

COMAH IMPLEMENTATION IN A MULTI-SITE ORGANISATION

Dennis O'Leary HSE Team Leader Bacton Delivery Area SNS Upstream, BP.
Andy Stanley Technical Director, RAS Risk Management Consultants, Chester.

This paper will set out the BP experience in developing a successful multi-site approach to the COMAH Regulations. It will set out the background to COMAH, the key differences between CIMAH and COMAH and the functions of the CA. It will show how a robust and transparent approach is essential in being able to deliver on the COMAH objective in a multisite organisation, that of avoiding catastrophes. Discussion of the ongoing challenge of sustaining the safe management and control of all BP's operations is included. The paper will go on to discuss how the benefits of developing close working relationships with others, including the Competent Authority (CA) can be realised. The paper closes with a brief summary of COMAH and the role of permissioning regimes in the future.

BACKGROUND

In the hydrocarbons and chemical industry, an explosion at the Flixborough chemical plant in 1974 killed 28 workers, this was followed by an incident in 1976 at Seveso in Italy in which a runaway reaction led to widespread contamination of land with dioxin.

These incidents prompted the EC to examine the way in which major hazards were controlled across Europe and led to the passing of an EC Directive – the Seveso Directive (82/501/EEC). In Great Britain this Directive was implemented by the 1984 Control of Major Industrial Accident Hazards (CIMAH) regulations. During the period 1984 through to 1994 further tragic events resulted in a review of the operation of the Seveso Directive.

This revealed that there were a number of weaknesses and omissions causing the EC to issue the Seveso II Directive (96/82/EC). In Great Britain the new directive was implemented primarily by the 1999 Control Of Major Accidents Hazards (COMAH) regulations. The SEVESO Directive or for the UK the CIMAH Regulations applied to all UK facilities that met certain specified criteria. The criteria were focussed on the use or processing of certain specified and named substances.

MOVING FROM CIMAH TO COMAH

In the 1980s when the CIMAH regulations were introduced, BP decided that a common approach to the submission of Safety Reports would be beneficial for many reasons. A network of safety professionals from all BP UK top tier sites was established. The function of this network was to provide guidance on the structure and content of Safety Reports and review the feedback that individual sites received on their submissions.

As in many other organisations, during the last few years the BP organisation has changed enormously. BP in the mid 90s moved to a business unit structure, in 1999 merged with Amoco and acquired Arco in 2000. It is now a substantially larger and more diverse organisation than ever before. There are now some 15 top tier and 19 lower tier sites in the UK alone, each predominantly in different business units and in geographically diverse and sometimes challenging locations.

The COMAH network of safety professionals initially established under CIMAH is now charged with the same and some additional responsibilities under COMAH. One of the first responsibilities the group faced, was how do we take the learning's from our previous CIMAH submissions and include them in our approach to COMAH.

BP had gained some experience in a ¹pilot COMAH project discussed by Ian Hamilton BP at the HAZARDS XIV Conference (Paper 7 1998). This work was undertaken prior to the merger with Amoco in January 1999.

Following the merger, it was decided to use the heritage Amoco Bacton Gas Terminal Complex as the location where much of the development of an approach to meeting and piloting the BP COMAH framework should be undertaken. This decision was made for a number of reasons, in that it would be one of the first locations which had to comply with the COMAH Regulations and was a relatively simple top tier site.

The 'old' BP CIMAH liaison network had developed a significant amount of guidance which was contained within a CIMAH 'toolbox'. BP Sunbury took ownership in 1999 for developing this CIMAH 'toolbox' into a COMAH 'toolbox'.

Thus, the development of the BP COMAH framework and the BP COMAH toolbox is enabling BP to deliver consistent COMAH reports whilst fully including site specific circumstances.

THE REGULATIONS

The COMAH regulations are a development from CIMAH and importantly have included some of the thinking from Lord Cullen's Report following the Piper Alpha tragedy (167 killed) and the subsequent Offshore Safety Case Regulations (1992). The Offshore Safety regulations, the more recently introduced Railways regulations and now the COMAH regulations come under the generic heading of permissioning regimes.

The clear requirement within the permissioning regimes in the UK is one of generating a Safety Report. The HSE have recently issued a recent discussion document on regulating high hazard industries setting out a number of basic principles. The second of these principles defines the basis for major hazard legislation by establishing that there is a legal duty on such industries to manage the risks and requiring them to:

- Identify hazards and assess the risks, using appropriate risk assessment methods, develop effective control measures and keep a current documentary record of all this
- Include design, hardware, systems, organisation, procedures and human factors in a coherent whole
- Implement control measures that are suitable and keep them up to date

- Make and test arrangements for managing emergencies and mitigating their consequences.

THE COMPETENT AUTHORITY

Seveso II imposes additional requirements on member states for the creation of a Competent Authority, in the UK this has been realised through various formal organisational arrangements between the HSE and Environment Agency (England and Wales), the HSE and Scottish Environment Agency for Scotland. The Competent Authority is charged with ensuring :

- The conclusions of the review of the safety report must now be communicated to the operator
- There is a requirement for a five year inspection plan to verify the contents of the safety report
- That the report is made available to the general public
- The duty to prohibit use where the measures taken by the operator for the prevention and mitigation of major accidents are “seriously deficient”
- Setting up a system for land use planning around major hazard sites
- The introduction of charging for all COMAH related activities
- The submission of safety reports at both the design and operational stages for a new establishment

KEY DIFFERENCES BETWEEN CIMAH AND COMAH

So what are the key differences between CIMAH and COMAH? The previous discussion has centred on some of the high level differences. However a discussion around some of the detail differences is now important.

The following are the significant differences:

- The need to demonstrate rather than describe. This one area has possibly led to more communication than any other aspect of the COMAH regulations. The issue being; when has sufficient demonstration been achieved.
- The appropriate use of risk assessment methods, where safety and environmental risk need to be considered equally. This is an interesting difference to previous permissioning legislation in this area, (IE Offshore Safety Case Regulations) as there is no specific requirement to use QRA or any other risk assessment methods, which are available. The emphasis here, is on the appropriate selection and effective use of the risk assessment methods.
- The public domain aspects of COMAH. A significant difference in that the COMAH reports are now available on the Public Register. The reports therefore are not written to satisfy just the regulations and the regulator, but also the needs of the community. Clearly this could present some operators with specific concerns, if they have been operating previously in an atmosphere of distrust.

- Domino effects need to be considered. This has and is proving to be a difficult area to fully implement. It requires the sharing of detailed information, sometimes between highly competitive organisations.
- Onsite as well as offsite risk needs to be considered, whereas under CIMAH offsite risk was the primary focus.
- Human Factors, the role of people in managing abnormal or emergency situations and the testing of the adequacy of emergency response plans and their implementation.

BUSINESS OPPORTUNITY OR THREAT

The authors believed we needed to develop a mindset or philosophy to meeting the regulations.

Should we approach the regulations positively so that they work for us and add value to our business. Thereby seeing the new regulations as an opportunity to build trust with the local community through the development of a robust and transparent Safety Report whilst at the same time deliver on the objective of the regulations.

Or, alternatively should we view the regulations as a threat, IE, Approaching the regulations as just more red tape that we must comply with, which will be yet another overhead for the business to manage.

Although it may seem an obvious choice to the reader of this paper, how often do organisations take time to consider what should be the approach to new Regulations?

For BP we chose the former perspective – to treat the COMAH Regulations as a business opportunity.

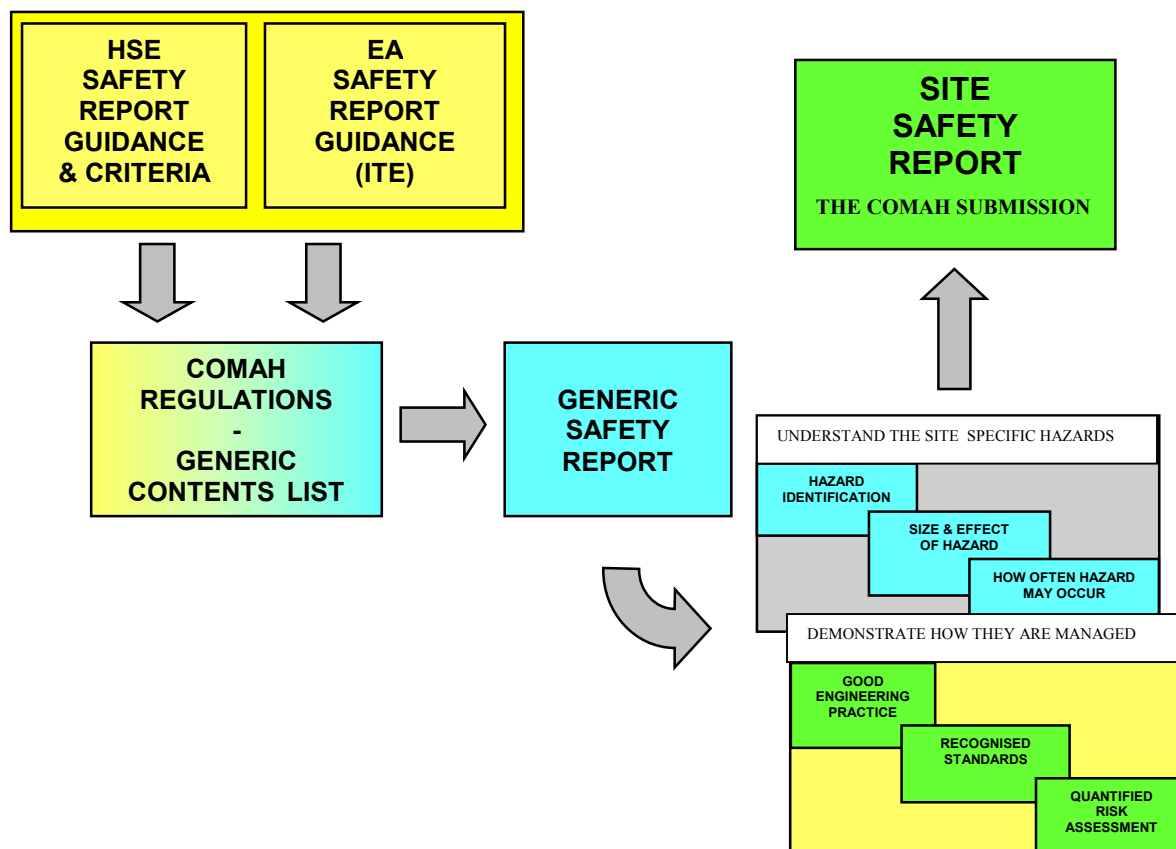
BP APPROACH TO IMPLEMENTING THE REGULATIONS

The BP approach to implementing the COMAH regulations can best be described by reference to the diagram on the next page. Essentially the guidance that was published at the time, by the various agencies was obtained and evaluated.

Other guidance that became available, such as the Chemical Industry Association (CIA) guidance on Occupied Buildings was included. For clarity only two references to guidance are shown, although a huge amount of other guidance has been reviewed.

It should be noted, although the SEVESO II document was available in 1997, published guidance really only became available during the latter half of 1999 and thereafter. Therefore much of the work that was developed in BP during that period was done in an environment without guidance from the Competent Authority.

BP APPROACH TO IMPLEMENTING THE REGULATIONS



Following this data search, the COMAH regulations and the associated CA COMAH Safety Report Assessment Manual (SRAM) were reviewed in detail. Interestingly, it became clear very quickly that the structure of the Regulations would not necessarily lead to a well-structured and easily understood or readable Safety Report.

These aspects were considered important because of the various stakeholders who needed to be able to access the information contained within the report. The stakeholders considered, being the CA, the management, the workforce, and the general public.

The Generic BP COMAH Safety Report framework was thus developed.

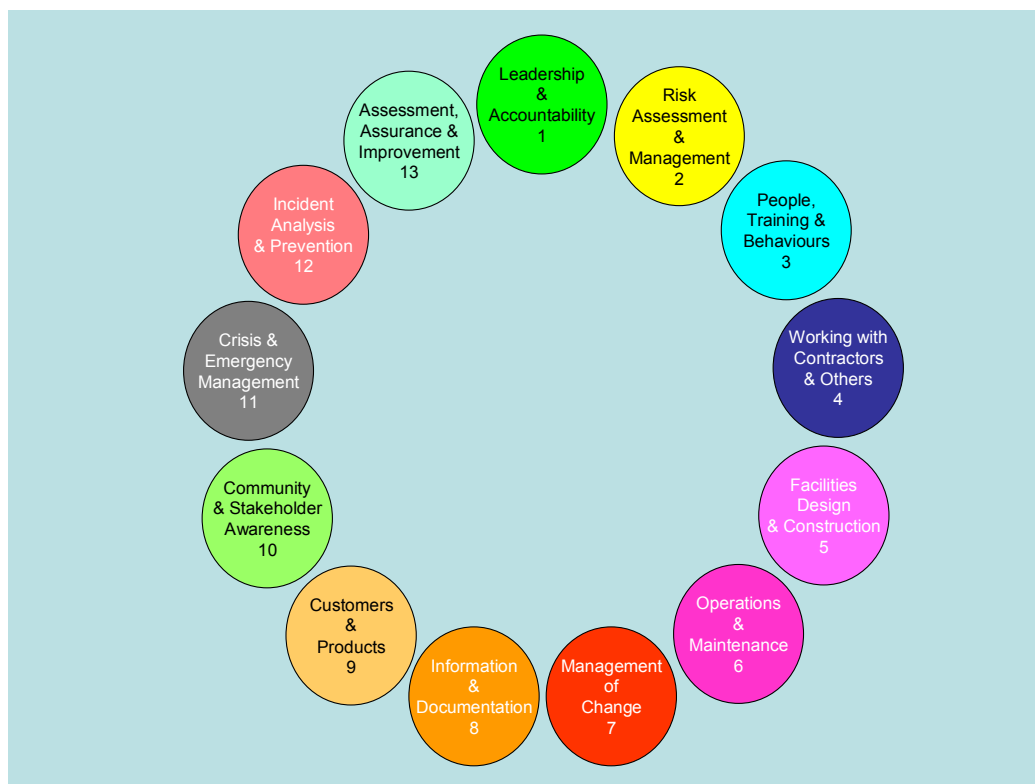
The framework is a key to developing a robust and consistent approach to the COMAH regulations across all UK BP top tier and lower tier sites.

It is important to point out, the CA was also keen to ensure consistency of report submissions, and indeed has set up the CA organisation to be able to deliver on this. The arrangements the CA have in place centre around the LUPI principle (Lead Unit Principle Inspector).

The role of this designated individual is to ensure that issues common at all sites operated by one named organisation, such as HARM criteria, etc are managed centrally. The perceived benefit of this approach is to ensure all sites can use the same fundamental criteria, agreed centrally and not subjected to endless parallel and expensive CA scrutiny.

DEVELOPING A MAJOR ACCIDENT PREVENTION POLICY

Developing the Major Accident Prevention Policy (MAPP) was, intriguingly difficult. Why? Well BP common to many other organisations has for many years, since the 1974² HASWA Act put in place various Health and Safety policies. The picture below shows the 13 elements of the BP Policy.



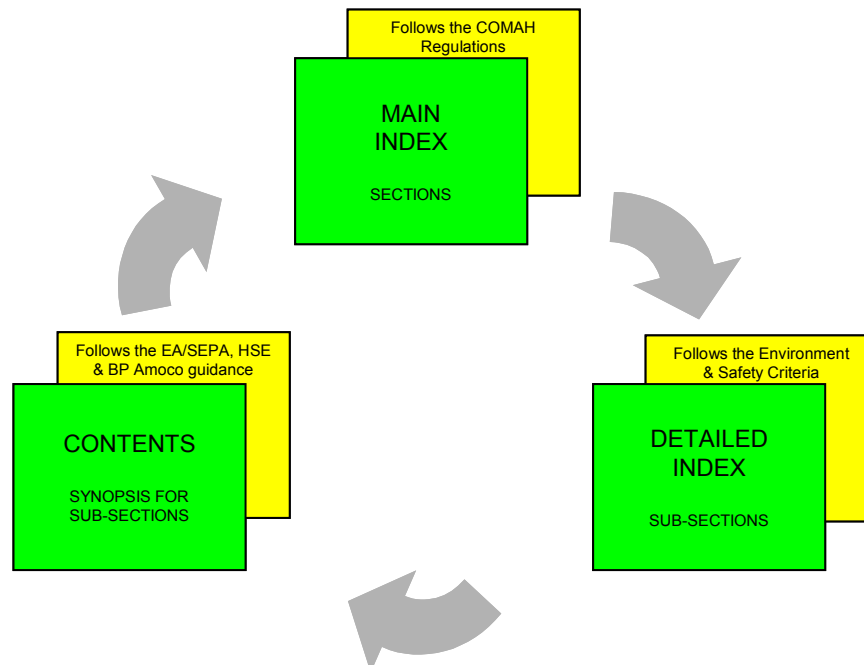
These elements cover the full spectrum of our activities, from the management of major accident hazards through to the reduction of slips trips and falls. However the COMAH regulations specifically ask organisations to address Major Accident Hazards within the MAPP. A further complication arose in that; typically policies were made at the highest level within organisations. This is common to BP also. So how could we link and demonstrate a high level policy document to what happened at the site level.

Our approach was to look in detail at our BP group wide policy, reference all of the elements within our Safety Management System (³GHSER) and then identify all the key areas for the management of major accident hazards.

We then decided, we needed a group wide MAPP which is totally transparent to the Group wide Safety, Health and Environment policy, but specifically addresses major accident hazards. We also needed a site MAPP, linking the Group wide MAPP to the site, but now referring to the organisation and arrangements at the site level. This at first seems a complicated arrangement, however it is in fact, very simple, because the documents are transparent to each other

DEVELOPING A COMAH FRAMEWORK FOR ALL UK SITES

The development of the BP COMAH framework or model was an iterative process. Reflecting our continuous learning the development of the model began before the regulations, criteria and guidance were finalised, IE in 1999.



THE STRUCTURE OF THE BP FRAMEWORK OR MODEL.

The framework or model has been developed so that it can be applied at any of the BP sites across the UK. The aim being to avoid any unnecessary repetition of effort and provide a consistency in our approach to the regulations. The model enables the focus to be the management of major accident hazards, rather than being distracted by deciding what the structure of the Safety Report should be.

There are three parts to the framework or model, the company, the establishment and the installation reports. The Company Report is common to all sites across the UK. It describes the structure of the Company and the common elements across the Company. It is common for all BP UK COMAH sites, and is updated by the Company centrally, rather than by the establishment or site. It is submitted with and forms part of every establishment's safety report. It contains information such as:

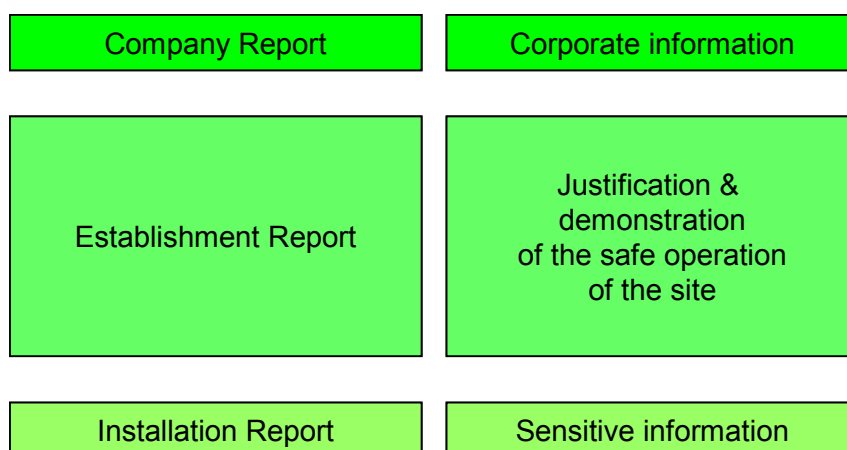
- The company HSE Policy, Major Accident Prevention Policy (MAPP) and Business Policies
- A Description of Company Structure
- The HSE Management System Framework (Getting HSE Right)
- The Company internal networks
- The technical Practices and references used by the Company
- The Company Incident Reporting Systems
- The Company Emergency and Crisis Management
- The Group or Company Assurance

The biggest and most important part of the model is the Establishment Report. This is where the demonstrations are made to show how the objectives of the regulations are delivered at site level. The establishment report describes the common features across the establishment. It forms the bulk of the submission presented and contains information such as:

- A description of the site location and its surroundings
- The inventories of dangerous substances on site and their hazardous properties
- The details of the establishment HSE management system, the roles and responsibilities
- The details of the site or establishment infrastructure.
- The details of the site emergency response plans, capability and testing arrangements.
- A summary of the key representative major accidents on the establishment including potential consequences and likelihood
- A description of the measures taken to avoid, prevent, control and mitigate the key major accidents
- Justification that the measures are commensurate with the risks

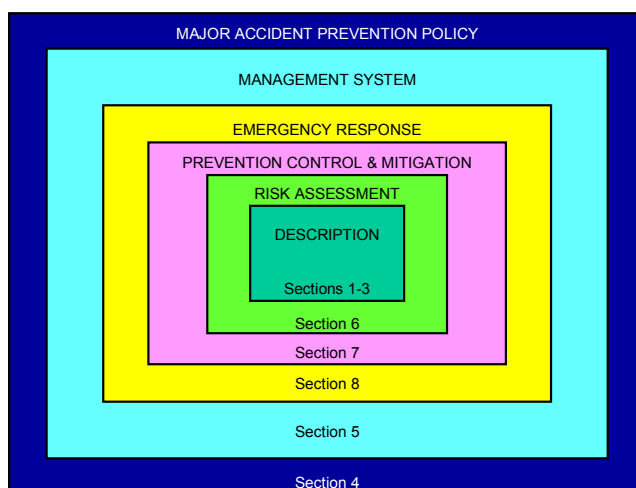
The Installation report, which invariably has much less text, is where either commercially sensitive or security information is placed, and is not essential to the main demonstrations. For complex sites such as Grangemouth there are many Installation reports. BP has also developed a technical COMAH “Toolbox”. This covers such aspects as:

- Identification of representative scenarios
- Possible outcomes (fires, explosions, pressure burst, missiles, toxic clouds)
- Criteria for harm (to people, property and the environment)
- Calculation of consequences
- Assignment of likelihood's
- Domino methodology
- Estimating risk levels
- Modelling the effect of control and mitigation measures
- Demonstration that risks are adequately managed



HOW THE ESTABLISHMENT REPORT WORKS.

The Major Accident Prevention Policy (MAPP) drives the establishment report. The description provides the source information for the risk assessment. This source information includes all of the substances and quantities on site or foreseeable as coming to site. The description includes the site, surrounding area and any specific issues – such as SSSI. A full site wide safety and environmental risk assessment using appropriate risk assessment methods and associated tools is then undertaken. Therefore a mixture of quantitative and qualitative risk assessments usually varying from site to site, dependent on the complexity of the hazards identified.

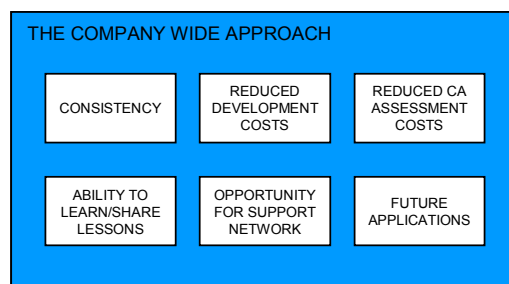
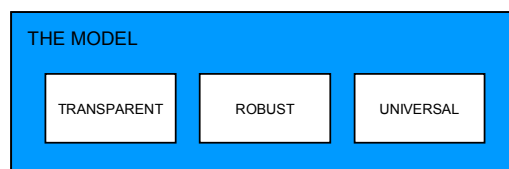


The results of the risk assessment are used to test the prevention, control, mitigation measures and emergency response systems. The prevention, control and mitigation details are developed using the risk hierarchy of avoid, combat and control.

The management system then ensures that all the prevention, control and mitigation measures are in place and managed to meet the expectations as laid out in the Major Accident Prevention Policy.

THE BENEFITS OF THIS APPROACH

What are the benefits of this approach? The model provides support and enables the development of a COMAH Safety Report that is transparent and robust.



We believed that a robust transparent approach is essential, for as stated before for the first time the Safety Report will be available to the public. In many respects our continued community licence to operate will depend on the success of the Safety Report. Therefore although technical accuracy is paramount, delivering on the much wider objective is equally important.

The universal nature of the model facilitates this consistent application of the COMAH regulations across all our BP UK (and perhaps European) sites. We are able to share our experience and lessons learnt from a very broad base of application. This has and is reducing our Safety Report development costs because the generic challenges can be solved once only. It has and is reducing the costs associated with the CA assessments due to the consistent submissions from our sites. The approach is already being considered as a new way of looking at existing legislation like the Offshore Safety Case Regulations.

THE LEARNING'S FROM 2000 AND 2001

Given that the BP Bacton report has now been ⁴accepted' by the CA what has been the key learning's from the BP approach to meeting the COMAH regulations and are these learning's transferable throughout the company and industry?

The COMAH regulations are significant step forward in regulating MAH's. Some key learning's are:

1. Adopting the right mindset is the first step
2. Understand the objective of the regulations
3. Undertake a gap analysis of what is in place and what needs to be in place
4. Engage the management and workforce and grow their understanding on how they can effectively contribute
5. Deliver on the gap analysis, keep the report live

The CA is now developing their ideas around their safety inspection philosophy to enable them to verify consistently how organisations are delivering on the site COMAH submissions. It is clear already, even at this early stage of COMAH compliance and development that a huge amount of work is still to be done.

LEARNING'S, OPERATOR VIEW OF THE CA

The Competent Authority approach across the country appears to be inconsistent. The authors believe this is due to a number of factors, not least the number of inspectors available and the training provided, but also the number of new sites that now come under the regulations.

Organisational preparedness for the COMAH regulations could have been much improved had a reasonable timescale for the full implementation of the regulations been allowed. The SHARPP pilot and the subsequent work undertaken at Bacton during 1999 was against a backdrop of little or in some areas of the regulations, no guidance from the CA.

The time required to complete a COMAH report, through undertaking the description, hazard identification, risk assessments and putting in place of appropriate management systems to adequately demonstrate how all the Major Accident Hazards can be managed, for some sites, is a huge undertaking.

That is not to say that these sites did not have adequate systems in place, clearly they did. However undertaking a sensible 'gap analysis' between what was in place and what needed to be done to satisfy the regulations can be a lengthy process.

LEARNING'S FOR OTHER OPERATORS

Developing a consistent, robust and transparent approach to the regulations can be done. Sustaining a consistent approach can deliver huge benefits, not least in delivering on the COMAH objective of avoiding catastrophes. It can also deliver in a real business bottom line sense.

Adopting an appropriate mindset is fundamental. However once this has been achieved, continuing to look past the regulations towards the spirit of the regulations can lead to other benefits. An example of this, at one of our sites where the CIA guidance for Occupied Buildings is being discussed, the site safety engineer has been able to demonstrate to the site management how the safety benefits for taking the office, admin buildings and people of site, will also provide real cost savings. Given the current topical discussion around the CONOCO Humber Oil Refinery this is perhaps, timely.

SO THE CHALLENGES WE FACED AND CONTINUE TO FACE ARE

1. Ownership. If the safety report is to deliver real value, it is vital that the safety report is not seen as the property of the HSE department but is owned by line management. The COMAH report will be the main document against which the company will be judged in any inspection carried out by the CA (and also in any incident investigation). It is therefore essential that the systems and procedures documented in the report are an accurate reflection of what actually happens on site and that line management are aware of this.
2. Communication. The safety report identifies the potential major accidents and the key risk control measures in place to prevent such accidents. If these key risk control measures are to remain effective, it is important that workers at all levels understand the consequences of their failure. The safety report is often seen as an excellent reference document. The challenge is to distil and communicate the findings of a long and complex document into a format which is easily digestible to all, so that it can be integrated into every day working practice.
3. A Living Document. Because safety reports are prepared and revised to a specific timetable, they inevitably represent a snapshot of the facility at a particular time. Ideally the safety report would be a living document continuously developing as the facility evolves with time. The need for the document to reside in the public domain along with the CA's comments severely limits the possibility of a single living document.
4. A Seamless Approach. The offshore and onshore approach to safety reports is substantially different, such that very different approaches often apply to equipment

connected together by a single pipeline. In an ideal world the approach would be the same either end of the pipe.

5. Communicating with the public. Safety reports will be made available to the public. Under the regulations, industry has no obligation to advertise the availability of reports or enter into a debate over their contents. However, there is a real opportunity for industry to take a more proactive role, engaging the public in debate and listening to and addressing their concerns.

THE FUTURE – PERMISSIONING REGIMES

So what of the future? The Piper Alpha disaster has been mentioned briefly. The current enquiry into Ladbroke Grove rail tragedy and the various railway failures have focussed governmental, regulatory and public concern around the effectiveness of permissioning regimes. In deed it is perhaps by no co-incidence that Lord Cullen is heading up the Ladbroke Grove enquiry.

What is clear, is that a greater emphasis is now being placed on safety reports due to public scrutiny. The need to understand new regulations, not from the perspective of meeting the requirements of the regulations slavishly, more from a perspective of the community licence to operate is becoming ever more real.

The regulator is now taking a much more robust view of human factors and the role they play in initiating Major Accidents. Major Accident Hazards now include environmental aspects, Major Accidents to the Environment (MATTE). The recently introduced Human Rights Act is likely to focus more thinking and resources into effectively managing this aspect of our business.

ONSHORE AND OFFSHORE ASPECT

So what does this mean for BP ? BP is a Global organisation operating Major Accident Hazards sites in a variety of geographically challenged locations. In the UK this is exemplified typically by our onshore and offshore hydrocarbons facilities. We are now looking to ways of how the management of major accident hazards can be improved and undertaken in a more consistent and robust manner across all our facilities.

The work undertaken in meeting the COMAH regulations is already spilling into our thinking for this, such that we believe we can derive more benefit from meeting the Offshore Safety Case Regulations. This is an important area, which is now coming into focus. We believe that much of the benefits realised to date from the Offshore Safety Case regulations have predominantly been due to necessary hardware improvements, such as blast wall protection, Emergency Shutdown Systems, fire & gas systems etc.

Further benefits should be achieved if we focus or concentrate on people and systems. A basic premise is that the safety case regime and practice has contributed to much good learning and knowledge. However, this knowledge is often ineffective in reducing the risks from Major Accident Hazards (MAH). BP are seeking to “unlock” the potential for this knowledge to become effective in the management of major accident hazards.

Within permissioning regimes, COMAH reports or the Offshore Safety Case must demonstrate that the duty holder has an effective safety management system (SMS). Duty

holders generally make this demonstration by describing their SMS in the safety case document.

However, it is evident that the system for Management of Major Accident Hazards as described in the safety case and the actual day-to-day management of MAH can be significantly different. The reasons for these differences are complex, but are associated with the different purposes and perspectives that people have in 1) documenting a management system and 2) operating an installation. The following table characterises these two perspectives of management of MAH:

Perspective 1	Perspective 2
“Objective” idealised, theoretical view of risk	View of risk based on experience and perception
Idealised and generic view of reliability	Realistic and specific view of reliability
Decisions based on simplification and analysis	Decisions based on judgement and experience
Solutions tend to be neat, logical	Solutions tend to be expedient (1001 things to do)
Management of MAH is described in safety case	management of MAH is dealt with by the safety case
Main problem solving tools are QRA and cost-benefit analysis	Problems solved through discussion / getting the job done
<i>‘Objective’ view of reality</i>	<i>Perception is reality</i>

‘Specialists’ typically use a ‘rational’ definition of risk as a basis for decision making. Their decision making tools include QRA and cost-benefit analysis. ‘Non-specialists’ tend to make decisions based on experience and judgement.

These different approaches are also associated with different views of management of MAH. One group seeks to precisely define safety critical elements, associated performance standards and verification activities, while the other group needs to deal with major accident hazards as only one of a large number of (often conflicting) issues.

These polarised perspectives may caricature two approaches but serve to illustrate the extreme differences that exist. In practice, ‘specialists’ will seek input to their models from those with relevant operational experience, but the obtained information may be difficult to incorporate into the models. On the other hand, the ‘non-specialists’ will base their decision-making on experience and judgement and sometimes ask for analysis to support decisions, however, the necessary timescale for decision often discourages analysis.

How can these different views of management of MAH be reconciled?

How can the management of MAH be improved in such an environment?

Today, many organisations empower their workforce to be creative in business and exercise and implement their own ideas. This empowerment leads to many positive ideas and actions, and a few negative outcomes which can be tolerated. However, for safety issues, traditional command and control structures still operate. In particular, managers apply control techniques to assist the management of MAH, but near-misses continue to occur. So why do major accident near-misses continue to occur?

Many systems have been introduced on offshore installations to aid management of MAH. The systems are introduced with a clear objective, but over time the focus shifts from delivery of the objective to delivery against the system. People lose sight of the real objective, which is control of hazards.

Permit To Work

The PTW system is often treated as a paper system that demands compliance, rather than a system for managing hazards - the job can not start until the paperwork is completed. This attitude devalues the system. Evidence of lack of management control tends to be corrected by introducing new systems e.g. task-base risk assessment.

So, the challenge is: To make people think more about the function of the management system and think less about how to satisfy the management system itself.

Clearly much useful work can still be undertaken in this area.

Perhaps BP's progress can be a subject for our submission to the HAZARDS XVII conference next year.

References:

1. SHARPP project (Safety Report Handling Assessment and Review Principles and Processes)
2. 1974 HASWA Act, Health & Safety at Work Etc Act 1974, following the Robens report.
3. GHSER, BP Safety Management System known as Getting Health, Safety and Environment Right.
4. Accepted. The CA does not officially accept COMAH reports. A 'Conclusions' letter is sent to the operator of the site, which states whether Regulation 4 has been achieved and what further measures the CA would like the operator to consider.
5. A Guide to the Control of Major Accident Hazard Regulations 1999, ISBN 0-7176-1604-5
6. HAZARDS XIV Cost Effective Safety, ISBN 0-85295-416-6