

RISKS TO PROCESS SAFETY IN A CONTRACTED OUT ENVIRONMENT (CONTRACTORS, CONSULTANTS AND CORPORATE RESPONSIBILITY)

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Over the last 25 years we have seen the demise of large chemical and manufacturing companies into smaller business units by a series of sales, floatations, divestments, management buyouts etc. With the division of previously large companies into multiple small autonomous units, there has been a reduction in the number of companies who retain significant safety or engineering capability in-house. This has led to a much greater reliance on the use of Consultants and Contractors for the provision of primary safety, technical and design support. It also appears that there is a limited number of consultants who are capable of providing a high level of safety knowledge.

It is clear that there are a number of risks involved in the extensive contracting out of core responsibilities to external companies and third parties. These risks are:

- Lack of responsibility of the consultant in ensuring that safety recommendations are feasible within the operating environment
- Lack of understanding of the key recommendations made by the consultant
- Failure of the company to recognise the importance of the recommendations made by the consultant
- Failure of the company to correctly specify the contract and delivery of the problem
- Lack of resources to implement consultant recommendations or recommendations are unreasonable
- Failure of the consultant to deliver an engineered solution in the hope of obtaining further work

This paper considers the use and relationship between operating companies, contractors and consultants and the issues for sustainability and corporate responsibility within a highly regulated (COMAH) environment. In particular, the risks and responsibilities of using external personnel on important projects and the ability to retain corporate knowledge and the responsibility for decision making are considered. Also, considered is the choice of contractor/consultant and how we ensure competency in a rapidly changing industrial climate.

Generally, an independent consultant provides management advice or recommendations, typically in the form of a report, whether written or verbal. The client does not have control over the result of the service or the manner of performance for the task.

For the company, how do we ensure that key knowledge is retained within the organisation and indeed, what is the minimum level of knowledge that is needed in-house to

retain the ability to be able to properly select an external organisation to provide specialist assistance. In particular, how do companies ensure an adequate level of Risk Management for the hazards found on the site within a contracted-out environment.

The question is posed as to what level of contracting out is viable and sustainable.

This paper is not a condemnation of contractors and consultants and nor should it be taken as one. Indeed, without the work carried out by these people, industry could not function as efficiently as it currently does. This paper is simply an examination of the potential risks that occur due to over-reliance on external resources.

INTRODUCTION

Over the past 25 years or so, the chemical and process industries have seen an unprecedented level of change, not only in terms of the globalisation of production but in the way that businesses are structured. In the past, large numbers of engineers were employed by companies in centralised technical and engineering departments. These engineers produced synergy in technical competence because of the critical mass of knowledge within the organisation.

Central engineering departments provided technical assistance company wide and were essential in maintaining both the technological edge of the company and also the level of technical safety, particularly with respect to major accident hazards. Thus, site based safety personnel had easy access to specialist technical knowledge in the fields of, for example, fire safety, pressure relief and risk assessment. In this way, not only was the day to day issues of slips, trips and falls safety addressed but there was also adequate support in-house for the more complex process and technical safety issues.

However, recent industrial trends have meant that large conglomerate companies have been split down into multiple small business units by a series of sales, divestments, management buyouts etc. The general purpose behind these divisions is to ensure that each section is a profitable organisation in itself. One side effect of this restructuring is that services that were previously provided centrally and funded by relatively small contributions from each of the individual businesses are no longer considered viable. Thus, centralised engineering and safety departments are no longer *de rigueur* and the engineers previously employed in these roles have been dispersed around

the smaller businesses or else have gone into contracting or consultancy organisations.

Whilst the fragmentation of businesses makes apparent financial sense in the shorter term, the question must be posed as to whether a small business unit model enables the retention of sufficient knowledge in-house safety knowledge to address the key issue of process safety within the modern business environment and also to ensure that sustain this level of safety for the future.

ISSUES

There are several issues with the contracting out of key process safety services.

- Lack of responsibility of the consultant in ensuring that safety recommendations are feasible within the operating environment
- Lack of understanding of the key recommendations made by the consultant
- Failure of the client to recognise the importance of the recommendations made by the consultant
- Failure of the client to correctly and fully specify the contract and delivery of the report
- Lack of resources to implement consultant recommendations or recommendations are unreasonable
- Failure of the consultant to deliver an engineered solution in the hope of obtaining further work
- In the longer term, the retention of key safety knowledge within a small business unit

REASONS FOR CONTRACTING SAFETY WORK OUT

There are two main reasons for contracting safety work out. These are:

1. Lack of specialist knowledge in-house to complete the work
2. Lack of resource (time) where the piece of work to be completed cannot be done in the time available with the level of resource in house even though there is sufficient knowledge to do the work

Both of the above are valid reasons for contracting out specific pieces of work.

In the past 20 years or so, there has been an explosion in the number of consultants working within the chemical and allied industries. This is in no small part due to the fragmentation of the aforementioned large business units and the inherent inability of a small company to support a number of in-house specialists – an importantly to keep them interested in the work, maintain their personal knowledge base and give them a suitable career progression.

CONSULTANT LACK OF RESPONSIBILITY

All consultants have a fundamental responsibility to the client to ensure that the recommendations made are feasible for the client to implement. In many cases it is all too easy

for a consultant to recommend improvements that are either disproportionate or else infeasible to implement. If the recommendations are considered infeasible by the client then the recommendations may not be implemented leading to failure of key safety systems. This can lead to a certain amount of complacency on the part of the consultant, since it may be relatively easy to suggest improvements that are either infeasible or else extremely difficult to implement in a cost effective manner.

Ultimately, it must be remembered the consultant is not responsible for the implementation of any improvements to processes, systems etc. Thus, once the final report has been delivered, it becomes the responsibility of the client to ensure that the intent of the modification is implemented. In order to do this effectively, the client must have a basic level of knowledge about the subject in order to recognise the feasibility of the recommended measures. If this knowledge is not available within the client company then there is a risk that the importance of the report recommendations may not be recognised.

Thus, there is a risk that the consultant may not provide a solution that meets the client requirements. Unless the client can recognise the deficiencies of the report then there is a risk to the business for failure to implement key recommendations or else incorrect implementation.

LACK OF UNDERSTANDING OF THE REPORT RECOMMENDATIONS

In the author's experience, this is a very common problem, especially when the work relates to complex issues such as fire or explosion hazard or COMAH. In these cases there is often a dual failure on both the consultant and the clients parts. The consultant assumes a level of knowledge which the client does not have in-house and there are a number of potential outcomes:

- The report is put to one side and there is a failure to deal with the key recommendations made
- The report is acted upon but the key findings and critical issues are either not understood or else incompletely understood
- Another consultant is called in to rework, revise or interpret the work done by the first one

The ultimate issue with both of these outcomes is that there is the potential deficiency of the safety systems within the company.

It is essential that the client is an informed or "intelligent" buyer of consultancy services and understands the key issues. It is also essential that the consultant clearly understands the level of knowledge and competence of the client when compiling the report. With the fragmentation of larger companies, it is becoming more common in the author's experience that the people responsible for safety generally have a reduced understanding of legislation and key safety issues if they have been in the same company/role for a significant amount of time. This is less so where

the responsible person has worked for several companies but it is still clear that there is a lack of structured training and development for safety managers in industry.

This, however, raises a more important consideration, namely, how can it be ensured that clients are, in fact, intelligent buyers when the organisation may only have one or two safety professionals to cover everything? Indeed, many of the safety managers in large companies are nearing the end of their careers and it is unclear where new people will come from or how they will be trained.

LACK OF UNDERSTANDING OF KEY RECOMMENDATIONS IN REPORT

In the author's experience, there is a common problem in that many consultant reports are often poorly understood, especially where these relate to complex topics such as explosion hazards, SIL assessment etc. There also often seems to be a reluctance to go back to the consultant to gain further explanation of the report.

It is the consultants' responsibility to write the report in such a way that the client is able to understand the issues within it. In order to do this, the consultant must make an assessment of the technical ability and knowledge of the customer and pitch the report at an appropriate level, where necessary providing additional supporting information with the report.

It is the responsibility of the client to have sufficient understanding within the company to cover the basic requirements of the process and the key safety issues. If the client does not understand the report then steps must be taken to ensure that key recommendations are, in fact understood. This is at least partially the responsibility of the consultant and steps should be taken by the client to ensure that the consultant provides a report which the client understands.

SPECIFICATION, CONTRACT & DELIVERY

When dealing with external contractors of any type, it is essential that the contract is clearly specified including the expected deliverables. The vast majority of contracts, however, do not clearly specify that the report must be written to take into account the level of knowledge within the company nor do they specify that an engineering solution is required; it is often simply assumed that this is what the consultant will deliver. In a number of cases, the solution delivered by the consultant has not matched client expectations due to a clear misunderstanding or failure to communicate the specific requirements (usually by the client).

Turning this around, it is beholden of the consultant to take into account the state of knowledge within the organisation and they type and depth of solution that is required. In too many cases, reports provided are written by experts to be read by experts and this is especially true where the client is lesser qualified and/or experienced.

The delivery of the report also should be addressed within the contract along with the level and provision of any additional support required by the client after delivery and as part of the contract.

It seems that many industry personnel would benefit from a better understanding of how to write a contract and also how to clearly communicate what the real requirements and purpose of the work are. In particular, the following items should be specified on an invitation to tender:

- Full description of the work required
- Purpose of the work
- Timescale including any time spent on site and expected delivery date of report
- Deliverables including report format
- Any specific exclusions

It is also essential that the customer ensures that the consultant is aware of the level of competence of the customer and will deliver a report that can be understood.

FAILURE TO DELIVER AN ENGINEERING SOLUTION

In a significant number of cases, the consultant fails to deliver an engineering solution that can be implemented by the client taking into account the level of resources and type of work carried out.

One particular example of this is the consultancy who carried out a DSEAR assessment on a large laboratory complex. The report correctly identified a number of deficiencies with the gas feed systems within the building but recommended that sections of the building including some laboratory areas should be subject to hazardous area classification.

The implementation of this basis of safety would have meant that it was practically impossible to use the laboratories taking into account that ATEX approved laboratory equipment is not generally available and that the one of the gas systems used feeds a number of Bunsen burners! It was quite clear that the basis of safety proposed by the consultant was totally unsuitable and even unworkable for the processes being carried out in the laboratory and, if implemented, would have effectively brought critical operations to a complete stop.

Fortunately in this case the client was aware of the issues posed by the original report and was able to look elsewhere for a sustainable basis of safety. A basis of safety was then implemented based not on hazardous area classification but on the integrity of the pipework systems.

A significant part of the problem in this case was the failure of the consultant to understand the key aspects of the legislation.

It is possible that the failure to deliver an engineering solution is a misguided attempt by some consultants to ensure that they gain further work from the client. Experience shows that this is not, in fact the case and clients who are baffled by science will tend to go elsewhere for a solution.

LACK OF RESOURCES

As stated previously, many companies have very limited safety resources and thus it is difficult to cover all of the necessary knowledge, especially if the company's processes and products are diverse.

In the current structure of many competencies, there is a significant risk of dropping below a minimum level of competence within the company. There is a need to maintain a level of "intelligent buyer" as a bare minimum and ideally, the safety manager should be to some degree proficient in the understanding of the hazards and risks found on the site. In this event, the responsible person will very much need to be a generalist with awareness of a wide range of hazards, risk assessment etc as well as an understanding of the relevant and applicable legislation and also any sector or interest best practice group guidance.

Maintaining this minimum level is difficult particularly in an organisation where the safety manager is the sole safety resource on the site. This becomes more difficult where the organisation has a very limited budget for allowing the safety manager to attend conferences and training courses where he (or she) can obtain additional knowledge and also stay current with the technical developments in safety.

For a small site with a limited number of processes, it may be feasible for a single person to have sufficient knowledge to cover some of the necessary requirements to a more than superficial level, however, if the site is a multi-plant, multi-process installation then the job of staying up with the amount of information required becomes increasingly difficult.

Making this even more difficult, when a particular person is the sole safety resource within an organisation, they are often so busy with the legal minimum monitoring of slips, trips and falls safety and other metrics that it is difficult to find time to deal with the higher level process safety issues. Even the most experienced safety professional would struggle to cover in depth the whole range of knowledge that is required on a complex site from fire, explosion, gas dispersion, PPC, COSHH etc as well as covering basic safety requirements.

In many companies, there is little available time and / or budget for safety managers to attend events that are useful for professional development. At such events, it is also useful to meet other safety professionals who can offer advice on the best contractor or consultant to fulfil a particular requirement. Without this external professional contact, it is almost impossible to gain a good working knowledge of process safety matters. This is often exacerbated by the requirement to justify financially attendance at meetings and seminars.

Risk of contractor not fully understanding the specific requirements of the work especially where the contractor either does not or cannot visit site are also becoming more frequent. One particular example of this is a large company who contracted out relief systems and basis of safety work to a contractor, who then sub-contracted the work out further to a division of the company outside

the UK. There is little chance of anyone from the sub-contractor visiting the site and thus, there is a significant risk of errors creeping in to the work.

There are risks involved with using the contractor which provides the lowest price in that the work may be contracted out further to another even cheaper resource. For example, with whom does the final accountability for the work rest with?

EXAMPLE 1

This company is a lower-tier COMAH establishment storing over 100 tonnes of LPG in aerosols plus approximately 150 tonnes of assorted flammable liquids in packages up to 5 litres. The company safety manager left the company and as a cost cutting measure, the company decided not to replace him. The warehouse manager now also fulfils the role of safety manager as well as his regular job. Although experienced in general slips trips and falls type safety, the manager has no significant knowledge of flammability and explosion hazards etc and has no formal safety qualifications (although he is soon to undertake a NEBOSH basic certificate). Support is generally provided from the group safety manager who is on site one day per week when required although he also has little experience of either flammability and explosion hazards or COMAH.

The company relies entirely on external consultants to supply information and work which is fundamental to the continuance of the license to operate. Whilst the company is aware of the basic requirements of COMAH, there is virtually no experience within the establishment of dealing with the Competent Authority on this and other topics.

EXAMPLE 2

This company is a top-tier COMAH site with a variety of processes some of which have potential for runaway reaction scenarios. The company safety manager also has two other roles within the organisation and is also the only qualified chemical engineer on the site. The company is heavily reliant on the services of this one person to not only cover the day-to-day process safety but also to take responsibility for COMAH, DSEAR, PPC and general process safety on the site.

There is no credible deputy and no succession planning for this individual.

EXAMPLE 3

This company is also a top-tier COMAH site with a large chromium plating shop facility. The safety advisor is a young person who has been promoted from the shop floor and has no experience of a COMAH regulator environment. There is no one else within the company who has sufficient experience to advise or mentor this individual who has a recent NEBOSH certificate. The company is totally reliant on outside assistance for the majority of safety and environmental issues other than basic slips, trips and falls.

These are three examples, there are numerous others. From the above it can be seen that these companies are heavily reliant on expert outside assistance to provide basic functionality.

For complex work, the contract must be written in such a way as to cover all of the necessary quality measures required.

EXAMPLES OF GOOD PRACTICE

In one particular case, a company new to COMAH used the assistance of their existing environmental consultants, with whom they had a good working relationship, to assist in the preparation of the specification of a contract to prepare their COMAH safety report. The specification produced covered the all of the key requirements of the client in respect of preparing the report and the expected role and level of assistance to be provided by the consultant.

This was followed by several hours of detailed discussions with the consultant to ensure that there was a full understanding achieved by both parties. The consultant was required to provide a written proposal detailing the agreed scope of work including timescales, key deliverables. Further discussions took place to ensure that the understanding was clear prior to the work commencing.

Regular meetings took place between the client and the consultant in order to ensure that delivery met the client requirements. The key to the success of this work was the agreement of a properly written and agreed formal contract between the parties, coupled with a minimum level of understanding on the part of the client i.e. an "intelligent buyer" of services.

Another company had a dust explosion hazards identified during a routine insurance inspection. The company safety manager had no experience in the field and contacted a trade body to obtain further advice. A number of consultants were identified and two were selected to provide proposals.

Discussions were held with both consultants with further assistance from the trade body and a scope of work was drawn up. Proposals were assessed against the requirement to provide an engineering solution. A consultant was appointed and contract drawn up with the key proviso that an engineering solution was to be agreed.

The consultant carried out testing of dust samples and assessed the dust explosion hazards. The results were explained to the client and several possible engineering solutions discussed before the optimum way forward was agreed.

COST OF CONTRACTING OUT

In choosing to contract out safety services, the total cost is frequently misreported or else not estimated correctly at all. In evaluating the comparative cost between in-house or contracted out services, organisations should identify all costs, both direct and indirect. A common mistake is

for the direct costs only to be reported thus making the contracted out works look cheaper.

Indirect costs include those incurred in the internal management of external contracts and the ongoing training and development of in-house personnel. Furthermore, the full administration of the services such as permit-to-work procedures, competent and approved person regimes, together with the technology to operate them, all attract a cost that must be recorded.

It is a false economy to assume that it is acceptable to leave key knowledge and competency with external contractors since the state and availability of this knowledge cannot be guaranteed. Corporate memory should be retained within the client company as this is not part of a consultancy brief and no blame can be attached to the consultant if information is not retained for longer than say, a year. This is a particular problem where there is a single person responsible for safety who then retires or leaves the company, often without a suitable period of handover and often with many years worth of files thrown out without proper understanding of their value.

COMPETENCY OF SAFETY MANAGEMENT

Over recent times, it has become apparent that there has been a reduction in the status and level of competence of safety managers in many companies. It is unclear as to whether this is as a result of cost saving or a lack of trained engineers and scientists within the industry or even just a misguided belief that this level of competency is adequate. Many companies, including quite a number of top-tier COMAH sites now have safety managers who have been promoted from shop floor positions or else non-engineering or production backgrounds, and who have little experience of interaction with the regulatory authorities. Additionally, many of these new managers have no formal engineering or scientific training. Instead, they have often simply been put through basic NEBOSH certification in Occupational Safety & Health and are then expected to be fully conversant with all aspects of process safety as well as slips, trips & falls.

In the opinion of the author, this does not provide a suitable and sufficient level of competence for the management of safety on a top-tier COMAH site. Companies need to consider the risks inherent in the processes carried out and materials used on site when selecting personnel having primary safety responsibility. There should also be a defined professional development route within the company and a succession plan. The training and career plan should take into account the type of business that the company is in and also the type of hazards found on site.

FUTURE PROVISION OF SAFETY RESOURCE

Another pertinent question is whether we can sustain the number of skilled safety consultants given the pressures on consultancy companies. In the present economic climate, there is pressure to do more with less and this

applies equally to consultancies. With pressure on profits, will a future generation of engineers be trained in the same way and have the same skills?

To the present day there is a pool of engineers and scientists who have been extensively and formally trained in larger companies on a range of process safety topics. It seems, however, that most of these process safety specialists are now in their late 40s or early 50s and in ten years or so will be looking to retire. It is difficult to see where the new generation of process safety specialists will come from under the present economic and operating climate since the pool of experienced engineers is gradually diminishing.

Although many consultants and contracting organisations make efforts to train personnel, there is no substitute for a period spent within and operating company to gain experience. Ideally, anyone wishing to be a consultant should have at least 10 years experience in industry in a variety of operations, design and technical roles.

The failure to ensure that the new generation of engineers has a good grounding in process safety will inevitably have consequences for the long term future of the profession. The fragmentation of companies means that it is often extremely difficult for a safety professional to gain a good level of rounded experience within a single company and therefore, to gain experience it is often necessary to move companies. Whilst this may provide good experience, it is an uncertain way to gain a structured career and learning path as well as being time consuming.

CONCLUSIONS

It is clear that the continued fragmentation of businesses and a lack of resources to train safety managers and related personnel will mean an increasing reliance on external contracted out resource (consultants). The decision to contract out safety services should only be made on a rational and objective basis and not based on purely financial criteria. When considered against the risks of a serious incident on the site the question must be asked as to just how cost effective contracting out of safety functions really is.

This is not, however, an excuse to rely on safety managers who have minimal qualifications and/or experience, especially where the site is a high hazard establishment covered by the COMAH regulations.

It must be acknowledged that there is a minimum level of in-house competence that must be retained in order for the contracting out model to function successfully. If this minimum level of core competence is not maintained

then there are significant risks associated with the delivery of external services both in terms of the quality of service provided and the implementation of key safety recommendations within the establishment. Thus it can be seen that there is a significant risk to the organisation from the contracting out of essential safety services unless sufficient knowledge is retained in-house.

It is the author's opinion that a significant number of organisations are neglecting the provision of internal safety resource and relying excessively on outsourcing of basic safety provision. Whilst this is in the name of efficiency and cost cutting, it has a number of potentially serious implications for the long-term future of the business and the chemical engineering and related professions. This is not a condemnation of consultants and contractors who provide a valuable and indeed critical safety resource.

The chemical and related industries must look seriously at the provision and training of safety resource within the organisation and the relative priorities of safety managers within the organisation. This is critical if the safety of the organisation is to be maintained in the long term.

The long-term sustainability of the present system where contracting out is widely used to the detriment of in-house resource and training is called into question. It is also clear that using lowest common denominator resource for in-house safety and relying on external contractors and consultants to provide key safety services is a potentially risky business. At the very minimum, companies should be at a level where they are "intelligent buyers" i.e. possibly not able to do the full range of technical work but having sufficient knowledge to understand the type of technical reports that are likely to be provided by consultants.

It seems clear that under the present conditions within the chemical and related industries, reliance on consultants will remain an important and integral part of ensuring safety. This is in no small part due to the client companies reluctance to maintain what is seen as an expensive resource in-house.

It is the author's opinion that the *current level* of reliance on contracting out for key services is not sustainable in the long term and that companies need to make long term provision for the training of in-house safety professionals. In the same vein, consultants also need to ensure that younger personnel are trained to an adequate level within the organisation. Failure to do so will inevitably result in a new degradation of the level of safety services provided.