

**CONTROL OF MAJOR HAZARDS OFFSHORE - IMPLEMENTING LORD CULLEN'S
RECOMMENDATIONS**

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It is nearly two years since the publication of Lord Cullen's Report on the Piper Alpha Disaster. This paper reviews the progress made so far in implementing Lord Cullen's recommendations, with particular reference to the development of Offshore Installations (Safety Case) Regulations in the light of responses to the consultative document issued in February 1992. It also outlines plans for a further programme of legislative reform.

INTRODUCTION

Experience worldwide suggests that it often requires a major accident to focus the attention of industry, government and legislators on shortcomings in existing regulatory controls and to provide the stimulus for a fundamental review.

In Britain, the approach to major hazards onshore was profoundly influenced by an explosion at a chemical plant at Flixborough in 1974. The plant was destroyed, 28 workers were killed and there was extensive damage to property offsite. A number of other major accidents occurred in Europe during the 1970s, the most significant of which involved the release of dioxin in Seveso, Italy, in 1976. These accidents led to the adoption of a European Directive on the Major-Accident Hazards of Certain Industrial Activities (the 'Seveso' Directive, 82/501/EEC) and its two amending Directives. These Directives were implemented in the UK by means of the Control of Industrial Major Accident Hazards Regulations 1984 (CIMAH). CIMAH 1984 was not applied offshore. However, certain principles embodied in CIMAH also underlie the new Offshore Installations (Safety Case) Regulations, although the latter go considerably beyond the CIMAH 1984 philosophy in certain important respects. I shall return to this later.

The offshore petroleum industry has also had its share of major accidents, including the capsizing of the "Alexander Kielland" and the collapse of the exploration rig "Sea Gem", to name but two. It was the findings of the inquiry into the "Sea Gem" disaster that inspired a major piece of offshore legislation, the Mineral Workings (Offshore Installations) Act 1971. This Act established among other things the concept of the Offshore Installation Manager, with a key role in co-ordinating safety on an installation and with powers and responsibilities analogous to those of the master of a vessel under marine legislation. The 1971 Act came to be supported by a number of sets of Regulations, including those on Operational Safety, Health and Welfare, Emergency Procedures and Construction and Survey, legislation which remains in force to this day.

However, the Piper Alpha disaster in July 1988 and the subsequent Public Inquiry led to a major re-appraisal of the prevailing arrangements - both organisational and legislative - for offshore safety. The result was a commitment on the part of the UK authorities to introduce as soon as possible new regulations requiring operators to prepare Safety Cases, and setting criteria to ensure that risks to safety and health offshore are systematically and effectively controlled.

THE CULLEN REPORT

The Report of the Public Inquiry headed by Lord Cullen into the Piper Alpha Disaster (the Cullen Report) was published on 12 November 1990. It contained 106 recommendations setting out comprehensive guidelines for the future development of the regulatory regime for offshore safety. The government immediately accepted the Report and its recommendations in their entirety.

A principal recommendation of the Report was that there should be a single regulatory body with responsibility for health and safety in the offshore oil and gas industry, and that this function should be discharged by a discrete division of the Health and Safety Executive (HSE) exclusively devoted to offshore safety, employing a specialist inspectorate.

Among the benefits which Lord Cullen foresaw in this arrangement was that of integrating the work of the offshore safety regulator with the specialist functions of the HSE as a whole. He also recommended that the responsibilities of the division's Chief Executive should

include the development of a new offshore safety regime, including in particular provisions relating to Offshore Installation Safety Cases.

PROGRESS IN IMPLEMENTING THE CULLEN RECOMMENDATIONS

The single regulatory body

One of the first tasks following the publication of the Cullen Report was to create a new body that would bring the offshore safety functions then being carried out by the Departments of Energy and Transport within a unified Offshore Safety Division (OSD). OSD was formally established under the aegis of the Health and Safety Commission and HSE at the beginning of April 1991, at the same time as ministerial responsibility for the regulation of offshore safety was transferred to the Secretary of State for Employment.

On assuming their new responsibilities, the Secretary of State and the Commission affirmed their commitment to securing full implementation of the recommendations in the Cullen Report. Top priority was given to preparing for the implementation of the central recommendations on the development of effective safety management systems for offshore operations, the preparation of Safety Cases by the operators or owners of installations, and their submission to, and acceptance by, HSE. It was also seen as essential to strengthen OSD's inspection and audit capacity by substantially increasing its complement of inspectors and other specialist staff.

To make possible this expansion of OSD's capacity and responsibilities, the government pledged substantially increased resources, rising from an allocation of £13 million for 1990/91 to £35 million in 1994/95. Since then, HSE has been running a series of recruitment campaigns to attract the necessary professional staff.

So far, it is fair to say that we have made encouraging progress in developing the new organisation and in taking forward our priority tasks. We started, at the beginning of April last year, with a basic cadre of about 100 staff in post. By the beginning of April this year, we were employing 226 staff, including 108 inspectors, plus a number of scientific, technical and research staff, as well as staff concerned with policy,

legislation and administrative support. Our target is to build up total numbers to about 400 by April 1994.

The Offshore Safety Act 1992

On the legislative side, important milestones have already been passed. In March of this year, the Offshore Safety Act received Royal Assent. This Act achieved two things of particular importance to OSD. First, it completed the transfer of responsibility for offshore safety to HSE, giving it statutory power to enforce offshore safety legislation in its own right (during the previous year this power had been exercised under the terms of an agency agreement with the Employment Department). Secondly, it made the current offshore safety legislation "existing statutory provisions" of the Health and Safety at Work etc Act 1974 (HSWA), thus providing a legal base for the reform of this existing legislation and its replacement by new goal-setting regulations made under section 15 of HSWA, as recommended by Lord Cullen. We have now embarked on a programme to give effect to these particular recommendations over the next few years.

The Offshore Safety (Protection against Victimisation) Act 1992

A second Act that reached the Statute Book in March was the Offshore Safety (Protection against Victimisation) Act. This implements Lord Cullen's recommendation that statutory protection of the type already provided in the case of trade union activities should be extended to offshore safety representatives. Dismissal of an offshore employee is now treated as an unfair dismissal, in terms of current employment legislation, if it was for carrying out any functions as a safety representative or member of a safety committee. There is also protection against action short of dismissal.

Parliament was thus responsive to the argument that no-one should be penalised for raising matters genuinely bearing on offshore health and safety or deterred from reporting such matters for fear of the consequences. This would not only be wrong in principle but totally counterproductive to the positive safety culture that we in HSE, and the main industry organisations, are trying to encourage offshore.

The Offshore Installations (Safety Case) Regulations Consultative Document

Another important milestone reached earlier this year was the publication of the Health and Safety Commission's consultative document setting out proposals for offshore Safety Case Regulations and supporting guidance. In accordance with normal practice, this was widely circulated for comment to all parts of the industry and a variety of organisations thought likely to have an interest.

By the end of the formal consultative period (which closed on 1 May) HSE had received over 100 responses, some of them very substantial and detailed. These covered a broad spectrum of views and interests, ranging from those of the main employer and trade union organisations concerned to those of individual operators, contractor companies, consultancy firms and some professional and academic bodies. HSE carefully considered all these responses and held further informal discussions with the main industry organisations and trade union representatives, before putting revised proposals to the Health and Safety Commission for recommendation to Ministers.

Clearly a good deal of hard thinking has been required of all concerned in the last half year, and we have had to take account of sometimes disparate views that have been expressed on certain issues. This said, we in HSE have been greatly encouraged by the positive and constructive attitude adopted by the industry in its comments on our proposals, and the evidence we have seen of a genuine commitment to developing a better safety regime offshore in the spirit of Lord Cullen's principal recommendations.

I do not propose to discuss all aspects of the regulatory package in detail but would like to highlight key features including some that attracted particular comment during the consultation period.

The Safety Case philosophy

Safety Cases will be required for all offshore installations and will need to cover all activities carried out on the installations or in connection with them. This illustrates an important feature of the new

regime. It is designed to avoid the pitfalls of examining particular items of hardware or particular activities in isolation. Instead, the Safety Case underlines the need for an integrated approach to risk assessment and safety management, in which the safety implications of all activities and their interaction are considered as a whole.

Further, the preparation of an installation Safety Case will not be a one-off exercise but will entail a process of continuing review, to ensure that the procedures and arrangements which it describes are updated to reflect operational reality. Formal submission points have been set in the regulations so as to provide a structure for this process and establish stages at which a dialogue can take place between the operator or owner and HSE. The advance periods prescribed for the submission of Safety Cases are intended to give adequate time for assessment, and permit discussion between the duty-holder and HSE, before irrevocable decisions are taken.

HSC and the Executive recognise that the systematic analysis required in preparing a Safety Case is a complex and time-consuming process requiring a considerable investment of effort on the part of management at all levels within a company. This, of course, lies at the heart of one of the main justifications for the Safety Case regime itself. It is not simply or even primarily a means of facilitating surveillance on the part of the regulatory authority - though the Safety Case will be a tool for developing a more structured, audit-based approach to offshore inspection in the future. It is also a route towards greater understanding and control on the part of the operator of the risks associated with a particular installation. As Lord Cullen made clear in his Report, responsibility for safety lies first and foremost with operators themselves, because in the end only they can ensure the development and implementation of effective systems for the management of safety on their installations. The investment of time and effort on the part of managements in preparing Safety Cases must be viewed in this context. HSE will, of course, assist this process as appropriate.

It is at this point that I should say something about another special feature of the Safety Case philosophy, namely that of formal "acceptance" by the regulatory authority of the case for health and safety made out in the duty-holder's submission. The considerations to which I have just referred have been adduced by some commentators as arguments against a regulatory requirement for "acceptance" and in favour of a regime that goes no

further than the onshore requirements of the CIMAH Regulations. We believe that this view is based upon a misunderstanding of Lord Cullen's intentions and that it overlooks or underestimates important aspects of the acceptance process.

Safety Case acceptance

HSE considers that acceptance of the Safety Case by the regulatory authority is fundamental to the Safety Case philosophy as set out in the Cullen Report and as developed by HSE in its legislative proposals. Lord Cullen was explicit in recommendations 8 and 9 of his Report that Safety Cases must not only be prepared and submitted to the regulatory authority but also be accepted by that authority.

In making the assessments necessary for reaching decisions on acceptance (or otherwise) of a Safety case, HSE will of course be drawing on its considerable experience of assessing onshore safety reports under CIMAH. However, while CIMAH reports are merely required to give certain information, the offshore Safety Case is required to demonstrate that the arrangements for safe operations are adequate and that certain safety objectives have been met. Lord Cullen made clear in his chapter 17 and in recommendations 2 and 4 that this demonstration of safe operation would be the central feature of the new regime.

Acceptance constitutes an integral and logical part of this system. It would be inconsistent for the authorities to require in the Safety Case a demonstration that safety management systems are adequate, that risks to persons from major accident hazards have been reduced to the lowest level that is reasonably practicable, etc, and then not accept (or otherwise) the case presented.

The acceptance mechanism is also important because it provides, compared with the arrangements under CIMAH, an additional level of assurance for workers who, by virtue of the exposed and isolated nature of their work-places offshore, are exceptionally vulnerable to the consequences of major accidents and escalating events.

This vulnerability of personnel working offshore and the potential for the rapid escalation of incidents explain the emphasis in the regulatory package on provisions for temporary refuge, emergency evacuation, escape and rescue and those on quantified risk assessment

(QRA). I would like to say something about both these aspects, in view particularly of comments received from the industry during the consultation period.

Temporary Safe Refuge

While some comments on the consultative proposals strongly supported the concept of temporary safe refuge (TSR) as set out in the document, other maintained that it was too closely tied to the requirements for a large production platform, that the guidance was too prescriptive and that the acceptance standards were too inflexible.

Our position has always been that provision for temporary refuge in any single case will depend on the characteristics of the installation and its hazards, taking account of both physical and human factors, including the arrangements for managing emergencies and the strategy for evacuation, escape and rescue.

We acknowledged in the consultative document that the analysis in the Cullen Report, supporting the recommendations on TSR, had mainly related to the circumstances of large, complex, fixed platforms like Piper Alpha. We also recognised the need to consider further how the concept should sensibly and cost-effectively be applied to other types of installation, including for example small installations with relatively few personnel, installations which are not normally manned and mobile installations.

First and foremost, it will be for the duty-holder to determine the appropriate TSR provision in the light of the circumstances of the installation and the likely demands that may be made on the TSR. He will then be expected to demonstrate the adequacy of this provision in his Safety Case submission. Provided he is able to make a convincing case for the arrangements proposed, he will find HSE responsive.

It does not, however, follow from this, as some have suggested, that there should be no minimum acceptance standards and that everything should be open to negotiation on a case by case basis. Lord Cullen envisaged a role not just for acceptance standards, but acceptance standards that are tough, because, as he said, they would be one of the main pressures for improvement and should be set by HSE at a level which results in "real improvements in safety".

Quantified Risk Assessment

It would be appropriate at this point to say something about QRA, particularly in view of comments to the effect that there was too much emphasis on the use of QRA in the consultative document and not enough on the limitations of the technique.

HSE's experience of major hazard industries onshore and offshore suggests that QRA can help to provide a structured and objective approach to the assessment of risk. Its use was commended by Lord Cullen. However, as we recognised in the consultative document, QRA should not be used in isolation in a mechanistic way. It is a tool to assist management in making decisions, for example in the matter of ranking and balancing risks. QRA techniques should always be used in conjunction with sound engineering judgement; they are not a substitute for it.

QRA is a means of generating data on risks in relation to major hazards on an installation. It can be valuable as an input to decision-making when reviewing options during the design and operational phases of a project. QRA is also useful as an input to establishing, and challenging, standards and working practices. Once QRA results have been obtained, identified high risk areas can be considered and working procedures and practices examined to see what changes might be made to reduce the risks. In this way, it becomes possible to integrate the safety management system of the installation with the risk analyses.

Demonstration of safety and the concept of reasonable practicability

The Safety Case will need to demonstrate that all hazards with the potential to cause a major accident have been identified, that risks have been evaluated and that measures have been, or will be, taken to reduce the risks to persons to the lowest level that is reasonably practicable.

It may be appropriate at this point to clarify what is meant by "reasonably practicable" in this context. The concept of reasonable practicability finds expression in existing health and safety legislation, starting with the Health Safety at Work etc Act 1974, and, while not

formally defined there, has acquired meanings through judgements made in the law courts. In essence, the duty-holder is permitted, in assessing what it would be reasonably practicable to do in a given situation, to weigh the risk arising from the activity against the time, trouble, cost and physical difficulty that would be involved in avoiding the risk. If the costs appeared to be so disproportionate to the risk that it would be unreasonable to expect the duty-holder to incur them, then he would not be obliged to do so. However, the burden of proof remains with the duty-holder to show that he has taken all reasonably practicable measures to fulfil his duties under the law.

Safety management and audit

The safety management system can be described as the heart of the Safety Case. For a Safety Case to be acceptable, it will need to demonstrate that the safety management system is adequate to ensure compliance with safety legislation. In drafting its proposals in this area, HSE was able to draw on its considerable experience of good management practice onshore, including that of its Accident Prevention Advisory Unit (APAU). In particular, the well-regarded APAU booklet entitled "Successful Health and Safety Management", which was published last year, helped to inform the general guidance section of the Safety Case consultative document. Among the matters which it is important to address, particularly in the context of offshore working, is the interface between operator's safety management systems and those of contractors.

A unique feature of the regulations is the requirement to show that adequate arrangements have been established for the audit of the safety management system at appropriate intervals. No control system can be effective without feedback. Much of this feedback will be generated through day-to-day monitoring by local management, but this needs to be backed up periodically by a more fundamental examination of the working of the system as a whole, carried out independently of line management. The auditors will be expected not just to examine performance against the standards laid down, but to test the value of the standards themselves in the light of the overall objectives that the safety management system needs to achieve.

The benefits of the auditing process are two-fold. First, it provides a means of verifying that the safety management system in place is working effectively, and generates the feedback necessary for internal improvement. Secondly, audits give a clear demonstration to the regulatory authorities that companies are managing their legal duties in an appropriate manner.

Over time, HSE's assessment of Safety Cases will be supplemented by reviews of company safety audits and by further audits carried out by HSE inspectors. Our ultimate purpose is to secure the development of a positive and self-sustaining safety culture throughout the offshore industry.

Developing a safety culture - workforce involvement

One of the most important parts of Lord Cullen's report was concerned with arrangements for the involvement of the workforce in improving safety performance. Lord Cullen rightly saw that a transformation of the safety culture and the achievement of high safety and health standards could hardly be effected without securing the positive and informed commitment of all those working offshore. It is thus entirely appropriate that the preparation of Safety Cases should entail consultation on key elements with the workforce, normally through the statutory safety committee. It is also clearly important that operators and owners not only consult their safety committees but take due account of the views expressed.

There are various other ways in which a positive safety culture can be developed. Top quality communication at all levels is undoubtedly essential, and not only through the safety committee channel. Lord Cullen particularly emphasised the important role of line management, especially first-line supervisors, in actively promoting workforce involvement in and commitment to safety. Supervisors and operational staff can also be encouraged to contribute their first-hand knowledge in helping to devise operational procedures and instructions, as well as monitoring performance. Other ways of helping to secure workforce commitment to safety through participation include safety circles and staff suggestion schemes. This list is not exhaustive.

The Safety Case regime in practice

The move to a new safety culture will require a more creative, innovative approach to safety management and major hazard control than is the case under a traditional compliance regime. This will entail a greater investment of time, expertise and thinking power by all concerned. HSE is developing its own capacity to respond by building up its inspection and technical support organisation, and by moving towards the increased use of audit-based techniques to complement established inspection methods.

The Safety Case regime will require a continuing dialogue to be maintained between the inspectors and the industry, particularly during the period leading up to the acceptance of a Safety Case. The transitional period provided for in the regulations is designed to allow time, where a submission is unacceptable, for HSE to discuss the deficiencies with the company and request a revised or additional submission.

Further legislative developments

The introduction of Safety Cases heralds the beginning of the modernisation of existing UK offshore legislation. The Safety Case regime will provide for risk assessment and safety management on individual installations. This regime will, in turn, be underpinned by goal-setting regulations which will establish basic standards applicable to all installations. This is a considerable task but we aim to make substantial progress with the necessary reforms over the next two years, subject to consultation.

In taking forward this work, we will be guided by some essential principles, including the need to:

- develop a corpus of goal-setting regulations which will underpin the Safety Case regime by promoting the effective management of safety offshore;
- review all existing offshore safety legislation in order to develop a structured reform programme;
- promote convergence between onshore and offshore standards;

- design specific offshore regulations where necessary to meet specific offshore needs;
- take account of the future prospects of, and technological developments in, the offshore industry.

CONCLUSIONS

It was rightly stated during a Parliamentary debate on offshore safety earlier this year that what has been called a safety culture is not a luxury. Nor is it a bureaucratic imposition. It is, in fact, fundamental to the way in which efficient companies organise themselves.

The exploitation of North Sea hydrocarbon resources is now taking place in ever more demanding environments. This presents an engineering challenge of considerable magnitude. There is no reason to doubt that the industry will prove itself fully capable of meeting this challenge, but it is essential that the pursuit of increased technical performance takes place in the context of a culture and management systems capable of ensuring that safety issues are rigorously pursued throughout the life of a project, from concept design onwards. It is in everyone's interest that operations should be carried out safely, and everyone suffers when a unit is put out of production or destroyed.

HSE has been encouraged by its contacts with the industry over the last eighteen months into believing that these points have been well taken, and is glad to acknowledge the constructive spirit in which all parts of the industry have approached the Safety Case proposals. The new legislation provides a framework and a stimulus for the continuing effort that is necessary if high levels of safety performance are to be achieved and sustained. There is, however, a limit to what can be achieved through regulation or enforcement. In the end, success depends on the quality of management at all levels in the industry and an informed commitment to safety on the part of the workforce as a whole.