

Leadership and Management for Safety – assessing your strengths

Jonathan Berman, Director; Shona Watson, Senior Consultant; Greenstreet Berman Ltd, Fulcrum House, 5 Southern Court, South Street, Reading RG1 4QS UK

A critical and over-arching contributor to safety is the set of arrangements for Leadership and Management for Safety (L&MfS), which is a term adopted in the nuclear sector to encompass both the management system and the strategic direction of the organisation. This paper presents an overview of the importance of critical review and assessment of those arrangements, examining not only the extent to which they are applied but, importantly, the intended purpose of each element of L&MfS and the organisation's understanding of that purpose. The assessment process explicitly considers the claims on the management arrangements made within the Safety Case and how the links can be clarified between those claims and the management arrangements themselves, such that their suitability and appropriateness can be reviewed. Drawing on experience of undertaking such assessments, guidance is offered concerning the manner in which they can be undertaken, the challenges that need to be addressed, and some emerging themes that are likely to be common across high-hazard organisations.

Keywords: Leadership; Management for Safety; Assessment; Organisational Change; Culture; Knowledge; Competence; Resilience.

Introduction

Safety Management has long been recognised as essential for effective risk control. Whilst engineered safeguards and barriers must be identified and implemented, the litany of major accidents over recent years underlines the importance of arrangements both for ensuring the availability and performance of those engineered systems, and also for delivering the human performance that supports them. This paper discusses an approach to the assessment of Leadership and Management for Safety (L&MfS) that has been applied within the UK nuclear industry, but which is of relevance across the high-hazard industries. The term L&MfS is one that has currency within the nuclear sector, and includes the management system whilst also acknowledging the importance of leadership within a high-hazard organisation. It encompasses those arrangements typically covered under the headings of Safety Management System (SMS), Safety Culture, etc. It is important to note that the views expressed in this paper are those of Greenstreet Berman and should not be considered to represent those of the nuclear industry or any particular licensee.

Complex socio-technical systems must be considered holistically. High-hazard organisations need to ensure that they have implemented a balanced design that integrates engineering and human performance, and makes appropriate claims on both. It is inappropriate to compartmentalise safety and seek to assess and enhance it in isolation from other aspects of organisational arrangements. For example, safety culture emerged as a concept after the accident at Chernobyl in 1986, and its importance is underlined by numerous studies and widespread guidance on its assessment and enhancement. However, whilst it is an important indicator of organisational safety and also a guide to opportunities for improvement, it is both an emergent property of the organisation and only one facet of effective management for safety. To equate some sort of positive measure of safety culture with effective management for safety would be inappropriate, although it is a valuable indicator of the impact of various aspects of L&MfS. It is therefore important to understand clearly how the organisation seeks to control and direct the arrangements that deliver effective performance, of which safe operations is a part, whilst also recognising those aspects of the management system that do not affect safety directly.

As the importance of management for safety has been recognised, so has the importance of the organisational processes that underpin it. This has led to a focus on the Leadership element of management – a logical extension of the tenet of safety culture that highlights the need for senior management to drive the desired culture change processes, and hence the need to be able to assess it.

The importance of L&MfS

The role of L&MfS

It might be axiomatic that L&MfS is a critical element of safe operations. It is certainly true that the quality of Leadership and Management generally is critical to the commercial success of an organisation. What is probably neither appropriate nor helpful is to distinguish arbitrarily between the aspects of the organisational arrangements that contribute to production, quality and profitability, and those that assure safety – one should view the management arrangements holistically, but understand and make explicit how the different elements of the management arrangements assure safe operations. The implication is that all aspects of L&MfS affect safe operations and need to be considered – none should be thought of as 'not relevant to safety'.

All high-hazard organisations will have arrangements in place to ensure that they remain in control of their activities. There will be arrangements to ensure that they properly understand the hazards arising from their activities, that they have assessed the risks and put in place arrangements to minimise them, that they continually monitor both the efficacy of those arrangements and also the factors affecting the risks that they manage, and that they continually seek improvements that will further reduce risk, in line with the principle of managing risk to be As Low As Reasonably Practicable (ALARP).

It therefore becomes important, when reflecting on some recent major accidents, to understand why apparently successful organisations appear not to have fully understood the demands that high-hazard activities place upon an effective

management system. When examining those accidents, it tends not to have been the ‘engineering’ or ‘hazard identification and risk assessment’ elements of the arrangements that have been found wanting. Instead, it has tended to be shortfalls in the manner in which the organisation undertakes its activities that have been at the root of the failures – how it responds to the outputs from its risk assessment and risk management processes.

The majority of notable accidents that have occurred in recent years across the high-hazard industries have been shown to have organisational shortfalls at their root. Whilst the immediate causes might be specific to a particular industry (a fuel leak in Nimrod; an uncontrolled well ‘kick’ on Deepwater Horizon; brake failure on a rail vehicle at Grayrigg), the systemic organisational failures shared common features. In his report into the Nimrod accident (Haddon-Cave, 2009), Sir Charles Haddon-Cave made very clear that the arrangements throughout the organisation for ensuring safety were flawed. He noted that the Safety Case was “*riddled with errors*” and that the process was “*undermined by a general malaise: a widespread assumption by those involved that the Nimrod was ‘safe anyway’... and the task of drawing up the Safety Case became essentially a paperwork and ‘tick-box’ exercise*”. Whilst identifying a number of individuals as bearing significant responsibility for the failings, the report also noted organisational failings that included inadequate oversight and supervision, failure to project manage or to act as ‘intelligent customer’, failure to appoint an Independent Safety Advisor to audit the Safety Case, and miss-categorised risks. The report noted many instances of inappropriate culture within the organisation, and the impact of huge organisational changes. Opportunities to learn from experience were available but not taken, and financial pressures led to a distraction from safety and airworthiness issues.

Elements of L&MfS

Much has been learned from the Nimrod accident and the Inquiry report. However, the messages it presents cannot be overstated. It is important not merely to identify that L&MfS is important for safety, but also to understand better the elements of the management system that might have an impact on the safety and reliability of the organisation. The Office for Nuclear Regulation (ONR), which is the UK nuclear regulator, has identified four themes that it considers to be central to effective L&MfS, as set out in its Safety Assessment Principles (SAPs) (ONR, 2014) and Technical Assessment Guides (TAGs) (ONR, 2013). These are Leadership and Governance, Decision-Making, Capable Organisation, and Learning. Each of these themes can be seen to be represented in the Nimrod accident. Whilst it could be argued that there is nothing peculiar about these four themes that make them applicable only to safety, the converse may be true – that these are the four attributes of the management system that encompass those aspects of the arrangements that will most directly influence safety. Our interpretation of these four themes are that they encompass the following:

- Leadership and Governance – the manner in which the safety strategy and objectives are determined and communicated, and how it is ensured that the organisation remains aligned with those objectives;
- Decision-making – how the organisation assesses risk, in all its facets, and how it takes decisions that might affect safety both at high-levels and more tactically; how it ensures that good decisions are taken (taking account of all available information) and that those decisions are taken at the right level, the right time, and with due recognition of uncertainty;
- Capable Organisation – how the organisation identifies the nature and extent of the resources required for safe operations, and how it both monitors the availability of those resources and also takes steps to ensure their availability over time;
- Learning – how the organisation learns both from its own experience and from other organisations; how it undertakes investigation and review, and also how it implements change as a consequence of the lessons that can be learned from those reviews.

It can be noted that ONR does not include Safety Culture as one of the themes. They recognise the importance of Safety Culture, but also recognise that it is an emergent property.

Considering the L&MfS arrangements against these themes helps to assess how they achieve their intended objectives, rather than focussing only on what they intend to achieve, and compliance with them. In this sense the themes provide a useful enhancement to any assessment that underpins assurance of safety, whether it is the Safety Case, the Case for Continued Operation, the COMAH Safety Report, the Major Accident Prevention Plan, etc.

The challenge for Assessment

The prompt for the review

A number of incidents have been noted above – many more can be added to the list, from Buncefield to Fukushima, and from West, Texas to Bad Aibling. In each case, organisational factors emerged which contributed to the incident, and which could have been identified and addressed in advance. It is therefore incumbent on high-hazard organisations to have arrangements, as part of their management system, that will review and assess the adequacy of L&MfS within their own organisation. In practice, it is by no means clear that organisations do this explicitly. Whilst there is likely to be regular review of the Safety Case, it is less clear that many organisations critically review their management systems, other than in response to incidents and events. Planned organisational change might prompt a review, but this tends to be a reactive response to change that is planned as a result of business decisions. For example, a major UK utility has recently been undergoing major change in order to split its operations into two completely separate businesses, as a precursor to a planned sale of part of the business. In order to do so, it developed a Safety Case for the change process, including examination of safety critical roles, the organisational structures that will be put in place, competence management, etc., i.e. all of the

elements of L&MfS. It also sought independent review of the planned changes. However, it was less clear that there was an established process for review and assessment of L&MfS on which it could draw.

Within the UK nuclear industry, Licence Condition 15 requires the Licensee to undertake regular Periodic Review of safety. The requirement, as stated in TAG 050 (ONR, 2013, page 4), is for 'periodic and systematic review and reassessment of safety cases'. Typically, these reviews take place every 10 years. The intent is to enable the Licensee to stand back from their day-to-day operations and, taking account of their cumulative operating experience, to review the extent to which the facility and the safety case conform to modern standards and good practice, the extent to which the safety documentation remains valid, and the adequacy of the arrangements in place to maintain safety until the next periodic review. A consequence of this requirement is that nuclear Licensees have in place a framework for review of safety within which review of L&MfS can take place. Regulatory interest in the L&MfS aspects of safety management has always been present, but has become more explicit over recent years. This includes an expectation that the Licensee can demonstrate not simply what they do in order to manage safety and to foster an appropriate safety culture, but also can demonstrate an understanding of why its arrangements are effective and hence why they can be confident that high levels of safety will endure.

This is not to suggest that explicit reviews of L&MfS happen only because of regulatory interest. A high-reliability organisation ought to undertake such review and self-assessment routinely. In practice, however, many organisations may not make their review activities explicit, nor might they fully recognise the importance of such review – there may be an assumption that normal business management ensures that the effectiveness of their management arrangements is under constant scrutiny. The litany of major accidents across different industries suggests that not all high-hazard organisations place sufficient importance on such reviews. Within the UK nuclear industry, the Licence Condition requirements for Periodic Review encourage formal reporting of the assessment and review process. The formality of that process does, however, highlight some of the challenges that exist if an effective, critical, review of L&MfS is to be undertaken.

The purpose of the review

ONR itself notes that Periodic Review, primarily, should be of value to the Licensee as an integral part of the company's approach to risk management. It should be documented and structured to be accessible and useable at different management and operational levels within the Licensee's organisation. It should not be aimed solely or specifically at the regulator. In the context of L&MfS, ONR notes the requirement for a systematic review of arrangements and practices, which should be self-critical, and should show that the L&MfS arrangements are relevant to nuclear safety, appropriate, and proportionate to the specific hazards and risks. Whilst the safety case methodologies for the identification and assessment of risk, and of the risk reduction measures in place, are familiar and sophisticated, and include much guidance in the form of Relevant Good Practice (RGP) concerning engineering and management practices, there is far less guidance available with respect to L&MfS. Furthermore, what might be effective good practice in one organisation may not be appropriate in another. It therefore becomes a challenge for the Licensee, or any other organisation, not only to determine which elements of their L&MfS arrangements are of particular significance for safety, but also to determine the adequacy and robustness of those arrangements.

A further level of complexity is introduced by the inevitable extent of organisational change which confronts all organisations. At any given time, there will be significant change taking place, whether it is in the context of a Licensee moving from being an operational site to a decommissioning site, or changes in ownership, or organisational response to business demands for increased efficiency, or greater output, etc. How should the organisation determine the effectiveness of arrangements that might still be in the process of implementation and roll-out? Furthermore, much organisational change is driven by a legitimate desire to improve efficiency and to reduce cost. However, this raises issues around resilience. As noted by Hollnagel et al (2006), a resilient organisation has to be flexible and adaptive, and capable of responding to uncertainty and unplanned events. To have this capability, the organisation is likely to require a degree of additional capacity and competency beyond what is needed for simple day-to-day operations. A move towards greater efficiency may lead to an erosion of that additional capacity such that the 'faster, leaner; more efficient' organisation is also more 'brittle' in the face of unplanned events. A review of L&MfS needs to be capable of considering these aspects of the organisation.

In practice, what this leads towards is a requirement for the L&MfS review to consider not only the extant arrangements but also, and perhaps more importantly, the change management processes and how they take account of the demands and requirements for safety within the context of the organisation's activities, and the hazards and risks that it seeks to manage. It is therefore not sufficient to focus solely on outcome measures of safety, but instead to examine the underlying processes in order to be able to demonstrate that they are capable of recognising and accommodating planned change.

The basis of the review

As noted above, ONR has specifically highlighted four themes: Leadership; Decision-Making; Competent Organisation; Learning. Licensees are expected to demonstrate the strengths of their arrangements in these respects. How best can this be done? Rather than merely describe arrangements, it is important that assessments provide a critical review, but to do so it is necessary to understand the claims being made on those arrangements. It is therefore important to understand the safety case rather than simply to consider the management system in isolation. Similarly, leadership arrangements will have a focus on business risk management, but this must be contextualised within the safety case framework and potential tensions between business and safety elements must be understood and addressed. The assessment process therefore needs to be capable of drawing out how the elements of L&MfS deliver against the safety case claims.

In turn, this requires that the organisation can demonstrate a clear and accurate understanding of the claims made on human performance within the safety case, and factors that affect that performance. Whilst it would seem obvious that this is

required, and that any high-reliability organisation would be able to do so with ease, in practice many of the claims remain implicit rather than explicit. The safety case might recognise the importance of competent staff to undertake certain tasks, and might recognise the elements of the competence management system that enables the organisation to record and track competence such that only staff who are deemed competent will be deployed on those tasks. However, there may be less explicit acknowledgement of the arrangements that determine the nature of the required competence, and how it is maintained. It is not sufficient simply to state the required competence and experience. It is important to be able to demonstrate why the defined competence is appropriate (how it has been determined). It is also important to demonstrate how it is ensured that staff have both acquired the necessary competence and also sustain it. How often should they undertake the activity before they are deemed sufficiently competent? How frequently should they undertake the activity in order to maintain their competence? How frequently should they be re-assessed? It is also not sufficient merely to define the periodicity of refresher training and demonstrate that this requirement is complied with. It is also important to be able to justify that periodicity. Consideration of competence then expands to embrace issues around cover for absence, succession planning, workload management, and so forth.

Thus, the critical review of L&MfS has to be grounded in the safety case claims, and those claims need to be made explicit. Being able both to elaborate the claims being made on human performance, and also to demonstrate the appropriateness and strengths of the management arrangements to support those claims should be 'normal business' for a high-reliability organisation, in the same way that such an organisation can use its safety case for substantiating its engineering and operations. In practice, the connection between organisational and management arrangements, and assurance of safe operations, is sometimes more implicit than explicit.

Criteria for the review

The elements of L&MfS that require review may appear familiar to the assessment of any management system. However, the purpose both of the review and of the elements of the management system being examined is to assure safety. It is therefore important to understand two inter-related elements. One is the set of linkages between the management arrangements and safety, taking account of the nature of the hazards and risks being managed by the particular organisation under review. The other is the set of broader organisational goals, structures and arrangements within which safety management resides, such that an informed assessment can be made of the appropriateness of the arrangements and their efficacy in the context of the particular organisational structures and behaviours. Arrangements that might be appropriate for one organisation may not be fully effective in another. For example, a management system that is optimised for an organisation that deploys a constantly changing workforce (perhaps due to fluctuating demands) might be very different from one that is optimised for a stable and enduring workforce. Neither need be 'better' or 'worse' – they merely reflect different business objectives and drivers.

A number of sources of 'RGP' for management systems can be considered, although all require interpretation if they are to be applied constructively. These include ONR SAPs (ONR, 2014) and TAGs (e.g. ONR, 2011), Office for Rail Regulation (now Office for Road and Rail – ORR) Rail Management Maturity Model (ORR, 2011), HSE Review of High-Reliability Organisation literature (HSE, 2011), etc. Whilst they provide a basis for determining the completeness of the review scope, and of the management arrangements, the assessment of the strengths and limitations of the specific individual arrangements needs to be based on both an understanding of the objectives of those arrangements and an assessment, based on evidence gathered during the review, of the performance of those arrangements. The assessment can be guided by RGP but cannot be determined by it.

A key requirement throughout the review process is that it should be evidence-based. Whilst some of that evidence will be qualitative, it is essential that an audit trail can be provided such that the findings are more than supposition and hearsay.

Approach to Assessment of L&MfS

Greenstreet Berman has had the opportunity to apply this approach across a number of different Licensees, operating in different parts of the nuclear sector (production, operations, decommissioning). In each case, the prompt for the work was either a scheduled Periodic Review, or a response to emerging shortfalls in management arrangements. Even where the prompt was the requirement of the Licence Condition, the organisations recognised that the work should have the primary purpose of enhancing their management of safety, and that the need to satisfy the regulator was addressed through consideration of the form of the output. If an organisation is undertaking such reviews of L&MfS solely to meet the regulatory requirement, then it is probably 'failing' on most if not all of the four themes.

The approach we have adopted is oriented around the four ONR themes – not because they have been identified by the regulator, but primarily because we consider that they cover the safety objectives of the management system. The failings identified in the Nimrod Report can all be grouped under one or more of the four themes, as can the failings in other major accidents such as Texas City Refinery. The 'Baker Report' (Baker et al, 2007) identified a number of shortfalls, including, amongst many: failure to provide effective process safety leadership (Leadership); failure to incorporate process safety into management decision making (Decision-making); failure to identify and provide the resources required for strong process safety performance, and poor process safety knowledge and competence (Capable Organisation); deficiencies in systems for investigating incidents/near misses and addressing previously identified process safety-related actions (Learning).

The use of the themes also decouples the assessment from the specific management arrangements and permits a focus on the safety objectives of those arrangements. For example, rather than considering the mechanics of the Permit to Work (PTW) system, and perhaps showing that the system as stated is being applied robustly, a focus on the themes enables an assessment of the manner in which the PTW system ensures that safety decision-making is supported, that the persons taking those

decisions are competent, that the persons undertaking the work are competent, and that a system of control is in place that is capable of being audited and controlled through governance processes.

The work is undertaken in five phases:

- Scoping and Stakeholder Engagement
- Identification of Claims
- Facility Data Collection
- Corporate Interviews
- Reporting

Scoping and Stakeholder Engagement

It is important to establish a clear understanding of the scope and terms of reference for the review, and to obtain ‘buy-in’ from staff at all levels from front-line workers to the Executive. It is also essential to have a ‘champion’ for the work who is at a sufficient level within the organisation that they can ensure resources are available to support workshops and interviews. Typically, this person would be Head of Safety, but could be Production Director, etc. It can be necessary to devote significant time and resources to this activity, but it is an essential precursor to an effective review.

Identification of Claims

This activity provides a clear description of the implicit and explicit claims within the safety case. It is developed from a review of the safety case, together with examination of the operational experience data available for the facility. The value of this activity is that it supports a better understanding of the significance of the individual claims, and of the elements of the management arrangements that support the claim. Furthermore, it provides an understanding of the interactions between different claims, as there may not be a one-to-one mapping between a particular claim and a specific management process. Figure 1 shows a typical emergent ‘claims map’ with respect to competence management. The inner circle contains the claim. The outer circle presents the boundary between Facility and Corporate arrangements.

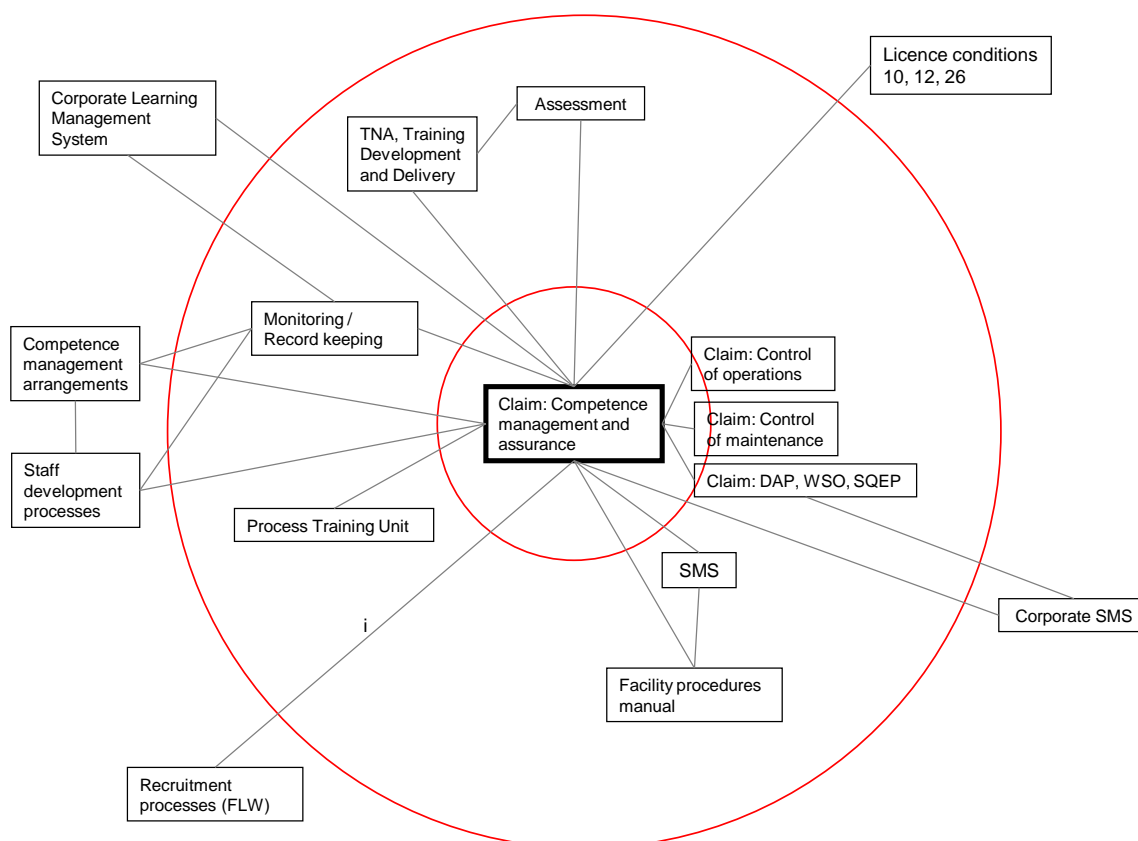


Figure 1: Example Claims Map for Competence Management

The task may not be simple or straightforward as it depends on the availability of appropriate documentation and the ease with which implicit claims can be teased out. Additionally, as in other industries, there may be strong reliance on RGP without a clear statement of how that good practice addresses the specific requirements imposed by the organisation’s activities.

A further important aspect of this task is that provides a means of distinguishing between claims that are managed directly at the Facility level, and those that are underpinned by corporate arrangements. This is of particular importance in multi-facility organisations, where there might be overarching corporate arrangements for certain functions (e.g. procurement of services, recruitment, competence management), whilst others are devolved to the local facility (e.g. control of operations, appointment of supervisors, etc.).

Data Collection

A range of data sources should be reviewed. Where available, quantitative measures of safety performance should be examined, including incident data, operational experience data, audit results, other performance indicators, etc. These will provide an overview of observable performance. They need to be augmented by a range of qualitative data that can inform the assessment of how the observed levels of safety performance are being achieved. Qualitative data are particularly important for indicating the effectiveness of leadership and the appropriateness of the management arrangements. Staff surveys can be an important contributor to such a process, although they will need to be supported by more targeted semi-structured interviews and workshops. Our experience is that such interviews and workshops are essential, and should build on the emerging picture that is gained from the review of quantitative data.

In addition, where appropriate we have used targeted surveys to investigate specific issues further, such as causes of non-compliance.

Typically, workshops are held with front-line workers and first-line managers, with interviews being held with the individual members of the facility management team. It is important to recognise that this activity is not intended to be an audit of the processes, but rather a review of its adequacy. Consequently, the purpose of data collection is not to ‘demonstrate’ that the processes are applied, but instead to form an evidence-based view of whether those processes are delivering the intended benefits.

Examples would include tracking safety-related decisions through to their conclusion, to demonstrate how the process delivers effective decisions, or where modifications to processes or procedures can also be tracked through to re-assessment (and if necessary modification) to the training and assessment arrangements as part of the normal operation of the competence management system. Shortfalls might be a consequence of the arrangements not being properly implemented (although that should inform the assessment of the governance element of the L&MfS review), or it might be that the arrangements are inappropriate. A review that merely identifies compliance with the stated arrangements is neither sufficient nor valuable.

Table 1 presents some of the topics that are covered within the interviews. The balance will vary depending on the role of the interviewee and the claims within the facility safety case. The workshops cover similar topics.

Table 1: Typical Interview Topics

Leadership and Governance	Capable Organisation
<ul style="list-style-type: none"> - Your role in promoting nuclear safety - Nuclear safety policy - Standards and expectations (behaviours) - Commitment to nuclear safety - Reward systems - Oversight of safety performance - Engagement with staff 	<ul style="list-style-type: none"> - Your role in maintaining a capable organisation - Resources, competence and intelligent customer capability - Knowledge management - Organisational design and Management of Change
Decision-Making	Learning Organisation
<ul style="list-style-type: none"> - Your role in effective decision-making - Effectiveness of decision-making - Basis for decisions and safety priorities in decision-making - Management of conflicting goals - Challenge culture - Promotion of conservative decision-making - Review of impact and effectiveness of decisions 	<ul style="list-style-type: none"> - Your role in promoting and enabling learning - Quality of incident investigation and analysis - Quality of action identification/implementation - Availability of resources to support learning - Learning from positive events - Willingness to learn - Trend analysis and learning - Reporting culture

As a consequence, the focus of the data collection is on the evidence for the performance of the arrangements. Some of this will come from a review of the documentation – including both a paper-based assessment of their adequacy and also an assessment of the evidence from audits and internal reviews, from critical incident reviews, from operational experience feedback, and from simple observation of work being undertaken. However, the principle source of information will be the workshops and semi-structured interviews.

Corporate Interviews

A set of interviews is held with members of the Executive, including the CEO if possible, and also with relevant Heads of Functions. The purpose of these interviews is to understand the operation of the interface between the corporate arrangements and the facility. In particular, the interviews explore how information is passed both up and down across that interface, and how decisions taken at a corporate level both take account of the facility requirements, and also are communicated effectively to the facility. The topic set is similar to that set out in Table 1, above, but with an increased

focus on the strategic elements of the four topic areas. A key aspect of the corporate interviews is to develop an understanding of potential mismatches between the corporate perspective ‘looking down’ and the facility perspective ‘looking up’.

Outputs

A number of different reports is likely to be required. The principal report is structured to meet the needs of the facility management, but includes signposting to enable the regulator to identify the information that it seeks. A further senior management report provides the Executive with a concise summary of the principal findings and recommendations.

Where appropriate, we have successfully used rating scales and ‘heatmaps’, particularly when summarising the outputs from workshops, to indicate differences between groups, and between factors. However, an underlying theme must be to indicate the reasons for those differences, and their impact, in order to enable the organisation both to identify potential improvement actions and to prioritise them. For example, differences in compliance culture and performance can be represented on a scale, but what is needed is also clarity concerning the reasons why certain groups have inappropriate perceptions. In one instance we identified that compliance could be improved by attention to elements of the competence management system including, in particular, a focus on improving self-awareness of competence. Many training arrangements include assessment of acquired skills and knowledge, but do not focus on providing individuals with a robust understanding of their own competence – the assessment is primarily ‘pass/fail’. Over-confidence in their own ability was correlated with a greater likelihood of non-compliance.

It is essential to have the trust of all stakeholders such that comments and observations are taken constructively rather than defensively. The requirement for evidence-based assessment comes to the fore at this point. It is important to be able to substantiate comments such that the ‘gap’ is accepted, before it is possible to set out potential solutions. The precise structure of the report will be influenced by the particular organisation’s expectations, but a model is to set out the ‘issue’, the evidence, and then to answer the question ‘so what?’ – what is the identified safety impact of the observed management shortfall. There needs to be a clear trail from the issue, via the claims, to the nature of the shortfall as it affects safety.

Two further challenges that need to be addressed within the approach to reporting is that of validation, and of change. Much of the information and evidence gathered during the review will be from interviews and workshops. There needs to be an accepted method, agreed at the outset, for validating that information. This may involve permitting interviewees to comment on the record of their interview, or it may rely on ‘triangulating’ stated views (e.g. reporting views only where they have been evinced by more than one person, or qualifying comments where the evidence-base is limited). What is important is that the basis for conclusions is transparent. This also raises issues of confidentiality. In practice, within any organisation, it will be difficult to offer anonymity or confidentiality – respondents are likely to be identifiable. As a consequence, interviewees should always be given the right to ask for certain comments not to be used or attributed. Our experience is that few people seek to exercise this right, provided that appropriate stakeholder engagement has been undertaken at the outset. Where respondents do voice concerns, this itself is a valid finding with respect to culture and learning.

The other challenge concerns organisational change. All organisations tend to be undergoing change. There is a temptation to seek to identify a ‘freeze date’ after which changes in the organisation are not considered – the assessment is based on the organisation ‘as is’ at the freeze date. Our experience is that this is neither helpful nor necessary. Clearly it is not possible to assess the impact of new arrangements if they are still in the process of being rolled out. However, such changes present valuable insights into how the organisation identifies the need for change, takes decisions on how to implement them, assesses the risk associated with change, undertakes the roll-out, seeks to learn from the experience of change, and assesses the impact once the change is embedded. Change therefore represents an opportunity to assess the attributes of L&MfS in a dynamic manner. What is important is to be explicit about how such change is represented in the review.

Success Factors

A number of potential ‘success factors’ can be identified with respect to reviews of L&MfS.

Do participants perceive that they are gaining benefit from the process?

It is essential that participants perceive that they are gaining benefit from the process. If the review is perceived as being oriented towards meeting a regulatory requirement, then it is likely both to attract less support and, more importantly, to be perceived as adding little value. The extent of the initial stakeholder engagement phase should not be underestimated. Furthermore, the engagement should be not only about informing stakeholders of the aims and objectives of the review, but also seek to tailor the review to better meet their objectives and expectations. The review must be perceived as adding value not only to senior management, but also to front-line workers (and all in between).

Within the interview process, time should be taken to confirm whether interviewees are perceiving immediate benefit from the process. For front-line staff this might be in the form of a perception that their views, suggestions and concerns are being communicated upwards. It should be noted that this expectation brings an obligation. There needs to be an appropriate mechanism for providing feedback downwards – how have the comments been received and what might happen as a consequence. There will be an associated expectation of change that needs to be managed. Due recognition also should be given to making clear the review timescales, such that expectations can be managed.

For more senior managers, there will be different potential benefits. Most welcome the additional insights that they can gain concerning perceptions within the organisation. Most also welcome the opportunity for self-reflection. If interviewees do not perceive that they are gaining benefit from the process, this should prompt re-examination of the terms of reference of the review and the process, to ensure that it can deliver value to the organisation.

Are the right stakeholders included in the process?

Although the review is of Leadership and Management for Safety, and hence by implication should include senior managers, it is essential that staff throughout the organisation are consulted. Many of the human-based safety claims are placed on front-line workers and hence there is a need to understand how the L&MfS arrangements affect and control their behaviours. It is therefore important that there is sufficient engagement with front-line workers.

At the same time, it is important that Directors also are included in the process, both to understand how they perceive their roles in ensuring safe operations, and also to provide context for the arrangements that are in place. Our experience is that Directors tend to be enthusiastic supporters of such reviews although frequently, and legitimately, they can be forceful in their challenge concerning the content and scope of the review.

Is the process identifying strengths and vulnerabilities?

For the review to add value, it needs to be able both to highlight strengths such that they can be maintained, and also limitations where change might be of benefit. If the review is merely descriptive, identifying elements that are required and showing that they exist, then the value of the review is limited. The review must be critical, identifying shortfalls either in the scope or implementation of arrangements, whilst making clear the implications for safety of those limitations. However, it should not dismiss the strengths as being 'obvious' and hence not worthy of comment. In the same way that some claims within the safety case are implicit, so some of the strengths of the arrangements might be overlooked as being simply 'normal business'. The review provides an opportunity to highlight their importance for safety. For example, senior managers may encourage upward challenge by collaboratively exploring concerns that are raised, and by communicating when a decision has been modified as a result of challenge. They may not immediately recognise the strength of this approach. By highlighting it, there is greater likelihood that it will continue.

Furthermore, by highlighting the strengths, the report is more likely to be accepted as balanced and hence due attention will be given to the limitations.

Are the strengths and limitations related to risks?

It is important that the review is perceived as being focussed on management for safety. It would be inappropriate to stray into the realms of business management. Interviewees, and in particular senior managers, may challenge some of the scope as being unconnected with safety. It is important to be able to explain the links. For example, a challenge might be raised as to why Executive decisions concerning recruitment and succession management are of relevance – they are simply what the senior management team in any organisation should be considering. It is important to be able to show that the review needs to consider how senior management decisions take account of the intended (and, potentially, the unintended) effects on resilience within safety-critical posts within the facility.

Is the output recognised as valid?

There must be a clearly stated basis for the scope of the interviews, and the list of interviewees. It is important to be able to demonstrate that an appropriate cross-section of the workforce is being canvassed, and that the findings are not distorted by vociferous minority views or agendas – although such views might be indicative of underlying shortfalls and hence should not be dismissed.

Is the output generating practical shortfall resolution plans?

Whilst the development of resolution plans remains the responsibility of the organisation, the review process should provide sufficient information to enable good decisions to be taken concerning both the nature of the resolutions and the priority to be accorded to the work. It is therefore important to frame the shortfalls in a way that enables constructive assessment to be undertaken. Simply to state that 'succession management is incomplete' would be unhelpful, whereas to provide information concerning the roles that are vulnerable, and the reasons, e.g. whether the shortfall is due to a failure to recognise key posts, or a failure to provide opportunities to train successors, or a failure to ensure that appropriate successors are identified, and whether these failures are due to unclear responsibility for ensuring resilience with respect to the identified posts, etc.

Perceived independence of the review team

By implication, where Greenstreet Berman has undertaken such L&MfS reviews it is, in part, because we are perceived to be independent of the organisation, but sufficiently familiar with it to be able to undertake a valid review. Some organisations may feel uncomfortable about exposing their arrangements to an external entity. They may feel that there will be greater openness and honesty if an internal reviewer is employed. Our experience is the opposite. Where an internal group is employed, there is a risk that they will be perceived to have a particular agenda, whereas a more open conversation may be had with an independent organisation (provided the terms of reference for the review are clear and accepted).

There is a balance to be struck between full independence (not knowing the organisation at all) and sufficient familiarity with the organisation to be able to make sense of the information being provided. It may be appropriate for the review team to hold early discussions about how it will gain, or access, organisational knowledge and explanations.

Sufficient stakeholder engagement

Whilst the importance of early stakeholder engagement has been noted repeatedly, it is also important that such engagement continues throughout the review process. Early interviewees may be concerned that time has passed without apparent outputs. Stakeholders will wish to be informed about progress. There tends to be a wish for early sight of findings (although

this should be resisted). Many interviewees may wish to have personal feedback about emerging findings with respect to their role and performance and consideration should be given to how this can be provided. It is an important part of the process when considered in the context of the 'Learning' theme within L&MfS.

It may be important for planned engagement to be scheduled to take place early in the reporting phase of the work, to ensure that the report structure continues to meet the needs of the different stakeholder groups.

Impact of Change

It is important that time is taken early in the process to understand current and anticipated change, both in terms of organisational changes, and operational changes. It may be appropriate to define the scope of the assessment in terms of the four themes, where there may be legitimate reasons for exploring certain areas in greater depth. For example, an organisation that is undergoing significant change in terms of its activities may merit greater focus on certain aspects of 'Capable Organisation' than one that is in a stable production environment.

It is also important to understand change in order that the data gathered from historical sources (audit reports, incidents, operational experience, etc.) can be related to the organisation as it was at the time.

Emerging Themes

Each organisation has particular strengths, and particular opportunities for improvement. Many of those will be unique to the business environment in which they operate. However, although much of our L&MfS review work has been in the nuclear sector, we have noted a number of themes that may be common across many if not most high-hazard organisations. This is not to say that these themes are all present as weaknesses in such organisations. Rather, they are noted here as topics that such organisations may already be focused on, but which can be significant in terms of the quality of L&MfS.

Succession planning – moves towards greater efficiency and streamlining may distract from the arrangements needed to maintain resilience. Re-organisation can weaken the line management links to key safety related posts and hence the responsibility for succession management.

Competence Management – the responsibility for competence management is not always clear, and often is delegated down to line managers who may not have the resources to do so, or the competence. Furthermore, such delegation can make the management of *team* competence more challenging as it becomes unclear where the responsibility for the competence of the team resides. It can be unclear how 'generic' competence frameworks meet/support the specific claims made on competence within the safety case.

Knowledge management – re-organisation may expose weaknesses in knowledge management. Demographic changes make explicit knowledge management increasingly important but resources to support this may be harder to secure.

Leadership – Senior Management may be distracted from their role in day-to-day safety communication.

Challenge – upward communication and challenge appears to have to be 'pushed' rather than being 'pulled' by senior managers.

Poor upward communication – a disconnect exists between the concerns perceived at lower levels in the organisation and the issues being addressed by senior managers. The two may be linked, but perceptions do not match.

Poor downward communication – senior managers may not recognise the importance of explaining the reasons for particular initiatives and arrangements, or may not explain them in the context of the concerns experienced at lower levels.

Mismatch between perspectives – what appears to be important to senior managers does not appear to address front-line staff concerns.

Avalanche of change – change becomes a permanent state with lack of clarity concerning the evaluation of change and demonstration of the benefits. There is a need to make explicit to those who perceive that they have borne the brunt of the 'pain' of the change both what is the intended benefit, and also what has been the actual benefit. Senior management can assume that the benefits that they have sought and realised are 'apparent' throughout the organisation, whereas they may not be obvious or apparent at lower levels.

Documentation not keeping pace with change – document management is a pervasive challenge which is aggravated by change.

Learning processes – these tend to focus on investigation and cause analysis rather than on driving actual change (i.e. learning).

Governance – review of L&MfS can be an intermittent process rather than embedded within normal oversight processes.

Resilience – an overarching theme that appears to be relevant to many organisations concerns the development of resilience. Resilience concerns the ability of the organisation to manage uncertainty, and respond to unplanned events. It requires a level of resource and competence beyond what is needed for simple compliance with documented processes, and may therefore appear to come in to conflict with moves towards immediate increased efficiency and cost-saving. Organisations need to be more explicit about how they manage these demands.

Safety II – the concept of Safety II (e.g. Eurocontrol, 2013; Hollnagel, 2014) can be used as shorthand for an approach which seeks to focus on success, and to understand better how successful (safe) performance is achieved, in order that the

arrangements that underpin it can be maintained. It is reliant on processes that ensure there is a proper understanding of 'work as done' rather than 'work as described'. Many organisations remain focused on work as described (as documented in processes and procedures) and decisions may fail to take account of the reality of how the organisation behaves. The gap between knowledge of work as done and organisational expectations may represent the most significant challenge for effective L&MfS.

Next Steps

A number of recommendations emerge from our experience of L&MfS review. The process is evolving, and our experience is predominantly in the nuclear sector. Whilst we would expect it to translate into any other high-hazard sector, the precise details, particularly in terms of how the safety case claims are made explicit, may vary.

In terms of 'process', certain key conclusions emerge:

- Organisations should ensure L&MfS review is an integral part of their governance process, with the objective of seeking improvement rather than 'demonstrating adequacy'. The review must focus on delivering benefit to the organisation rather than representing mere compliance with (internal or external) regulatory requirements.
- This proposed approach could be considered as the logical development from existing approaches embodied in COMAH safety cases, SMS reviews and Safety Culture assessments as it seeks to draw all of these together and make explicit the links between the safety case claims and the leadership and management arrangements. This approach enables the organisation to demonstrate that it understands what it requires from its L&MfS arrangements, and how the arrangements in place deliver against those requirements. This in turn gives confidence that it can sustain the effectiveness of the arrangements.
- The review should make clear 'work as done' and hence highlight potential mismatches between the understanding of processes and arrangements at different levels within the organisation.
- The review must engage at all levels within the organisation, from front-line staff to Directors.
- The review must be organised to support the development of practical and proportionate improvement plans.
- Organisations should seek opportunities to benchmark themselves and learn from other organisations, whilst recognising that those other organisations are different, and hence there should be no expectation of 'solutions on a plate'. We have applied rating scales to facilitate benchmarking, although these tend to be in terms of the adequacy and suitability of arrangements rather than the specifics, as the latter will be more organisation-focused, and hence on their own may not fully reveal a need for change.

With respect to L&MfS itself, such reviews represent an opportunity to consider the organisational arrangements holistically in terms of safety, and hence to provide challenge with respect to both incremental and major changes that are being introduced to meet business needs:

- Make explicit the expectations in terms of resilience and test the existing L&MfS arrangements against them.
- Understand potential differences between work as done and work as described, and how those differences affect the performance of the management system.
- Use the review to maintain a focus across the organisation on both current management objectives and arrangements required to accommodate anticipated changes in the operating environment.
- Use the review proactively to identify beneficial changes in management arrangements, and to have a basis for assessing their impact on safety.

A final observation concerns the definition of leadership. As will have been observed, no definition has been offered within this paper. This is deliberate. It is for the organisation itself to develop its own definition of leadership, and how it differs from management. Existing guidance and standards appear to coalesce around concepts of setting a clear vision, priorities, and enabling its delivery. However, the manner in which this is achieved will differ both from organisation to organisation and Chief Executive to Chief Executive. Our experience has been that good leadership is easy to recognise when it's present.

References

- Baker, J., Bowman, F., Erwin, G., Gorton, S., Hendershot, D., Leveson, N., Priest, S., Rosenthal, I., Tebo, P., Wiegmann, D. and Wilson, L., 2007. The BP U.S. Refineries Independent Safety Review Panel. January 2007. http://www.csb.gov/assets/1/19/Baker_panel_report1.pdf. Accessed December 2016.
- Haddon-Cave, C. 2009. The Nimrod Review. HC1025. London: HMSO
- HSE, 2011. High Reliability Organisations. A review of the literature. RR899. London: HSE Books
- Hollnagel, E., Woods, D. and Leveson, N. 2006. Resilience Engineering. Aldershot: Ashgate.
- Hollnagel, E. 2014. Safety-I and Safety-II. Farnham: Ashgate.
- ONR, 2014. Safety Assessment Principles for Nuclear Facilities. Office for Nuclear Regulation.

ONR, 2013. Technical Assessment Guide – Periodic Safety Reviews. Nuclear Safety Technical Assessment Guide. NS-TAST-GD-050 Revision 4. Office for Nuclear Regulation.

ORR, 2011. Railway Management Maturity Model (RM3). Office of Rail Regulation.

Eurocontrol, 2013. From Safety-I to Safety-II. A White Paper. Eurocontrol.