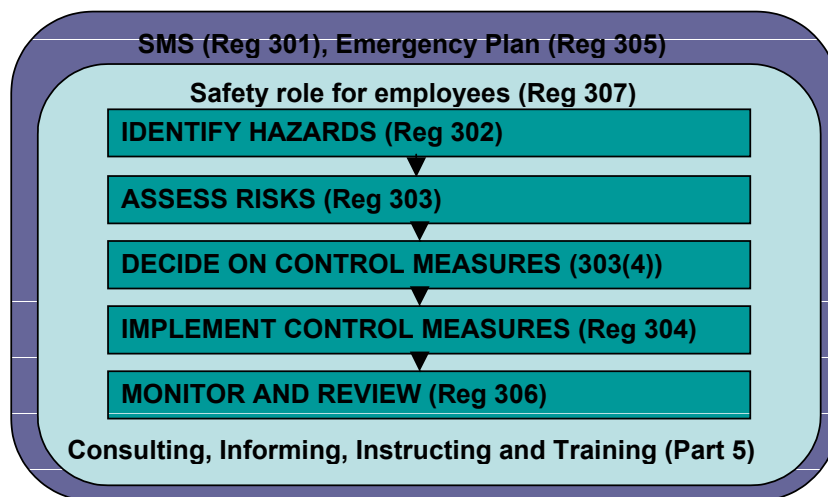


Figure 1. Regulations in part 3 safety duties of operators and part 5 consulting, informing, instructing and training

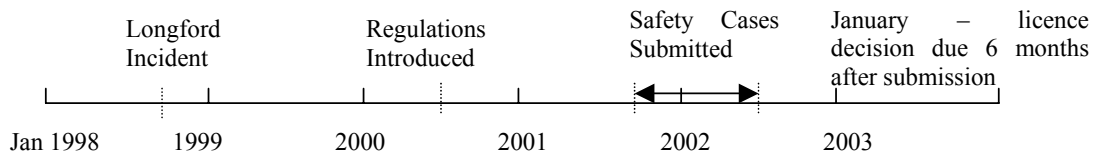


Figure 2. Timeline for implementation of the major hazard facilities regulations

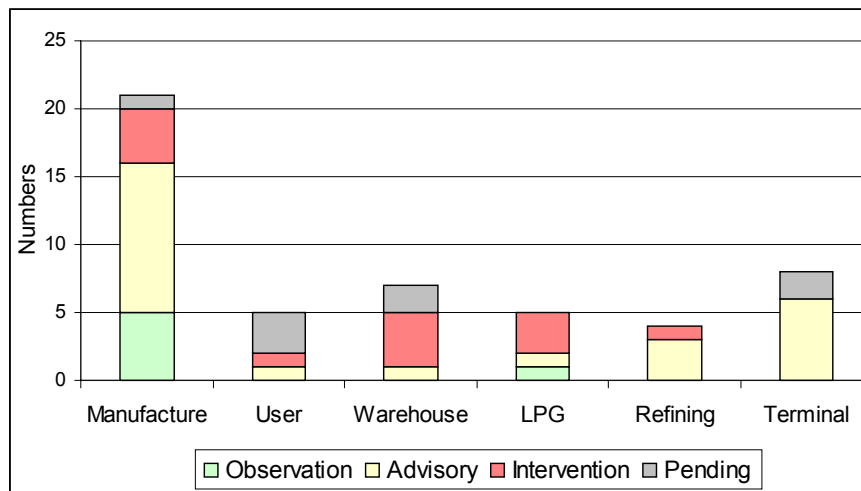


Figure 3. Oversight strategy for MHFs June 2001