

SH&E Auditing

Maximizing audit impact using management systems

By Mark D. Hansen and Jan A. Knight

MOST SH&E PROFESSIONALS have been involved in an audit at some time during their careers. Audits are no small matter; those involved must designate time to prepare, interview employees and conduct a facility walkaround. Over the years, audit programs have matured, with the 1990s ushering in a period of tremendous improvement through management systems in response to new business challenges and pressures including:

- public demand for more information from companies regarding SH&E performance and risk mitigation measures;
- internal customers expecting more (for less) from the audit program and expecting it to provide greater value to the organization;
- audited facilities expecting the process to provide high value and, in some cases, expecting it to provide a "safety net" to ensure that nothing has been overlooked (Greeno and Wilson; Arthur D. Little).

These challenges have revitalized audits and their function. With upper management commitment and endorsement from corporate SH&E officers, organizations are striving to:

- increase the proficiency of both full- and part-time audit staff;

the issues discussed are applicable to any company auditing program effectiveness.

Challenges for SH&E Auditing

The success of implementing these changes lies with the audit program manager. S/he is in the best position to ensure that the audit program moves forward as a major contributor to a facility's success in managing SH&E issues to a business advantage. The challenge is to build a strong case for what the tailored audit program should be in order to meet the needs of a rapidly changing organization in a dynamic business environment (Figure 1).

As companies rightsize or downsize, their SH&E functions are being pressured to maintain effectiveness while reducing costs. In the face of constant downsizing, even in a profitable environment, the most pressing concern facing audit programs is people resources (Greeno and Wilson; Arthur D. Little). The issue is not so much the number of auditors needed; rather, companies are hoping to achieve the same results using part-time auditors. This demand is contrary to typical audit standards of independence and objectivity. Therefore, to balance the needs of stakeholders, the board of directors, employees and the public, a company must carefully coordinate a plan to maximize return on its audit resource dollar through effective training, team selection and oversight, quality control and feedback.

SH&E professionals also need to develop and implement quality control measures for the audit process (Figure 2). Such controls help to ensure that thorough audits are conducted on a consistent basis. For example, a company may require that each team member understand the basis for control systems and verification strategies; formal review and sign-off by team leaders; and daily team meetings to review audit progress and the nature of issues being identified [Greeno, et al(b); Arthur D. Little]. A company may also develop a systematic training program that requires each auditor, full-time and guest,

- employ rigorous audit scheduling methodology to justify resource allocations and audit scope;

- implement procedures to measure and track performance improvements across the organization;

- focus greater attention on program quality and efficiency (Greeno and Wilson; Arthur D. Little).

While the comprehensive audits described here are more typical of large multinational companies, many of

Mark D. Hansen, P.E., CSP, CPE, is director of risk control, oil and gas, with The St. Paul in Houston. He is also the 2002-03 President of ASSE and is a professional member of the Society's Gulf Coast Chapter. Hansen holds a B.S. in Psychology and an M.S. in Industrial Engineering, both from Texas A&M University.

Jan A. Knight, CSP, is health and safety advisor for the lower 48 states in the Onshore U.S. Business Unit of BP America Production Co., Houston. She holds a B.S. from the University of Houston, Clear Lake. She is a member of ASSE's Gulf Coast Chapter and of the Society's Risk Management Practice Specialty.

Maximize Return on Audit Resources

as well as team leaders, to be routinely trained in auditing techniques [Greeno, et al(b); Arthur D. Little].

The SH&E Audit Process

Developing an audit process ensures that a consistent methodology is implemented for repeatability. The process should cover pre-audit, on-site and post-audit activities (Figure 3). Table 1 presents a summary of principal activities and intended outcomes for each step.

Standard Operating Procedures

Since the audit program must be responsive to divergent applications, feedback mechanisms must be built into the process; this includes team-leader reviews, third-party oversight reviews, customer/facility feedback and periodic program reviews (ISO 14011). The audit leader plays a key role in keeping the audit on track, managing the team and giving feedback to team members to ensure quality of the individual work product. When collecting customer feedback, it is best to provide facility managers with a short questionnaire, rather than a long, detailed document (Figure 4). In addition, some companies maintain auditor profile sheets as a sort of "report card" on part-time auditors [Greeno, et al(b); Arthur D. Little]. These profiles cover an auditor's expertise in applicable areas and are provided by those being audited and other team members. Such information helps the company target auditor training to specific weaknesses.

Assessing Strengths & Weaknesses

An audit is designed to assess a facility's strengths and weaknesses. This process encompasses the following activities:

- **Identify operational risks.** What are the inherent risks (considering magnitude and likelihood) if a particular expectation is not managed appropriately?
- **Evaluate management and control systems.** Are management practices and procedures designed soundly? Are these systems, coupled with the engineered controls, appropriate given the inherent risks? Will the controls function within the framework of the asset or department?
- **Document strengths and weaknesses.** What verification strategy will provide the optimum allocation of available resources to ensure that issues representing high-risk and weak practices and procedures/control systems receive sufficient attention ("BPXA Assessment")?

Evaluating the soundness of a facility's management and control systems is essentially a subjective process. While explicit compliance requirements are common, detailed criteria or standards that define adequate practices and procedures are rare. In the absence of such criteria, seven key principles can be used to evaluate management systems ("BPXA Assessment"):

Clearly Define the Audit Program Role

- Maintain a vision for the program in a changing organization.
- Expand roles within the corporation.
- Define what constitutes "success" for the audit program.
- Achieve and sustain program value and quality assurance.

Manage Audit Resources

- Minimize the effect of downsizing on available audit staff.
- Attract and retain quality audit team leaders.
- Manage the "virtual" audit staff as they travel to all locations.
- Utilize computer technology to best advantage.
- Utilize third-party verification.

Determine Audit Coverage

- Target facilities for audit.

Know What & How to Audit

- Integrate environmental management systems into the audit process.
- Manage audits at all locations around the world, across facilities, subsidiaries, suppliers and contractors.
- Stay on top of changing regulations and industry standards (e.g., ISO, Responsible Care).

Report Audit Results

- Measure compliance performance.
- Analyze data to understand trends and their implications.
- Communicate audit results and performance to stakeholders.

Source: Greeno and Wilson; Arthur D. Little.

1) **Policies, program or procedures.** The facility has defined consistent policies, programs or procedures that document SH&E controls and practices and provide guidance.

2) **Clearly defined responsibilities.** Facility personnel understand their roles, responsibilities and authorities in achieving the desired level of SH&E performance.

3) **Systems for project review and approval.** The facility has established an effective system for reviewing and approving nonroutine or out-of-specification operations.

4) **Trained and experienced personnel.** Facility personnel have sufficient experience, training and awareness to accomplish the SH&E function or task. Personnel are familiar with applicable regulatory requirements and internal standards and policies.

5) **Protective measures.** The facility is aware of the risks its equipment, materials and operations pose to personnel and the environment. Safeguards have been established to prevent or control major problems.

6) **Recordkeeping system.** The facility has an accessible, comprehensive recordkeeping system that provides documentation of SH&E activities and addresses compliance with governmental regulations and company policies.

7) **Internal verification.** The facility has established a system of checkpoints, reviews, sign-offs, etc., that serve as day-to-day SH&E assurance.

Verification strategies subsequently employed should be dependent on the evaluation of the strengths and weaknesses of management systems and internal controls, combined with an assessment of inherent risks associated with a particular issue. To develop a verification strategy, it is best to select

Figure 2

Example of SOPs for Auditing Programs

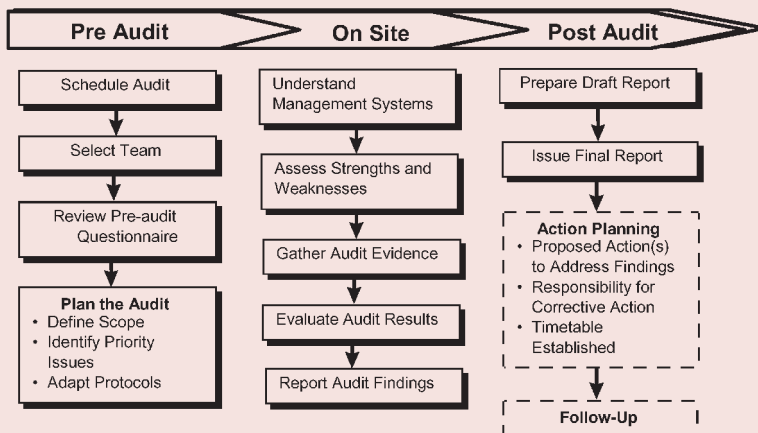
Table of Contents		
Descriptive Procedures:		Last Revision Date
SOP #1	Standard Operating Procedures for the SHE Audit/Assessment Program	11/01
SOP #2	Objectives, Scope and Key Elements of SHE Audit Assessment	11/01
SOP #3	The Compliance Audit/Assessment Process	11/01
Fundamental Auditing Procedures:		
SOP #4	Pre-Review Activities	01/02
SOP #6	Understanding Management Systems	11/01
SOP #7	Opening Meetings	11/01
SOP #8	Assessing Management Systems	11/01
SOP #9	Gathering Audit/Assessment Data	11/01
SOP #10	Sampling Strategies and Techniques	11/01
SOP #11	Evaluating Audit/Assessment Data	11/01
SOP #12	Management Feedback Meetings	11/01
SOP #14	Interviewing Techniques	11/01
SOP #15	Preparing and Reviewing Working Papers	11/01
SOP #16	Audit Program Protocols and Questionnaires	11/01
SOP #18	Audit/Assessment Follow-up Activities	11/01
SOP #19	Preparing and Issuing Audit/Assessment Reports	11/01
SOP #22	Dispute Resolution	11/01
Managerial Procedures:		
SOP #23	Audit Units	11/01
SOP #26	Emergency Procedures	08/02
SOP #32	SH&E Audit/Assessment Program Records Retention and Control	11/01

Source: Greeno, et al(b); Arthur D. Little.

sites which need to be audited are evaluated in a timely manner. An effective targeting scheme can be developed based on risk. For example, the risk-based audit scheduling model (Figure 5) establishes a solid rationale for site selection by mathematically evaluating and prioritizing facilities according to several risk factors. These factors include variables such as size and nature of facility operations; types of chemicals used or manufactured; regulatory climate for environmental and safety; number of contractors employed; age of the facility; and nature of the surrounding community. This method generates scores for each facility, which are used on a relative basis. For example, one might select which sites to audit as a percentage of the whole (e.g., top 10 percent highest grossing scores) or one might select the top highest grossing scores (e.g., top 10 scores).

Figure 3

Key Steps in the Audit Process



Source: "BPXA Assessment Program Audit Process Report."

an approach that emphasizes areas where inherent risk is high and management systems and/or internal controls are weak.

SH&E Audit Site Selection

Because of pressures to maximize the benefits and quality of the audit program while controlling costs, the audit program manager must ensure that

Another option is the audit timeless index (ATI), which is used to schedule audits based on an algorithm made up of four factors: hazard, prior audit, time since last audit and plant production (Figure 6). A site-specific component is included, such as in a laboratory location. These factors all contribute to the index. Facilities with an ATI of 10 or higher are considered priority locations for audits.

In response to cost-consciousness and quality concerns, some firms use a grouping process. This means a few locations among a large number (e.g., five out of 50) of similar small facilities in a group are audited. Results can then be generalized and shared among the group. Whatever method is chosen, the audit program must provide assurances (and a comfort level for upper management) that auditors are assessing facilities which need attention and are evaluating the most critical items.

Self-Assessments

Since it may not be feasible to audit every site, it is necessary to provide a method that allows facilities to perform self-assessments to some company standard. Self-assessments help to ensure that the processes required to meet identified management system components have been developed and implemented; employees are aware of management system requirements and their roles; processes are complied with and are effective; and the local facility is learning and improving.

Self-assessment questions include:

Table 1

Basic SH&E Audit Process

Basic Step	Principal Activities	Outcome
Plan the audit.	<ul style="list-style-type: none"> •Review relevant policies, standards and procedures. •Review federal, state, local regulations. •Annotate protocols. •Review facility background information. 	<ul style="list-style-type: none"> •Annotated protocols. •Audit plan and schedule. •Preparatory material for opening meeting.
Understand management systems.	<ul style="list-style-type: none"> •Conduct opening meeting. •Take site tour. •Review internal controls. •Conduct initial interviews. •Review key documents. •Conduct limited verification testing. 	<ul style="list-style-type: none"> •Strong working knowledge of key systems on site. •Key issues to review.
Assess strengths and weaknesses of internal controls.	<ul style="list-style-type: none"> •Review Step 1 information. •Identify risks associated with activity. •Assess effectiveness of internal controls. •Discuss assessment with audit team. 	<ul style="list-style-type: none"> •Priorities and strategies for verification work. •Reallocation of audit resources. •Risks identified. •Strengths and weaknesses of systems.
Gather audit evidence.	<ul style="list-style-type: none"> •Develop testing and verification strategy. •Perform physical inspections. •Conduct focused interviews. •Examine data and records. •Perform verification testing. 	<ul style="list-style-type: none"> •Analysis of site programs. •Audit evidence to substantiate findings. •Status of compliance confirmed.
Evaluate and summarize audit findings.	<ul style="list-style-type: none"> •Review data collected. •Ensure factual accuracy of findings. •Integrate findings with those of other team members. •Identify trends in the data. •Determine root causes. •Provide evidence to support findings. •List exceptions and observations. •Attend daily debrief meetings. •Attend close-out meetings. 	<ul style="list-style-type: none"> •Draft findings. •Accuracy of findings confirmed. •Potential root causes identified. •Early, clear, consistent communication of findings to facility. •Understanding of facility concerns. •Preliminary draft report.
Report findings.	<ul style="list-style-type: none"> •Review working papers. •Prepare draft report. •Respond to comments and challenges on findings. •Prepare final report. 	<ul style="list-style-type: none"> •Draft report summarizing audit process and findings. •Final report.

Source: "BPXA Assessment Program Audit Process Report."

Processes/System Development

•What processes and procedures are in place? Written or informal? Up-to-date?

•What are the process and procedure gaps?

Awareness/Knowledge

•Are all employees aware of their roles and responsibilities?

•Are employees aware of what to do to meet expectations?

Compliance & Effectiveness/Performance Measurement

•Does the facility comply with processes and procedures? Do any incident, observation or audit findings prove otherwise?

•Are objectives and performance standards in place? Are they being met?

Improvement

•Is an improvement plan in place? Are findings

close to resolution? Is there an annual plan for targeted improvement? What is its status and is it being followed?

Based on management system elements and the type of facility being assessed, an expectation scoring system should be developed. This allows the local facility to gauge its performance against SH&E performance indexes and enables management to more easily communicate improvements or opportunities for improvements. Table 2 illustrates such an expectation scoring system.

Self-assessments are typically performed by a cross-functional team of facility personnel and can be subjective. Interviews with personnel and review of documents and records may or may not be performed. Although more informal than an audit, self-assessments are a viable tool for local management

Figure 4

Maximizing Return on Audit Coverage

Auditee Feedback Form						
Location						
Date of Audit						
Responder						
	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	No Basis
1. The audit objectives were clearly communicated to me.						
2. The audit took an acceptable amount of time (from entrance to exit).						
3. The disruption of daily activities was minimized as much as possible during the audit.						
4. My business concerns and perspective were adequately considered during the audit.						
5. Communication of audit results and status to me during the audit was timely and adequate.						
6. The audit team demonstrated technical proficiency in the audit areas.						
7. The audit team demonstrated courtesy, professionalism, and a constructive approach.						
8. The audit team's conclusions were logical and well-documented.						
9. Audit results were accurately reported and appropriate perspective was provided.						
10. The audit report was clearly written and logically organized.						
11. Overall the audit provided "value added" to my organization.						
Comments:						

Source: ILCI; Arthur D. Little.

to perform a "health check" on SH&E programs in the intervals between formal audits. As a bonus, self-assessments are a refresher on management system elements and expectations; findings can be used to direct the successive year's improvement plans.

Evolution of SH&E Auditing

Audit programs have become more sophisticated. Their primary focus has shifted from identifying problems to confirming compliance to assessing the level of implementation of management systems (Greeno and Wilson; Arthur D. Little).

Management systems are fast becoming a global initiative. Many believe that such systems help drive compliance and improve SH&E performance and, therefore, many are building them into audit program objectives (Figure 7) (ISO 14011; ISO 14012; Bird and Germain; CCPS; Arthur D. Little). To seamlessly integrate these areas, one must first determine what management systems elements to cover. Then, one must look beyond the design of the systems to assess the detailed implementation. However, care must be taken to not focus on management systems to the exclusion of compliance, since compliance results can help measure how effectively management systems are working [Bird and Germain; Greeno, et al(a); Arthur D. Little].

When identifying which systems elements to review during audits, it is best to select them based on priorities and audit the most critical to the least critical. Here, the structure of the audit team is important. Management systems audit teams typically consist of a team leader from operations, a coordinator from corporate SH&E audit staff, a legal advisor, an outside expert and a staff member from operations to serve as a liaison between the team and site management [ISO 14011; Greeno, et al(b); CCPS; Arthur D. Little].

A distinct protocol should be used to address SH&E management systems in any facility or business (Bowman; ISO 14010; ISO 14011; ISO 14012; CCPS). Applicable codes and standards are a good starting point for this process; these include the Responsible Care program from the American Chemistry Council (formerly the Chemical Manufacturers Assn.); the European Community's Eco-Management and Audit Scheme; British Standard 7750; and ISO 14000.

Facility managers should find management systems assessments meaningful and valuable. These assessments offer a systematic approach for identifying a problem, analyzing exceptions or root causes, grouping those exceptions/findings, examining them as groups and developing corrective actions to improve the management systems (Bowman; ISO 14010; ISO 14011; ISO 14012; Greeno and Wilson; Arthur D. Little). The result is an overall root-cause analysis aimed at eliminating recurring problems by making systems improvements.

This method can also show where a facility is setting a high threshold and meeting its goals; this allows a corporation to single out top-performing facilities and those managers who show innovation and SH&E leadership [Greeno, et al(a), (b); Arthur D. Little]. The best approach is to identify which management systems elements to review, communicate the scope to appropriate personnel, then staff the audits to match the complexity of the sites. As noted, specific, detailed management systems protocols help auditors perform comprehensive, repeatable audits [Greeno, et al(b); ILCI].

Effective audit programs integrate management systems into the audit process in various ways (CCPS). For example, auditors evaluating hazardous waste activities would assess training, procedures, recordkeeping and physical controls (Bowman; Krieger, et al; Arthur D. Little). Others may look at management systems that cut across functional areas which may affect overall SH&E performance, such as line responsibility, SH&E awareness and training, regulatory tracking and risk assessment/risk management. In both approaches, the value gained from integrating the two systems is significant (CCPS).

Figure 5

Example Audit Site Selection Process

Measuring SH&E Audit Performance

Communicating audit findings is a continual challenge. The value of the audit program depends on effective and timely communication of results to upper management and stakeholders [Greeno, et al(b); ILCI; Arthur D. Little]. To be most effective, the audit program should be viewed as a tool to measure performance and its improvement. Audits provide management with a measure of SH&E performance across all facilities. While measurement systems have inherent difficulties (e.g., subjectivity of the “scoring” process, pressures to give a “good grade,” possible grade inflation over time), they provide a means of measuring performance [Greeno, et al(b); Arthur D. Little].

The ability to defend an audit program and communicate both the approach and results effectively to upper management determines the support the program will receive. Management will typically provide more support once it understands the program’s ability to measure safety performance and to meet audit program goals [Greeno, et al(a), (b); ILCI; Arthur D. Little].

At some companies, facility performance is communicated to the board of directors; at others, managers’ bonuses are tied to audit grades. Because of the significance placed on the audit score, quality assurance mechanisms can be developed to maintain the integrity of the scoring process (Greeno and Wilson; Arthur D. Little). Such mechanisms include formal procedures for developing the “opinion”; quality review of that opinion by the audit program manager; and an external review. Despite some inherent pitfalls in such a system, it provides some obvious benefits to management. Auditors can provide grades in the form of a performance classification (Figure 8) [Greeno, et al(b); Arthur D. Little]. The classification system can contribute to the pressure on lagging facilities to improve SH&E performance, yet is complimentary to facilities and managers who have worked continuously to enhance performance.

To better meet the needs of internal customers, a four-tier prioritization model can be implemented; essentially, this is a two-by-three matrix (three levels of risk or potential impact on the facility and two levels of control—Figure 9) [Greeno, et al(a); ILCI; Arthur D. Little]. All audit findings are mapped against the grid and any finding in the “high impact, no controls” box is classified an “A” finding, which requires immediate

EXAMPLE AUDIT SITE SELECTION PROCESS

One of the factors in the Site Selection Process is to determine the relative importance of the subject matters to be audited. An example is shown below.

Subject Risk Factors Sample Ratings

	On-Site TSD	Fuel Usage
1. Complexity	5	1
2. Prior Audit Experience	5	3
3. Public Disclosure Implications	4	1
4. Timeliness/Deadline Requirements	4	1
5. Opportunity/Position	5	4
6. Physical Hazards	5	1
7. Regulatory Environment	5	2

Total Subject Risk Score 33 13

Rating Range Each Factor	Total Subject Risk Score
Minimum =1(lowest risk)	• Minimum Total =7
Maximum =5(highest risk)	• Maximum Total =35

Source: Greeno and Wilson; Arthur D. Little.

Figure 6

Maximizing the Return on What & How a Company Audits

Example Audit Timeliness Index

The diagram below shows the audit scheduling algorithm. Each of the five components is related to one of their scheduling criteria:

- Hazard component is based on the location score from the hazard ranking data.
- Prior audit component is based on performance classifications from the last two audits.
- Time since last audit component is based on the number of employees and on-site contractors.
- Special site-specific component allows tuning of the model for site-specific factors, such as laboratories with special considerations, new businesses, or other situations that are not adequately covered by the other four components.

$$\begin{array}{l}
 \text{Audit Timeliness} \\
 \text{Index}
 \end{array}
 =
 \begin{array}{l}
 \text{Ca (Fa)} \\
 \text{Hazard} \\
 \text{Component}
 \end{array}
 +
 \begin{array}{l}
 (\text{CbFb1})/\text{Fb2} \\
 \text{Time Since} \\
 \text{Last Audit} \\
 \text{Component}
 \end{array}
 +
 \begin{array}{l}
 \text{CcFc} \\
 \text{Time Since} \\
 \text{Last Audit} \\
 \text{Component}
 \end{array}
 +
 \begin{array}{l}
 \text{CdFd} \\
 \text{Plant} \\
 \text{Population} \\
 \text{Component}
 \end{array}
 +
 \begin{array}{l}
 \text{CeFe} \\
 \text{Plant} \\
 \text{Population} \\
 \text{Component}
 \end{array}$$

Example:

$$\text{ATI} = \text{CA(Fa)} + (\text{CbFb1})/\text{Fb2} + \text{CcFc} + \text{CdFd} + \text{CeFe} = 1 + 2 + 1 + 2 + 1 = 7$$

Hazard Component = 1 – single continuous processing plant (increases with the number of processes)

Prior Audit Experience Component = 2 – Some corrective actions generated, most completed within six months, capital items in completed in one year. Increases with the number of open items.

Time Since Last Audit = 2 – One point for every year since the last audit

Special Site-Specific Component = 2 – A laboratory with potentially hazards exposures. Increases with more specialties.

Plant Population Component = 1 – One point for every hundred persons working at the facility

Source: Greeno, et al(b); Arthur D. Little.

attention. SH&E professionals can use these findings to set action plan priorities and to identify what issues to convey to upper management. This combination of management systems assessments and prioritization of findings helps the audit program effectively communicate results to facility managers.

Once complete, all involved in the close-out meeting, including facility representatives, must know where the problems are and where to focus attention. Periodic updates should be conveyed to upper cor-

Table 2

Expectation Scoring System for Self-Assessments

Score	Systems Level	Awareness Level	Compliance Level	Performance Level
0	NONE	LITTLE	0%	
1	SOME informal in place.	Some awareness of requirements of the processes/procedures that are required.	0%	Start of learning process.
2	SOME being developed, some in place.	System development people aware of requirements.	<60%	Learning/developing phase <i>SHORT</i> of company standards.
3	LARGELY in place. Plan for remainder in place.	GOOD awareness of roles and responsibilities.	80%+	GOOD AVERAGE performance <i>ALMOST</i> meets company standards.
4	IN PLACE	ALL FULLY AWARE of roles and responsibilities.	90%+	VERY GOOD performance <i>MEETS</i> company standards.
5	IN PLACE	People <i>ACTIVELY PROMOTE</i> the SH&E culture.	HIGH	BEST IN CLASS. Can demonstrate continuous improvements.

To be most effective, audit results should be reported to the board of directors at least once a year, perhaps even quarterly. The discussion should go beyond findings to provide a clear picture of the general state of the organization's SH&E performance. This is where a quantitative measurement approach is helpful. Trend charts should provide a sense of how the program is progressing and should indicate the status of action items. In addition, a semiannual trend analysis can offer a clear and comprehensive update on how the audit program is proceeding, which is typically of high interest to these stakeholders.

Conclusion

To build and maintain quality and effectiveness through all aspects of the audit program, those involved must:

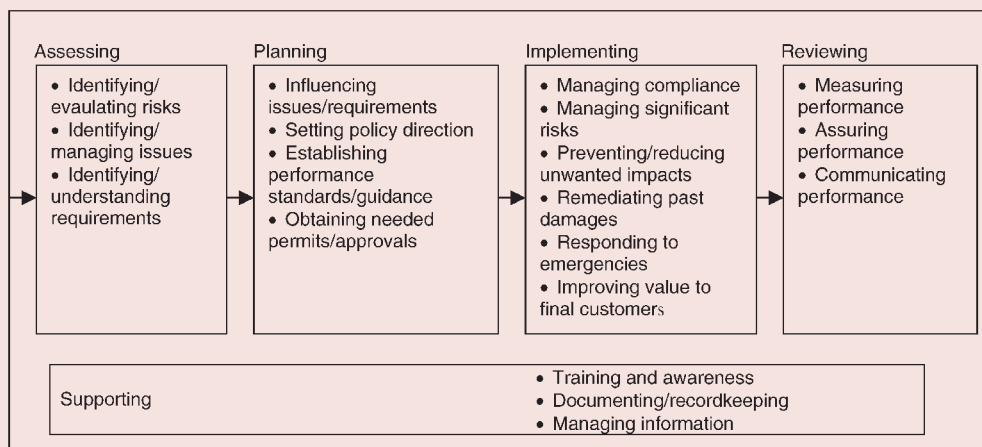
- focus on all dimensions of the program, including site selection and its impact on coverage and scope, and the roles for individual auditor, team leader and the team as a whole;
- use audit feedback—from auditees, auditors and team leader—to evaluate and improve the program;
- communicate results by first understanding their context and true meaning, then sharing them in a way that is understandable to facility and upper management [Greeno and Wilson; Greeno, et al(a), (b); CCPS; Arthur D. Little].

The auditing process is evolving. It is the focus of much external activity in the form of industry codes such as Responsible Care and ISO standards. The ability of audit programs to extend the effectiveness of management systems is growing as well.

It is helpful to examine different aspects of a company's activities on a three-tiered basis: threshold, performance and growth (Greeno and Wilson; Arthur D. Little). Certain aspects of a program are basic (threshold). Typically, companies want to perform these activities well because they are necessary simply to be a player in the market. After a certain point, however, more and

Figure 7

Auditing Management Systems



Source: ISO 14012; Greeno, et al(b); CCPS; Arthur D. Little.

porate management as well [Greeno, et al(a); ILCI; Arthur D. Little]. A unique and important aspect of the audit reporting process is the fact that the CEO should read the executive summary of each audit report. Therefore, this summary must call attention to areas of notable performance, critical issues and specific action items.

different aspects of a company's activities on a three-tiered basis: threshold, performance and growth (Greeno and Wilson; Arthur D. Little). Certain aspects of a program are basic (threshold). Typically, companies want to perform these activities well because they are necessary simply to be a player in the market. After a certain point, however, more and

better threshold activities do not boost stakeholders' level of satisfaction. Performance activities distinguish a company in the eyes of stakeholders, while growth factors are how a company truly differentiates itself from its competitors. Over time, growth factors become performance factors, and may even move down to threshold-level activities.

The sophistication of an audit program is linked to the sophistication of what is being audited and how well it is being managed. Once it is clear what an audit program can contribute to the bottom line, those involved can infuse innovation and vision into the audit process while driving performance improvement. What more could you ask? ■

References

Arthur D. Little Inc. *Environmental, Health and Safety Auditing: An Arthur D. Little Colloquium*. Boston: Arthur D. Little Inc., 1995.

Bird, F.E. and G.L. Germain. *Practical Loss Control Leadership*. Atlanta: International Loss Control Institute, 1996.

Bowman, V. *A Practical Guide for Environmental Managers and Environmental Auditors*. Glenview, IL: National Registry of Environmental Professionals, 1999.

"BPXA Assessment Program Audit Process Report." Santa Barbara, CA: A.D. Little, 1996.

Center for Chemical Process Safety (CCPS). *Guidelines for Auditing Process Safety Management Systems*. New York: CCPS, 1993.

Greeno, J.L. and J.S. Wilson. *Environmental, Health and Safety Auditing*. Boston: Arthur D. Little Inc., 1995.

Greeno, J.L., et al(a). *Environmental Auditing: Fundamentals and Techniques*. 2nd ed. New York: John Wiley & Sons Inc., 1987.

Greeno, J.L., et al(b). *Environmental, Health and Safety Auditor's Handbook*. New York: John Wiley & Sons Inc., 1988.

International Loss Control Institute (ILCI). *International Safety Rating System Auditor Program*. Atlanta: ILCI, 1996.

International Organization for Standardization (ISO). ISO 14010. *Environmental Auditing: General Principles*. Geneva, Switzerland: ISO.

ISO. ISO 14011. *Guidelines for Environmental Auditing: Audit Procedures: Auditing of Environmental Management Systems*. Geneva, Switzerland: ISO.

ISO. ISO 14012. *Guidelines for Environmental Auditing: Qualification Criteria For Environmental Auditors*. Geneva, Switzerland: ISO.

Krieger G.R. and J.F. Montgomery, eds. *Accident Prevention Manual for Business and Industry*. 11th ed. Itasca, IL: National Safety Council, 1997.

Your Feedback

Did you find this article interesting and useful? Circle the corresponding number on the reader service card.

RSC# Feedback
33 Yes
34 Somewhat
35 No

Figure 8

Audit Opinion Classification Scheme

Meets Requirements

This opinion applies when, based on the auditor's review, the facility is judged to be in compliance with all (or virtually all) of the applicable requirements included in the audit scope. For those few requirements where isolated exceptions are noted, these departures are determined to be occasional, anomalous and inconsequential in comparison to the overall level of compliance achieved. It is intended for locations that are found to be in full compliance with applicable requirements.

Substantially Meets Requirements

This opinion is given when audit results substantiate a high degree of compliance. It applies when, based on the auditor's review, the facility is in compliance with most of the applicable requirements reviewed, yet a few requirements are not satisfied. These departures are considered to represent isolated exceptions in an otherwise effective compliance program.

Generally Meets Requirements, Except as Noted

This opinion applies when, based on the auditor's review, a number of exceptions to applicable requirements are noted. These exceptions are more than isolated anomalies and reflect weakness in the design and/or implementation of compliance programs.

Requires Improvement to Meet Requirements

This opinion applies when, based on the auditor's review, several exceptions to applicable requirements are noted and some of the exceptions reflect the absence of required programs, significant departures from established criteria or lapses in program implementation.

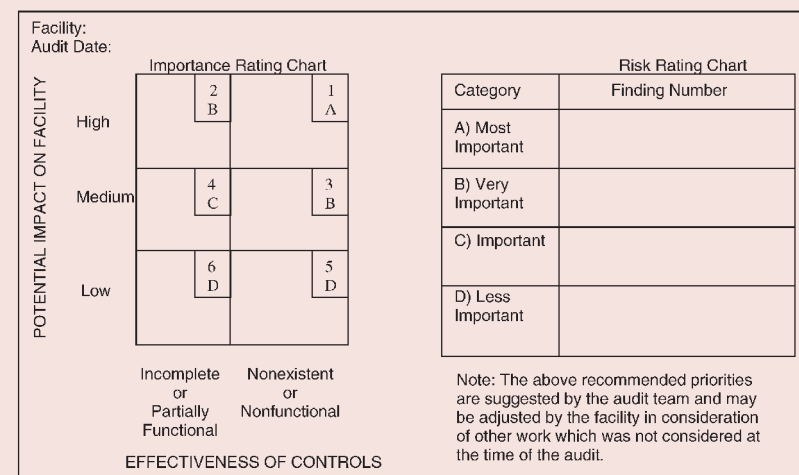
Requires Significant Improvement to Meet Requirements

This opinion applies when, based on the auditor's review, many exceptions to applicable requirements are noted, including several significant departures from established criteria, the absence of several required programs, or prolonged inattention to the resolution of previously identified compliance or liability issues.

Source: Greeno, et al(a), (b); ILCI; Arthur D. Little.

Figure 9

Priority Rating Chart



Source: Greeno, et al(a); ILCI; Arthur D. Little.