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# Professional Safety

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## Process Safety Management

### Due Diligence Considerations

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# Acquisition of a PSM-Subject Facility

## Considerations in due diligence

By David M. Einolf and Luverna K. Menghini

**M**ERGERS AND ACQUISITIONS (M&A) are an increasingly familiar part of life in international business. In 2006, more than \$3.6 trillion in transactions were consummated (Meisler, 2007). With increasing activity comes increasing interest in more competitive deals and less ability to complete “leisurely” due diligence. As such, the scope of due diligence is being constantly reduced and the time allowed for conducting due diligence has nearly evaporated.

Within the SH&E arena, due diligence generally focuses on past environmental remedial liability (defined in large part by the Comprehensive Environmental Response, Compensation and Liability Act, or CERCLA). However, after experiencing acquisitions with significant environmental compliance liabilities, more proactive companies have increased their emphasis on environmental regulatory compliance.

In the realm of safety and health, however, little attention has been paid to overall compliance. In general, acquisition due diligence consists of a desk survey of current workers’ compensation costs and illness and injury statistics (OSHA 300 logs). In some

instances, field observers completing environmental due diligence may be asked to make safety observations, but in general they have little experience in the process safety management (PSM) arena and can only spot the most egregious issues.

As such, acquiring firms may be subject to liability for potentially catastrophic events resulting from process safety concerns. For example, in 2004, an explosion at the Formosa Plastics Corp. facility in Illiopolis, IL, resulted in the death of five employees. The U.S. Chemical Safety and Hazard Investigation Board (CSB, 2007a) found that a root cause of the explosion was failures in the PSM-required analyses conducted by the prior owner, Borden Chemical.

Acquiring managers will need to integrate PSM compliance programs into existing corporate structures. This article addresses the issues associated with rapid assessment of PSM choke points and subsequent, aggressive integration of PSM programs following a merger or acquisition. The sidebar on pg. 29 also reviews key findings of the Baker Panel (Baker, Bowman, Erwin et al., 2007) with respect to issues of PSM compliance in M&A activities.

**PSM Choke Points**

OSHA’s PSM standard (29 CFR 1910.119) has been in effect for more than 15 years (effective date May 1992). Even so, implementation of PSM programs is not uniform across covered firms. Furthermore, in chemical accidents examined by CSB (2007b), those that occurred in facilities covered by the PSM standard almost universally involved failures in the PSM system, such as human error and equipment failure (EPA, 1997).

### PSM Choke Points

The authors’ analyses of PSM implementation at hundreds of PSM-subject facilities—including chemical manufacturers, refineries, chemical processors and end-users—over the past 10 years has identified several areas of the PSM program where failed implementation can cause the greatest potential future liability. Furthermore, these areas, which are termed *choke points*, are readily identifiable by a due diligence or integration team. Attention to the following choke points can reduce PSM liability in M&A integration:

- process hazards analysis (PHA);

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- mechanical integrity programs;
- management of change (MOC) and pre-start-up safety review (PSSR);
- standard operating procedures (SOPs);
- compliance auditing.

There is no silver bullet in PSM integration, but there are leading indicators of PSM failure. Identifying and correcting these issues can help create a safer environment in the acquired firm.

### Process Hazards Analysis

PHA is often considered the core of the PSM program. The standard mandated that covered firms complete PHAs over a 3-year transition period (1994-97). As such, original PHA documents now are almost 10 years old and should have been revalidated at least twice since then. If the PHA revalidations have been robust, then a facility's PHAs may not represent a choke point. However, the quality of PHAs and their risk-reduction features often are causes for concern.

### Validity

When the PSM rule was implemented in 1992, PHA was a novel concept, limited to certain chemical and petrochemical facilities and certain practitioners in the nuclear industry. Since then, proactive employers have educated their employees and a solid group of professional PHA facilitators have honed their craft.

Unfortunately, the authors have found that many facilities continue to build and maintain PSM programs around PHAs conducted by facilitators with limited experience, created without insight from peer group companies, and that do not incorporate modern codes and standards. PHA revalidations often are wholesale redevelopments of previous PHAs incorporating these techniques and using more modern software techniques to facilitate PHA follow-up and follow-through. A simple review of PHA documents can provide an eagle's-eye view of the quality of the PHA exercise.

### Inclusivity

The PSM standard requires involvement of personnel at all levels who are involved in operation, maintenance and design of the system to be involved in the PHA. However, in some cases, PHAs are completed by vendors or third parties, or by senior engineering staff exclusive of personnel involved in the daily operations and maintenance of the process. The authors have found that this often is the case at facilities where a third party holds a turnkey contract for operation and maintenance of a gas or chemical delivery system (common at semiconductor manufacturing facilities). In many of these instances, current operators are not familiar with the PHA and were never involved in its completion.

It is possible to develop an assessment/interview tool to be used during M&A due diligence that can evaluate the relevance of the PHA to current staff. Such a tool would likely include effective questions for current employees to determine whether they have reviewed the PHA, understand the hazards inherent in the process, and are familiar with a selection of the recommendations from a PHA study.

### Revalidation Exhaustion

As most facilities move into their third round of PHA revalidations, an understandable amount of fatigue ensues among personnel involved in the PHA and those responsible for executing the recommendations. In many cases, the personnel involved in the original PHA are included in the revalidations. When a covered process has remained relatively unchanged over the life of its operation, completing the revalidation for the first or second time can be redundant and tiresome—particularly when it entails reviewing potential failure scenarios that already have been reviewed and not developing new potential safeguards or recommendations for improving inherent safety of the system. The authors have found significant lapses in completing PHA recommendations and extremely cursory revalidations.

Review of the most recent round of PHA revalidations can provide an acquirer insight into the depth of the process. For example, if NNI (typically used to document No New Issue) is entered onto every line of the PHA revalidation document, the assessor may have reason to question the thoroughness of the evaluation. Similarly, if no new recommendations are evident as a result of the revalidation, the level of intensity of the review may be questioned.

### Recommendation Completion

Many PHAs are completed without a view to the end product of the desired outcome of the analyses (Wallace, 1999). As a result, many recommendations may have been left open for some time, interim actions may have been taken and not accounted for, or a cursory action may have been conducted solely for the sake of closing the recommendation action item.

While PHA quality is an important consideration in acquisitions, it pales in comparison to the importance of PHA follow-up. (It is impractical to comprehensively review PHA follow-up in this article.) In some cases, facilities can provide follow-up data that appear on the face to be adequate, yet prove inadequate upon detailed inspection. Acquirers should interview personnel responsible for follow-up; determine whether a system exists to address PHA recommendations; and review recommendation follow-up documentation.

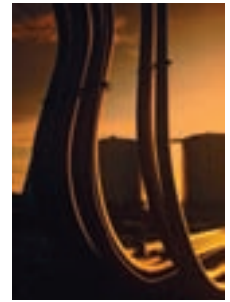
### Mechanical Integrity

For many PSM-subject facilities, mechanical integrity means little more than maintaining a preventive maintenance program. In the authors' experience, few have implemented a risk-based approach to maintenance, and few have evaluated performance factors in developing a mechanical integrity approach.

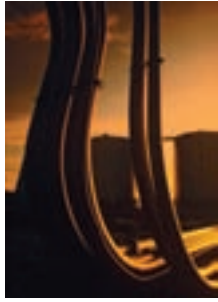
Determining the quality of a facility's mechanical integrity program is one of the most challenging facets of considering a PSM-subject facility during an acquisition. Several key areas should be assessed.

### Maintenance Management Process

Evaluating a facility's maintenance management program can provide insight into the facility's ability to respond to mechanical integrity issues. A first cut can be made in determining whether the facility has



**Abstract:** Due diligence in mergers and acquisitions (M&A) rarely focuses on safety and health concerns. Typically, limited site observations are combined with an assessment of workers' compensation trends. This approach ignores a significant source of potential liability—compliance with OSHA's Process Safety Management (PSM) standard. These issues can cost substantial sums of money to correct and, if uncorrected, can lead to catastrophic loss exposures. This article discusses an approach to M&A due diligence that optimizes on-site evaluation time; reduces the uncertainty associated with acquiring PSM-subject facilities; and allows an acquirer to develop a rational strategy to implementing a program consistent with the firm's PSM approach and values.



*Assessing the leading indicators of PSM failure can identify problem areas and help create a safer environment in the acquired firm.*

a computerized maintenance management system (CMMS) on site. If so, an assessor may obtain copies of preventive maintenance items; interview personnel to determine whether the system is being used to assess frequency; and judge the depth of preventive maintenance covered in the program. Facilities without a CMMS are at a disadvantage and may be more difficult to assess during an acquisition.

#### **Equipment Inspection Process**

PSM-subject facilities should have extensive records to support the inspection of critical process equipment [29 CFR 1910.119(j)]. The facility should have a list of critical equipment, and the list should then have an associated inspection schedule and accompanying criteria.

#### **Maintenance Training Programs**

The authors' experience with OSHA inspections over the past 10 years indicates that the agency is concerned with the qualifications of employees or contractors performing equipment maintenance—a concern that the authors believe is justified. In an environment of cost reductions and outsourcing, pressures to cut costs often result in deferred maintenance programs or reduced quality of maintenance.

Therefore, acquirers should pay special attention to the origin of maintenance staff (in-house or outsourced) as well as to the training of those personnel. If outsourced technicians conduct maintenance on the covered process, the assessor should review the contractors' qualifications, including documentation of the technicians' training focused on the maintenance tasks they are performing.

#### **Management of Change: Pre-Start-Up Safety Review**

If the PHA process is the core of a PSM program, the management of change (MOC) program is its vanguard. The best-performing facilities use MOC principles to manage deviations from all process changes, not just those considered to be subject to PSM (CSB, 2001). Given this, a targeted inspection of the MOC process and its relative—the pre-start-up safety review (PSSR)—can provide insight into the quality of the PSM program. The following areas should be targeted at this choke point.

#### **Integration of Engineering Requests & MOC**

A disconnect often exists between what is frequently termed the capital asset requisition process and PSM. This results either from centralized ("home office") engineering processes or from outsourced/turnkey (design-build) engineering. An acquirer should review the capital project process at the target firm. In particular, the last major capital project should be evaluated and the MOC/PSSR paperwork reviewed. Engineers involved in the process should be interviewed, and the regulatory response (including traditional environmental issues and the risk management plan) should be evaluated.

#### **MOC/PSSR Follow-Through**

Just as with the concerns regarding PHA recommendations and audit recommendations (to follow),

the nature of MOC/PSSR follow-through reflects the facility's PSM "attitude." An assessor who reviews the status of recommendations produced during the process (assuming that one has been followed) will gain insight into the nature of the MOC process and the rigor of follow-up.

For example, if review of MOC documentation shows that operating and maintenance procedures were to be developed and employees trained as a result of a change, yet the PSSR does not include documentation that these procedures were developed or proof that employees were trained, the assessor may be justified in questioning the effectiveness of PSM implementation at the site.

#### **PSSR Completed before Start-Up**

An error frequently observed in smaller operations is a failure to complete PSSR at a facility prior to actually starting the process. In many cases, documentation is completed when the transition occurs between the construction team and the owner—an artificial distinction that has been historically ignored by OSHA (to the detriment of the owner). Given that many incidents occur during start-up of a process—either the first time the process has been operated, after a period of inoperability or after a change to the process—failure to conduct PSSRs is a significant oversight with potentially massive consequences.

#### **Standard Operating Procedures**

The currency and quality of standard operating procedures (SOPs) developed at a facility can be an indicator of the quality of the PSM program. OSHA and CSB investigations have shown SOPs to be a significant factor in process incidents (Environmental Health Center, 1999). Therefore, a thorough review of SOPs is recommended during a PSM audit and in the acquisition process. However, this can be time-consuming and a desk review may miss the implementation of SOPs at the plant floor level. Therefore, the following areas can be targeted to address this choke point.

#### **In-Plant Review**

A trained environmental due diligence assessor can spend some time looking at SOP issues during a site visit. In particular, the assessor can evaluate whether SOPs are present at equipment locations; whether employees can locate and identify crucial SOPs for their equipment; and whether SOPs have been evaluated on a regular basis.

#### **All Systems Go**

An assessor can review the systems associated with SOPs. In particular, the acquirer can review the manufacturing process and determine whether s/he believes that procedures are present for the appropriate portions of the process. Strategic interviews with engineers who developed the SOPs, line supervisors and maintenance managers responsible for ensuring that SOPs are implemented, and operations personnel who use the SOPs to operate the process can indicate whether the procedures are being discussed with employees and evaluated for performance on a regular basis.

## Compliance Auditing

Compliance audits represent the third of PSM's internal reporting triumvirate. As with PHAs and MOC, compliance auditing is key to understanding the quality of a facility's PSM program (Einolf & Menghini, 1999). An assessor should review compliance audits and their subsequent follow-up to ensure that recommendations have been addressed through implementation of corrective action plans. In particular, evaluators should consider the following areas.

### Audit/Auditor Quality & Objectivity

The authors have evaluated hundreds of PSM compliance audits over the past decade and they have completed many more. Based on this experience, it is fair to say that all audits are not created equally. The authors recommend that audits be completed using a comprehensive guidance document, such as the OSHA Compliance Guideline CPL 2-2.45A (OSHA, 1994), and that issues be addressed with rigor. Auditors should be selected for their ability to audit—whether in a particular area (such as mechanical integrity) or for an overall understanding of the PSM program. Audits conducted by internal personnel should be viewed cautiously due to the potential lack of objectivity. Corporate audit programs provide an overlay of objectivity, but they should be regularly benchmarked to ensure that they are meeting the standard's requirements.

### Follow-Up Mechanisms & Accountability

Management should be held accountable for the completion of PSM audit items. If no specific accountability mechanism exists and an audit trail cannot be established, then the audit process may be suspect. As with the PHA and MOC processes, a mechanism for producing follow-up requirements and assessing their completion should be in place.

## Conclusion

There is no panacea for addressing PSM issues in acquisition. However, by addressing the five key choke points, acquirers can develop an adequate snapshot of compliance. The items discussed can be obtained from a facility without a specific site visit and can be evaluated by a competent PSM specialist within a limited time frame. Evaluation of these issues will likely lead to a series of interview questions that will allow the acquirer's PSM team to determine the difficulty of integrating the acquired firm into the existing corporate PSM program.

Furthermore, evaluation of the systems behind PSM can provide valuable information to the acquisition team. Beyond basic cultural differences that will appear in the acquisition process, the system questions will address issues regarding compatible training, software and direction. By focusing on the PSM choke points, the acquisition team can pinpoint resources in a major acquisition, while allowing for expansion to a broader scope for smaller facilities. ■

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## The Baker Panel Report

On Jan. 16, 2007, BP U.S. issued "The Report of the BP U.S. Refineries Independent Safety Review Panel," also known as the Baker Panel Report, a much-anticipated review of the corporate safety culture, process safety implementation and other safety issues at BP's five U.S. refineries. The report was recommended by CSB. The panel was tasked with reviewing issues and factors not tied directly to the Texas City incident (i.e., the group did not conduct an investigation of that incident). The 374-page report focuses on process rather than personal safety. The core of the report—as applied to this discussion of PSM in mergers and acquisitions—can be summarized in five findings.

1) The corporate safety management system does not ensure timely compliance with internal process safety standards and programs at individual sites.

2) There has not been adequate assurance that site personnel and contractors have sufficient process safety knowledge and competence.

3) An effective root-cause analysis procedure has not been implemented to identify systemic causal factors that may contribute to future accidents. When true root or system causes are not identified, corrective actions may address immediate or superficial causes, but not likely the true root causes.

4) An effective process safety audit system has not been implemented for sites based on the panel's concerns about auditor qualifications, audit scope, reliance on internal auditors and the limited review of audit findings.

5) The company . . . has sometimes failed to address promptly and track to completion the process safety deficiencies identified during hazard assessments, audits, inspections and incident investigations.

These findings are consistent with challenges in implementing an overall corporate PSM system. What the Baker Panel found at BP is not isolated to either BP or to the major oil refiners. PSM audits, inspections and investigation findings at other facilities reflect similar issues, especially as concerns newly acquired facilities (CSB, 2007a).

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