

The Role of the COMAH Safety Report in Improving Health, Safety and Environmental Performance at a Chemical Processing Site

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SYNOPSIS

Operators of certain installations in the UK process industry have been required to submit safety reports since the CIMAH Regulations (1) were introduced in the 1980's. The COMAH Regulations (2) in 1999 replaced the CIMAH Regulations and required the safety reports to incorporate much of the current policies about health and safety regulation, risk assessment, and tolerability of risk. This paper briefly describes the COMAH Regulations and then discusses the contribution that the Regulations have made to improving health, safety and environmental performance.

1 THE BACKGROUND TO THE COMAH REGULATIONS

Operators of certain installations in the UK process industry have been required to submit safety reports since the introduction of the CIMAH Regulations in 1984. This duty was revised with the introduction of the COMAH Regulations in 1999. These two Regulations came into force in response to the Seveso I and Seveso II Directives from the European Union.

The Directive on the Major Accident Hazards of Certain Industrial Activities, the "Seveso" Directive, was issued in June 1982 by The European Community. It was so called because much of the incentive for such a directive was due to the accident at the Icmesa Plant at Seveso in Italy in 1976. In that incident, the accidental production and release of a dioxin as an unwanted by-product from a runaway chemical reaction led to a large number of skin complaints in the local community and widespread contamination of farm land. In the UK there had been the explosion at Flixborough in 1974 which caused 28 on-site fatalities and significant off-site damage. The Seveso Directive was subsequently revised in the light of incidents such as the disaster at Bhopal in India which resulted in over 2000 off-site fatalities, and the accident at Basle in Switzerland which led to serious pollution of the river Rhine. The Seveso II Directive was issued in 1997.

As described above, the COMAH Regulations implement a European Union Directive. Also, the Directive and legislation is a response to actual incidents which crossed site boundaries and impacted on the general public. These antecedents could have been a cause for concern. We have seen examples of legislation coming from the European Union which we have considered to be unnecessary and unwelcome, and which has increased bureaucracy without contributing to the public good. Similarly, in the atmosphere of "this must never happen again" that prevails after a major

incident, unrealistic and disproportionate controls may be implemented. This was not the case, and presumably thanks to effective influencing from the UK representatives, the Seveso Directives mirrored much of the policies and practices that had been developed in the UK for the regulation of major accident hazard installations.

With this 15 year background of safety reports, it might be thought that the process industry would be very familiar and maybe even comfortable with the concept and practice of permissioning regimes, and that the transition from CIMAH to COMAH would have been seamless, simple and uncontroversial. The reality was very different. This paper will not dwell on the CIMAH Regulations, but will discuss the contribution of the COMAH Regulations in managing health and safety. It is likely that the current COMAH Regulations and the manner in which they are enforced will be more representative of the expectations of today's permissioning regimes and the supporting safety reports.

2 THE IMPLICATIONS OF THE COMAH REGULATIONS

2.1 Integrated Health and Safety and Environmental Risk Assessment

The COMAH Regulations are concerned with accidents that cause harm to either people or to the environment. For this reason, enforcement of the COMAH Regulations is a dual responsibility of the Health and Safety Executive (HSE) and the Environmental Agency (EA), or the Scottish Environment Protection Agency (SEPA). These bodies are collectively referred to as the "Competent Authority" (CA). Enforcement of the CIMAH Regulations was the responsibility of just the HSE, and there were concerns both within industry and within the enforcing agencies themselves that this dual responsibility under COMAH may result in inconsistent guidance and standards, and duplication of effort. However, in the very early days of COMAH, the HSE and the EA went to considerable lengths to reassure industry that this would not be the case, and in my experience, this has not been a problem. The two bodies were able to agree a common and consistent approach to assessing and commenting on safety reports. There has not been a sense of duplication of effort or excessive overlap between the two authorities. Although it is noted that the EA has also been heavily occupied with the implementation of IPPC. Adopting an integrated approach to the identification and control of accidents to both people and to the environment creates two advantages. There is economy of effort for the operator who is preparing the safety report. There is also the benefit of taking a holistic view of the hazards and the risks associated with a particular potential accident scenario.

2.2 COMAH Qualifying Criteria

Installations become COMAH sites on the basis of a fairly complicated assessment formula relating to inventories of dangerous substances. Dangerous substances can mean materials with acute hazards to people such as fire, explosion, and toxic effects, or materials with chronic health hazards such as carcinogens, or materials which are hazardous to the environment, such as biocides. The criterion used to select installations that should be subject to this particular permissioning regime has been a measure of the scale of event that the installation is capable of creating. This is not a criterion that is either fully consequence based, or risk based. At this stage there is no

consideration of location, town centre or remote, which would significantly affect the potential consequences, and there is no consideration of the likelihood of an incident occurring. These are important factors but to incorporate them into the initial selection criteria is probably unworkable due to excessive complexity. The appeal of this approach is that it is objective and transparent.

(COMAH Sites are further classified as “upper tier” or “lower tier”, again based on the inventories of hazardous substances. Upper tier sites have higher inventory criteria and more duties under the Regulations. For the purpose of this paper I will not dwell on the differences between lower and upper tier, but would note that the following comments primarily relate to experiences with upper tier sites.)

2.3 COMAH Duties

Being a COMAH upper tier site places a series of duties on the operator. These require the operator to:

- Notify the CA
- General duty to take all measures necessary to prevent major accidents and to limit their consequences
- Report certain incidents
- Submit a safety report
- Consult with employees
- Provide information to the public.
- Prepare and periodically test an on-site emergency plan
- Provide information to the local authority
- Provide information and cooperate with other establishments where there is a potential domino effect (see below)

The Regulations also place a series of duties on other parties:

- The CA shall designate groups of establishments where the likelihood or consequences of a major accident may be increased because of proximity – the domino effect.
- The local authority shall prepare and test an off-site emergency plan.
- The CA shall examine the report, report its findings, and if appropriate, prohibit the operation of the establishment.

It is important that when we think of COMAH as a permissioning regime we don't just think of the document called the Safety Report produced by the operator. Once a site is identified as a COMAH Site, the Regulations call up a whole raft of processes intended to both reduce the likelihood of an incident, and also to mitigate the consequences if an incident does occur. They also involve others in addition to the operator. This is a significant benefit as we recognise that the total safety management picture utilises a series of layers of protection from the operator taking measures to prevent his plant causing an accident through to the responses of the emergency services.

The safety report identifies for the CA not only the main hazards and risks of an installation, but also those hardware and software controls which specifically address those main risks. This assists the CA to target their inspection visits and safety

management system audits on those controls which are critical to the prevention or mitigation of major accident hazards for that specific installation. This is clearly a much better use of the time of the CA. For the operator, it should mean that he is not required to deploy scarce resources into delivering improved performance in areas of his hardware or his management systems that are not really critical in the control of the risks of his major accident hazards.

The original intention was to put safety reports into the public domain. With heightened concerns over the potential for terrorist attacks, this has not happened. Allowing safety reports to be scrutinised by the general public might have encouraged senior managers and directors to pay more attention to their safety responsibilities. This would be consistent with the recent policy statement on the health and safety responsibilities of directors (3).

2.4 The Cost of COMAH

COMAH is specifically targeted on major accident hazards such as fires, explosions, toxic gas releases, etc. The Regulations use terminology such as "...uncontrolled developments...,serious danger..., ...involving dangerous substances...". The Regulations do not address many of the other hazards and risks that exist on major process plants just as they do in any other industrial installation. Operators continue to have the full range of health and safety duties relating to the many other hazards and risks on COMAH Sites that are not related to major accident hazards. It is essential that in this time of the Revitalising Health and Safety initiative (4) that operators of COMAH sites do not lose sight of other health and safety issues such as on site transport accidents, falls from height, musculoskeletal disorders, etc.

An aspect of COMAH which has been a step out from previous practices for the UK process industry has been the requirement placed on the CA to charge operating companies for their time. There are clearly wider political issues behind a decision of this nature. It has meant that the financial impact of the COMAH Regulations on operators has been significant as they have had to bear three new costs:

- The costs of implementing COMAH and preparing the safety Report
- The costs of the CA in assessing and commenting on the Safety Report
- The costs of any subsequent surveillance or inspection visits.

For all companies, large and small, this has been a significant "new" cost.

These costs of implementing COMAH have been significant for operating companies, even before accounting for the cost of any safety improvement measures that may have been required. Whilst many companies will have sought to increase their health and safety budgets to meet this burden, there may have been a diversion of funding from other worthy health and safety priorities such as those highlighted under the Revitalising Health and Safety initiative. A number of operating companies have expressed concern that responding to the more direct and immediate statutory duty of preparing a safety report under COMAH may divert resources away from important but less imminent safety improvements required under the general duties of the Health and Safety at Work Act.

2.5 The Safety Report

The required contents of the safety report are essentially as follows:

- The name and address of the establishment and contact details.
- A description of the site and the surrounding environment, including any locations that may be particularly vulnerable such as schools, hospitals or sites of special scientific interest.
- A description of the process materials, their hazards, and the manufacturing processes.
- A description of the organisation and management system.
- A section which identifies the potential major accident scenarios and assesses the risks.
- A description of technical parameters and equipment used for the safety of the installation.
- A description of the measures of protection and intervention to limit the consequences of an accident.

The term “description” regularly appears in the above list. However, the actual content of these sections should be clearly linked back to the identification and risk assessment of the potential accident scenarios. For example, if the risk assessment has shown that certain major accidents are prevented by the expertise of individual operators, then the section on the management system should show that there has been particular attention paid to devising and managing the systems for selection, training needs assessment, training, validation of training, etc. Although many of an operator’s safety management systems, risk control measures, emergency response measures, etc. will probably have been developed against the background of the specific hazards and risks on that operator’s site, it is unlikely that there is already a documented direct and explicit linkage. This requirement causes the operator to re-examine and re-evaluate management systems and emergency arrangements against the risk management needs of that particular installation.

The safety report has to be resubmitted every 5 years and also has to be revised whenever there is a “significant change” on the installation. There is a definition of significant change provided in the supporting Approved Code of Practice (5). This reflects the intention that the Safety Report should be a living document that evolves as the installation, or the installation’s surroundings, evolve. This is needed for the Safety Report to continue to be relevant. It might also be argued that any risk assessment needs to be frequently reviewed to take account of either new knowledge or technology, or changes in society’s attitude to risk. Whilst updating the report to reflect plant changes is expected, a concern expressed by many operators is that this requirement to periodically resubmit allows the competent authority to keep “moving the goalposts” in the sense of demanding more of the contents of the safety report. This may be more technical information, or more detailed or extensive hazard analysis and risk assessment. Seeking continuous improvement in the content and hence value of the safety report may well be a legitimate objective for the CA, but could lead to frustration if the expectation of operators is that this is essentially a once and for all activity.

2.6 The Demonstration of ALARP

As noted earlier, the process industries have been required to produce Safety Reports since the mid 1980's. In moving from CIMAH Safety Reports to COMAH Safety Reports, a fundamental change was introduced. A CIMAH Safety Report was essentially a description of the installation. It described the manufacturing process, the site and the surroundings, and it listed the things that might go wrong and the arrangements in place to either prevent or mitigate those incidents.

Operating companies that produced CIMAH Safety Reports have found themselves having to go back to the drawing board when they came to write their COMAH Safety Reports. This has been because of the requirement under COMAH for the safety report to demonstrate that the operator has reduced risks to “as low as reasonably practicable” (ALARP). This additional requirement has meant that the operator has to supply the background information as before under CIMAH, but then also has to carry out the risk assessment and to justify the conclusions of the risk assessment. The role of the competent authority can then become one of examining the sufficiency and suitability of the risk assessment and the conclusion that the risks are ALARP. It is this requirement to carry out a suitable and sufficient risk assessment that identifies all the hazards and then demonstrates that risks are ALARP, that has created the greatest difficulty for operators.

The concept of reasonably practicable has been with us for over 55 years since *Edwards v National Coal Board*, and is one of the cornerstones of the regulation of health and safety risk management. Most organisations and managers should be aware that they have a duty to reduce risks as low as reasonably practicable, and should have been guided by that principle through all the design, construction, operation, maintenance, etc, decisions that have been taken during the life cycle of the installation.

The concept of ALARP is easy to describe and to understand. The views of the Health and Safety Executive are very well explained in the current guidance document on risk management – *Reducing Risks, Protecting People* (6). However, when faced with analysing the large number of potential hazards on a typical COMAH Site, most operators have found it difficult to marshal the analysis and arguments into the demonstration that the CA requires. The CA themselves, whilst probably being very clear about the concept of ALARP, have also struggled to crystallise their thinking about how to make the demonstration into meaningful guidance for operators.

One of the complications that does arise in providing guidance on how to demonstrate ALARP is that there is no “one size that fits all”. The amount of rigour and thoroughness that should be applied in making the demonstration that the risk is ALARP, varies according to the understood level of risk, and the complexity and novelty of the installation. This is the proportionality principle. So if the risk associated with a particular hazard is relatively high, the operator must present a particularly complete and well argued case that there are no further risk reduction measures that are “reasonably practicable” available to him. Similarly if the risk is low, the justification can be less extensive.

The case that risks are ALARP may be argued using any or several of a number of different techniques. These range from the simple and quick qualitative techniques such as HAZOP studies and reference to standards, through to more time consuming and expensive techniques such as quantified risk assessment (QRA) and cost benefit analysis (CBA). This requirement for proportionality in the justification of ALARP is very sensible. If employees and members of the general public are being asked to accept risks towards the higher end of what might be considered to be tolerable, then they have a right to expect a detailed and comprehensive justification of why those risks cannot be reduced. Similarly, for those risks that are already small, it would be an unnecessary expenditure of resources to require detailed risk quantification etc. to justify a situation that experience tells us is already ALARP. Despite the obvious “rightness” of this approach as a principle, the majority of operators of COMAH Sites have found difficulty in producing the type of proportionate justification that risks have been reduced to ALARP that the CA has expected.

There are probably two reasons for this. Many operating companies believe that there has been inadequate guidance documentation on this subject of demonstrating ALARP. It should be noted that the CA has now moved to address this concern and recently a considerable quantity of guidance has appeared on the HSE website, but then the first COMAH Safety Reports were submitted in 2000. I would suggest the second reason is that operating companies appear to have not been thinking about their risk management decisions in terms of whether the risks are ALARP or not. If they have been basing decisions on ALARP thinking, then they certainly have not been documenting the justifications for those decisions. This would explain why the industry has struggled to generate these ALARP demonstrations in respect of decisions that were made by their engineers and managers in the past.

This need for more effective identification and evaluation of major accident hazards was recognised by ICI in the late 1980's. ICI developed the technique of Process Hazard Review (PHR). PHR is similar to a HAZOP study, but is focused on loss of containment events. It is a quicker and hence more cost effective technique than HAZOP. PHR also incorporates risk ranking techniques. This requires the study team to assess likelihood and consequence of potential accident scenarios. Where the residual risk is high, the study team needs to consider the options of more fundamental, and hence potentially expensive, risk reduction measures.

The important point to note is the wider changes that this particular permissioning regime is introducing. The COMAH Regulations, and especially the duty to produce a Safety Report which demonstrates ALARP, is requiring operators to fundamentally change the way in which they view, evaluate and manage risk. In my own experience, many engineers and managers used to view decisions about the tolerability of risk with a stop/go perspective. Either the risk was acceptable and the project or activity could go ahead as planned, or the risk was not acceptable, and changes had to be implemented. Due to this emphasis on demonstrating ALARP, I find that managers and engineers, when faced with difficult decisions about accepting risks, want to explore options for risk reduction and to test whether those options are reasonably practicable. This change in the understanding of risk management should lead to more appropriate and cost effective decisions.

3 SUMMARY

The process industry has now had almost 20 years of preparing safety cases under the CIMAH Regulations, and more recently under the COMAH Regulations. Over the past 20 years, industry in the UK has a very good safety record and clearly the operation of a permissioning regime has contributed to that performance.

The COMAH Regulations should not just be seen as a requirement on the operator to produce a safety report. There are a number of aspects to the Regulations. Each of these contribute to improving the safety, health and environmental performance of the installation. The Regulations also involve not only the operator of the installation, but also several other parties. The integration of the roles of these parties under a single framework is a valuable part of achieving the desired benefits.

The cost to operating companies of implementing The COMAH Regulations has been significant. For many companies, the immediate statutory duty to comply with the Regulations and to respond to the CA has dominated the deployment of health and safety resources. This has caused companies to set aside their own improvement plans, which may have been more associated with occupational safety issues, and to concentrate on the management of major accident hazards. In this time of the Revitalising Health and Safety initiative, we need to be sure that there is an appropriate balance between pressures to improve major accident hazard management and occupational health and safety management.

The COMAH safety report is required to demonstrate that risks have been reduced “as low as reasonably practicable” (ALARP). Whilst the concept of “reasonably practicable” has been in existence for some time, many operators have struggled to demonstrate that this had been done in all the many decisions made through the life of the plant. The insistence by the CA that safety reports really do demonstrate ALARP has probably been the cause of a large part of the expense that operators now associate with COMAH. However, in insisting on this demonstration in the safety report, the CA is not only making the safety report a more useful document, it is also bringing about a significant change in the way individuals and organisations think about and manage risk. It is suggested that this change in approach to risk management amongst engineers and managers will make a significant contribution to safety management.

REFERENCES

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