

## **WHY CAN'T WE LEARN FROM OUR MISTAKES LEARN THE LESSON - TELL THE STORY**

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### **ABSTRACT**

Tell the story well and people can learn from the lesson. The United States Department of Energy (DOE) Office of Environmental Management (EM) and its contractors are pursuing environmental remediation at the Hanford Site. This endeavor has been underway for a number of years, both at Hanford and at other sites across the DOE complex. Independently, the occurrence of two fatalities on two Sites at opposite ends of the country within two weeks raised the question, "What is going on in the Field?" Corporate EM management communicated directly with Field Office Managers to answer the question. As a result of this intense interest and focused communication, EM identified four areas that need additional exploration. One of those is, "EM's ability to learn from its mistakes." The need to cultivate the ability to learn from our mistakes is not unique to DOE. A quick review of EM Lessons Learned reports shows that most of the reports in the EM system originate at the sites with the largest budgets doing the most work. Not surprising. A second look, however, reveals that many reports are repetitive, that many people might consider many reports trivial, and that reports on some of the more significant events sometimes take a long time to get distributed across the DOE Complex. Spot checks of event reports revealed frequent identification of symptoms rather than root causes. With a high percentage of identified root causes in the questionable category, it is highly unlikely that the real root causes of many events are being corrected, thus leading to recurrences of events. To learn the lesson from an event, people need to be aware of the root causes of the event. Someone has to tell a story the reader can learn from, i.e., include all the information needed to understand what happened and why it happened. Most importantly, they need to understand the lesson to be learned.

### **INTRODUCTION**

Why don't we learn from our mistakes? The lessons from mistakes are not communicated. The lack of communication may result from a visual and/or procedural description of what happened without ever identifying the lesson to be learned, or from a poorly written Lessons Learned. Readers of a Lessons Learned that does not clearly communicate a lesson probably resent suggestions that they should review Lessons Learned for constructive input to work planning. They may develop a resistance to reviewing Lessons Learned or having their staff review Lessons Learned. Lessons Learned that do not clearly communicate a lesson are likely generated from a less than adequate incident investigation. Incident investigations are needed that Learn the Lesson and then Tell the Story so that the reader gets the point.

Resistance to reviewing or using Lessons Learned may result from several sources. If DOE and contractor management and staff were polled, it might be informative to listen to what they have to say about Lessons Learned. Some would say the work is the first of a kind and Lessons Learned don't apply. Others would say we don't have time to do review Lessons Learned, the schedule is already too tight. Often, change introduces unexpected complications that are only

discovered when final reviews occur or when the authorizing official asks the right questions. What is the balance between configuration control in design and getting the job done efficiently? What is the balance between having adequate work control and interfering with progress? Who makes the decisions? When are they made? On what basis? Organizational cultures can create obstacles to problem-solving, i.e., to learning from mistakes. We should be able to learn from experience, ours or someone else's, so we don't have to repeat mistakes that have already been made. Better yet, we should be able to grab a good idea and get an even better result.

The Columbia [Space Shuttle] Accident Investigation Board (CAIB) reported evidence that failures in the areas of organization, culture, and management as well as in technical areas contributed to the failure of the Columbia mission. The Report also noted that similar failures in NASA organization, culture, and management contributed to the failure of the Challenger seventeen years earlier. At the time of the last launch of the Challenger, some concern was expressed regarding the effect of the cold temperatures on the performance of the booster rocket O-rings. That concern was discarded by “Group Think” among the managers and senior engineers who were focused on meeting schedule. Later, during the investigation of the failure, it took an outlier, a physicist named Richard Feynman, to listen to the “small things”, to consider the whole picture systematically without prejudging what could or could not be the cause of the technical failure. Feynman used a simple beaker of ice water and an O-ring made of the same material to demonstrate to the experts the significant effect of cold on the O-ring's performance. Others would find that the desire to meet schedule had significantly affected the decisions about the launch.

During launch of the Columbia space shuttle, foam broke off the fuel tank and hit the shuttle's wing. Concerns were raised that a two pound piece of foam traveling 500 miles per hour could damage the leading edge of the shuttle's wing. A team of 40 experts assembled to analyze the available data and make a determination about possible damage. The group decided that impact was not likely to have damaged the critical flight surface. Data from foam impacts during previous launches were interpreted to support the no damage theory. Only four months before the accident, the impact of a piece of foam falling shortly after launch had damaged the rocket nozzle, but that was a "small thing" to the group. CAIB members noticed that the nozzle had been damaged and postulated that impact damage from a piece of foam could possibly damage the wing flight surface. To confirm their theory, the CAIB conducted a test simulating the foam impacting a wing panel at 500 miles per hour which showed, without a doubt, that the impact could create a large hole in the leading edge of the wing during launch. This is an example of thoughtful inquiry. Finding the cause of an accident depends on the perspective of the investigator when viewing the evidence and their willingness to consider the "small things".

The causal factors that are not identified are those that were not expected to have any impact. The weak and ineffective barriers that were not called out are those perceived by the culture to be irrelevant to the problem. Therefore, the unidentified causal factors reveal as much about an organization as the identified causal factors. Dr. William R. Corcoran presented this concept in his Root Cause Analysis Workshop<sup>1</sup>. The subtitle for the workshop was *Getting to the Safety Culture and Business Process Lessons to be Learned*.

Mark Cannon and Amy Edmondson<sup>2</sup> reported that the inability of most organizations to learn from failure may be from a lack of attention to small, everyday organizational failures. “Small things” are often the early warning signs which, if detected and addressed, may be the key to avoiding catastrophic failure in the future. They reported that when small failures are not clearly identified, discussed, and analyzed, it is very difficult for larger failures to be prevented. Their work has provided considerable insight into the organizational benefits of identifying failure, analyzing failure, and experimenting with small changes as learning opportunities. If people want fewer and less consequential problems they must make a critical assessment of their organizational culture.

Programs like the Voluntary Protection Program (VPP) have proven effective in bringing about change in an organization's safety culture because of strong management and worker support. A Lessons Learned Program that is as viable in general application as VPP is for safety might work. When EM is able to effectively identify the system that is the source of the problem, it is likely that it will be the source of the solution as well. Insight into the workings of management and the Lessons Learned process will result from intentionally exploring the area of the ability of any organization to learn from its mistakes. Looking outside as well as inside the organization will increase the level of corporate awareness and provide answers to this important question. You can determine what the culture is by looking. In fact, there is no other way!

## **ORGANIZATIONAL CULTURE**

Dr. Corcoran observed, and I agree, that an organization's problems are the direct and inevitable result of the way it does business. If people want fewer and less consequential problems they must decide to change the way business is done. If you want to change the way people do business you must get them to change the way they think. This involves changing the material they use in their thinking and the culture they operate in.

A simplified description of cultural processing of an accident could be described as follows:

Bad Thing Happens	Notification Follows Discovery	People Gather to Discuss-Socialize	Causes Are Identified	Corrective Action Taken	Things Get Better - For A While
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Two questions the culture needs to ask of itself are:

- How do we sustain better communication?
- How do we sustain performance improvement?

An organization can sustain better communication when better communication is acknowledged and performance improvement is seen and recognized. Increased ease in completing the job, higher reliability, or just getting it right the first time provide incentives to sustain performance improvement.

Dr. Corcoran<sup>3</sup> stated that the investigation of almost every consequential event reveals that there were multiple opportunities for multiple ordinary people to prevent the event entirely or make its consequences much less severe by doing ordinary things ordinarily well. Some of the opportunities for ordinary people doing ordinary things ordinarily well are listed below in *Six Ways That Problems Are Found*:

<u>SIX WAYS THAT PROBLEMS ARE FOUND</u>
A person accountable for the problem finds it.
A member of the accountable person's management finds it.
An independent assessor finds it.
An external assessor finds it.
The problem manifests itself by causing an event.
The problem is revealed by an accident it did not cause.

A variety of factors can impact organizational culture. Reduced funding and budget cuts lead to down-sizing and loss of expertise. Accelerated schedules and work overload can lead to corner-cutting. Cost-cutting often leads to out-sourcing and further loss of expertise and the ability to maintain continuity in an operation and even in oversight. A review of the CAIB report on the Columbia accident provides several examples of these decisions illustrating impacts on organizations and on organizational performance. Management choices have a lot to do with organizational performance as do the daily choices of workers in the field. These are factors that can be part of learning the lessons when incidents happen.

Some programs provide material that is new or viewed from an alternate perspective for organizations to use in their thinking. The programs may even present a different way of thinking altogether. The two programs discussed below have actually resulted in improving the organizational culture in multiple organizations.

The first program was introduced to management by a progressive thinking labor union, i.e., the Paper, Allied-Industrial, Chemical & Energy Workers International Union (PACE). PACE has a safety program that has improved the level of organizational safety awareness in many locations. PACE uses a system they have developed, i.e., the Triangle of Prevention (TOP) Program. TOP involves not only teaching the workers the Systems of Safety, but including the workers and management in incident investigation. By taking specific actions to correct flawed Systems of Safety, TOP breaks the link between precursors and serious incidents. The major purpose of Lessons Learned has been to protect worker safety. The payoff is when individuals feel they are actually a part of the process and the organization appreciates their input. Employees see that changes occur that improve performance and that recognition is given where recognition is due, sometimes to the individual, sometimes to the team, sometimes to management.

The TOP Program endorses educating all employees to establish a common understanding of Systems of Safety and Incident Investigation. Applying the training, employees rely on measuring and tracking incidents and proactive leadership to implement the program. The Systems of Safety make sense to workers and management alike so that incidents are easily categorized and communication is clear. The Systems of Safety are: design and engineering, maintenance and inspection, mitigating and warning devices, training and procedures, and human factors. The program uses an objective, rule-based, logic tree methodology to determine the root causes of accidents, incidents, and near misses. TOP supports employee involvement. The goal is to replace intervention with prevention.

Changing the culture of an organization isn't always easy. But the VPP program has been reported to be able to bring about cultural change in organizations. A recent DOE report<sup>4</sup>

mentions that the cultural change fostered by participation in VPP often results in improvements in other program areas not directly related to the overall environment, safety, and health program. Several organizations reported using the 'cultural change', and the momentum and desire of the workforce to achieve quality that resulted from VPP to 'fuel' their efforts in achieving ISO 9001 business systems certification and improvements in other program areas.

What leads to success in the VPP program?

- Commitment - commitment by all employees to higher quality work.
- Leadership - voluntary responsibility and accountability of employees.
- Involvement - all employees involved in decisions that affect work.
- Respect - increased respect and value for other's ideas, backgrounds and capabilities.
- Teamwork - active teaming of employees to achieve mission and goals.
- Communication - honesty, civility and respect in all communications.
- Partnership - building and maintaining effective partnerships.
- Balance - balance, fairness and reasonable approach is visible in all dealings.

These qualities are also contained in the DOE Integrated Safety Management System (ISMS). The qualities are found in the bases for other successful organizations. The impact of these qualities on organizational performance is not limited to safety performance.

Both of these programs are inclusive, both involve incident investigation and causal factors analysis, and both depend on effective corrective actions for success. Incident investigation looks back to determine what happened, what caused it, and what corrective action will prevent recurrence of the event. The satisfaction of solving a problem or improving performance encourages employees to take ownership, realize what is important, and seek out root causes of problems so they can be corrected.

## **BUILD THE PROGRAM**

Start building a Lessons Learned program by defining the program mission, the goals and objectives, and your resources and constraints. Don't forget to be aware of sources of resistance and obstacles that need to be overcome or circumvented. Steven Covey provided good advice when he said "Begin with the end in mind!"

The following resource is very useful for developing a comprehensive overview of the program. The United States Office of Personnel Management (OPM) developed a tool they call the *Program Assessment Ratings Tool* (PART)<sup>5</sup> that can be used as a general guide in developing a program when viewed from the practical side. PART provides a comprehensive overview by looking at four aspects of any program:

- I. Program Purpose and Design
- II. Strategic Planning
- III. Program Management, and
- IV. Program Results.

You may select what applies to your program from the general performance rating questions provided, the questions are generic and apply to all programs. Reviewing the questions will provide some idea of what comprises a basic program. Guidelines are provided for what evidence is expected to justify a YES response to each question. This is a tool that can be mined

for ideas for program metrics and for performance evaluation once the program is in operation. Responding with a NO, but providing what evidence you do have, enables you to develop a semi-quantitative evaluation of the program. The results can be used to track program progress and to identify specific opportunities for improvement over time.

After reviewing a surveillance on a contractor's Lessons Learned program, a facility representative commented,

"I can't help but give you an aside on my opinion of the ... Lessons Learned program. ... For one thing I think it operates too slowly. They don't get pertinent information out quickly enough. For another I think the Lessons Learned program management is not a critical customer. They allow their facilities to submit poor quality Lessons Learned, normally written by someone who either doesn't know what the pertinent information is, or is writing it as a punitive action for having been involved in the problem and just wants it behind them. They may be running it in accordance with the requirements, but their quality and timeliness have never impressed me."

This critique may sound harsh, but what is it telling you? When you are reviewing submitted Lessons Learned, think about it as a mini-review of the Lessons Learned program. Are the lessons being identified and is the message being communicated? Reviewing Lessons Learned input may provide insight into opportunities for improving the program. Many organizations focus Lessons Learned programs on identification, documentation, and dissemination of Lessons Learned. Often there is no provision or means to encourage review, application, or incorporation of Lessons Learned into project planning or the work planning process.

The benefit of the investigation is in the corrective actions and in the Lessons Learned. The value of the corrective action and Lessons Learned depend on the impact of the incident, the quality of the investigation, and the performance of the investigation team. The old adage, "If it is worth doing, it is worth doing well." is especially true when completing an investigation and a causal factors analysis. An organization stands to benefit if it has a clearly understood process for deciding when an incident needs formal investigation.

Timely notification of incidents to the organization and to potentially affected management is a good practice. Incidents must be communicated to the organization and to potentially affected management in a timely manner. The communication must contain the pertinent information so that effective corrective action can be taken.

On the other hand, if your organization reports every incident as a Lessons Learned, the sheer volume can clutter the Lessons Learned system. Better to provide reports with clear lessons to be learned and value to the reader to encourage possible users. Users don't have time to search through weak or irrelevant reports to find one they can use. It is best to get the right information to the right people.

Many organizations focus Lessons Learned programs on identification, documentation, and dissemination of Lessons Learned. Often there is no provision or means to encourage review, application, or incorporation of Lessons Learned into project planning or the work planning

process. This omission may be due to incomplete development of the Lessons Learned program and/or from encountering resistance to using Lessons Learned.

Resistance to using Lessons Learned often results from recipients being: a) overworked or overwhelmed by other tasks, b) driven by schedule pressures, c) doing what they consider “first of a kind” work, or d) swamped with Lessons Learned, especially if they are poorly written, irrelevant, or just not feasible. A perceived “poor match” is a quick way to dismiss the extra work of thinking through the applicability to the recipient’s need.<sup>6</sup> Investigators and Lessons Learned writers must consider the recipient’s perspective in telling the story so that the lesson is evident. Suggestions for this are in the following *Learn the Lesson* and *Tell the Story* sections.

An organization must have a system to quickly prioritize incidents based on impact to the organization. Impacts can be positive as well as negative. Most effort seems to be focused on the negative impacts, but it doesn’t necessarily have to be that way for Lessons Learned.

Organizational impact is determined by evaluating the consequences of an incident and/or significance of an incident or series of incidents, positive or negative. A small number of consequences having substantial organizational impact may yield most of the lessons to be learned. Incremental learning from consequences having less impact may not add great value.

The significance of incidents to an organization has several aspects. What is setting up the condition(s) for the incident? How wide-spread are the incidents in time and in space? Which barriers are missing or being penetrated? Which barriers are remaining or are unchallenged? Which campaigns are seen to have incidents? How far into the campaign do the incidents occur? What are the costs or losses resulting from the incident? Both consequence and significance are considered when determining the impact of an incident to an organization.

A qualified incident investigation team leader will be appointed to investigate incidents having significant impact on the organization. The team leader should have experience in incident investigation, causal analysis, and the multiple techniques available for root cause analysis. The team leader will draft the plan for the investigation and select the team members. Team members are likely to benefit more from the learning experience of being part of an incident investigation and review if they have had some training.

It is ideal for an organization to have all employees trained in incident investigation. The TOP program has a goal to educate all employees, management and staff alike, to recognize that all incidents are caused by systems failures. All employees learn the six major Systems of Safety. Common terminology and understanding of cause and effect developed out of a shared educational experience enhances the basis for clear communication, which is a key element of Lessons Learned. If Lessons Learned are not identified and not clearly communicated, we may not learn from our mistakes.

Recently Bill Corcoran commented, “One of the things that I learned by working with the team is that the training alone is not enough. Trainees need hands-on experience working alongside a practitioner.” This underscores the need for team leaders to have both training and experience in incident investigation and causal factors analysis. Team leaders for operational readiness

reviews (ORR) are another example where classroom training must be supplemented with “on the job training” under the tutelage of a qualified ORR team leader. Understanding what constitutes valid application of the various tools available is important in generating valid results. Interestingly enough, lessons learned during “on the job training” often highlight the need for maintaining a strict discipline throughout the process of incident investigation and causal analysis. The concept of maintaining discipline throughout the process is a key element of a successful Lessons Learned culture. Additional discussion of the process is found in the *Learn the Lesson* section that follows.

Measures of program success or tools to evaluate effectiveness are also elements of a complete Lessons Learned program. While at the October 2004 Society for Effective Lessons Learned Sharing (SELLS) Workshop, James McLaughlin reported on system metrics that are being used by the DOE Yucca Mountain Project for their Lessons Learned program<sup>7</sup>. The system incorporates key performance indicators as its basis and provides a quick status summary, which can be modified to suit various customers. The purpose of performance indicators is to focus on critical areas that can impact the overall mission and provide a basis for making management decisions. The underlying principle behind each metric is the use of objectivity to assess performance. The system provides key information at a glance but provides the ability to “drill down” to identify issues and actions.

The scope of the performance indicators range from basic activities to top management issues related to mission success or failure. Types of measures include leading indicators, real-time indicators, and lagging indicators. Leading indicators are a measure of the input(s) into a product, service, or process such that evaluation of the input provides an indication of future performance of the product, service, or process. Lagging indicators provide a measure of the results of a process or service in meeting customer expectations of quality, timeliness, and effectiveness. Instead of focusing on reporting on events, it provides an easy assessment of trends. It also encourages sharing of expertise and knowledge and allows benchmarking of successes as well as analyzing problem areas.

What can be done to improve the system? SELLS has been working primarily from DOE contractors to improve the quality of the Lessons Learned and to encourage reporting of Best Practices. The SELLS organization also maintains a website (<http://www.eh.doe.gov/ll/sells/index.html>) for sharing information and identifying additional Lessons Learned resources. SELLS is a resource for Lessons Learned programs and organizations looking for a Lessons Learned model. SELLS conducts semi-annual workshops that provide opportunities for people to exchange Lessons Learned on Lessons Learned programs. Each workshop has a theme that is timely for DOE Lessons Learned practitioners.

Too often, we don't get to hear the good news, i.e., Best Practices. The following Best Practice was discovered by following up on a question about a lesson learned that reported a deficiency in implementing a procedure<sup>8</sup>. I called the originator about the statement, "Verbatim compliance is mandatory." to verify that it was required and that the requirement was documented. The point of the story heard in response was a success story that could be shared as a Best Practice.



The incident contained the classic elements. The categorization of a facility was changed from research and development to a non-reactor, nuclear facility. The facility was now subject to Price-Anderson Act Amendment conduct of operations requirements and liable for compliance. The company upgraded the authorization basis and developed work procedures for the nuclear work. An independent assessment determined that the facility implementation of some procedures was deficient. As a corrective action to remedy the deficiency, management issued a policy statement that "Verbatim compliance was mandatory." A simple enough fix. However, management and workers noticed improved performance and productivity as a consequence of the corrective action. Those performance improvements and the fact that they resulted from proactive company action to further improve prior performance improvements is worthy of note. It definitely represents a Lessons Learned that could be shared with other groups, other facilities, other Sites, or other companies.

Great organizations develop a rigorous improvement process with highly disciplined follow through to stretch their performance and become leaders in their business sector. Effective communication is one of the building blocks of a strong organization as are self-assessment and Lessons Learned programs. Organizations that have weak or missing program elements don't perform as well as they could.

### **LEARN THE LESSONS**

Lessons Learned is about review and improvement. Generating a Lessons Learned should be a learning exercise. As a writer, keep those things in mind that you need to have to tell the story. Communicate the lesson learned to the recipient. The investigation report must contain adequate, pertinent information so that: a) feasible and effective corrective actions can be identified and assigned, and b) the Lessons Learned contains enough information so that the incident can be reconstructed. A reader will get little benefit from a Lessons Learned that contains only a visual (superficial) description of the event and/or the procedures without the other pertinent information.

Remember that a small number of consequences having substantial impact may yield most of the lessons to be learned. Incremental learning from consequences having less impact may not add great value.

Remember also that the causal factors not identified are those that were not expected to have any impact. The weak and ineffective barriers that were not called out are those perceived by the culture to be irrelevant to the problem. Therefore, the unidentified causal factors are as revealing of an organization as the identified causal factors.

The term *application efficiency* is the likelihood that a lesson will be applied by another group. The *feasibility* of a lesson being applied improves its *application efficiency* based on the recipient's potential to experience the same problem considering the system constraints. In some cases, a receiving group may not be susceptible to the same problems or the corrective actions may not be feasible. In short, if only relevant problems are transferred to a recipient and the recommendations are feasible in their systems, then the likelihood that a lesson learned will also be applied by that group increases. Therefore, understanding the relevance of the source group

factors to recipient group factors may provide additional insights into how to improve the *application efficiency* of Lessons Learned.<sup>9</sup>

The benefit of the investigation is in the corrective actions and in the Lessons Learned. The value of Lessons Learned is in their application and resultant improvement in performance of the receiving organization. As an investigator and/or writer, establish your priorities. You need to be selective in developing Lessons Learned because resources are limited and so is attention.

The process that enables you to learn the lessons begins when an incident is identified for investigation. The process that identified the incident is based on impact to the organization. The impact is based on the consequence and significance of the incident. A team lead is selected to lead the incident investigation. Because the impact of the incident on the organization is known, the team lead now has information pertinent to the incident. The team lead drafts the investigation plan and the Lines of Inquiry to develop further insight into the causes of the incident. The following Eight Questions for Insight can be applied to the event, to each consequence, and to each causal factor.

<u>EIGHT QUESTIONS FOR INSIGHT</u>	
Quality & Safety Impact	What were the event consequences?
	What was the event significance?
Vulnerability	What set us up for the event?
Consummation	What triggered the event?
Exacerbation	What made the event as bad as it was?
Mitigation	What kept it from being a lot worse?
Corrective Action (closeout)	Learning: What should be learned from the event?
	Doing: What should be done about it?

A method for causal factor analysis is selected and the Line of Inquiry is developed further based on what information has been gathered. Ask the questions and answer them. Stick with the system when doing causal analysis. The process is systematic and disciplined; do not skip a step or take short cuts. Information is gathered and organized. Use the collective knowledge of the team. Causal factors are determined – direct causes, contributing causes, and root causes. Success depends on continuing to ask the right questions until the root causes are identified, i.e., that small set of behaviors or conditions the removal of which will prevent similar events or will severely limit their consequences and which are not caused by more important underlying behaviors or conditions.

At this point, the intake portion of the investigation should be complete. The test is to be able to reconstruct the incident from the data. If the team's work passes the test, all that remains is final analysis and verification before writing the report, the corrective actions, and the Lessons Learned.

## TELL THE STORY

This simplified description of cultural processing of an accident illustrates the need for Lessons Learned:

Bad Thing Happens	Notification Follows Discovery	People Gather to Discuss-Socialize	Causes Are Identified	Corrective Action Taken	Things Get Better - For A While
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Two questions the culture needs to ask of itself are:

- How do we sustain better communication?
- How do we sustain performance improvement?

The Lessons Learned should be written so it holds the readers attention and makes the point. Like a story, a Lessons Learned is easier to understand when it begins by setting the stage, i.e., describing the situation (including antecedents and/or precursors and exacerbating and/or mitigating factors), the players (characters and roles), and the action (behavior). Then the outcome (consequences/ significance/ impacts) and the lessons to be learned can be better understood. The test of the story is to be able to reconstruct the incident from what has been presented.

Lessons Learned documents are attempts to efficiently transfer information from an information sender to an information receiver. Focus on the potential receiver. Resistance to using Lessons Learned often results from recipients being: a) overworked or overwhelmed by other tasks, b) driven by schedule pressures, c) doing what they consider “first of a kind” work, or d) swamped with Lessons Learned, especially if they are poorly written, irrelevant, or just not feasible. A perceived “poor match” is a quick way to dismiss the extra work of thinking through the applicability to the recipient’s need. Ask the question, “Who else may benefit from this lesson and what about this incident is important to them?” Resistance is reduced by increasing relevance.

Investigators and Lessons Learned writers must consider the recipient’s perspective in telling the story so that the lesson is relevant and feasible. Relevance is perceived as how closely factors in the Lessons Learned match those factors important to the receiver. Although the chance of a Lessons Learned matching the needs of the recipient for all factors is remote, matches can still be found at a more aggregated level of abstraction. People are known to be very good at moving between levels of abstraction, even though this requires some thoughtful reflection. The concept of "Abstraction Hierarchy" is well known in Human Factors Engineering.<sup>10</sup>

The *feasibility* of a lesson being applied improves its *application efficiency* based on the receiver’s potential to experience the same problem considering the system constraints. In some cases, a receiving group may not be susceptible to the same problems or the corrective actions may not be feasible. In short, if only relevant problems are transferred to a recipient and the recommendations are feasible in their systems, then the likelihood that a lesson learned will also be applied by that group increases.<sup>11</sup>

The possibility of performance improvement for receivers makes the development of a good Lessons Learned worth the effort. Another benefit is developing a way of thinking, of viewing a problem that makes solving the problem or even anticipating and preventing the problem, easier. Once this thought process is developed, you can apply it to all levels of your work. You may even realize benefits of this new perspective at home or in your personal life.

## CONCLUSIONS

A review of effects of organizational culture, building the program, learning the lesson, and telling the story lead to the following conclusions regarding the development and implementation of successful Lessons Learned programs:

- Organizational culture and success and Lessons Learned are interdependent.
- Conduct Lessons Learned on incidents selected based on impact to the organization.
- Generating Lessons Learned is about review and improvement, it is a learning exercise.
- A Lessons Learned should read like a story that presents a lesson(s) and make feasible recommendations.
- Get the right information to the right people.

## ACKNOWLEDGEMENTS

The author wishes to thank Al Hawkins and Mike Weis (DOE) for their management support, Joel Hebdon (DOE) and John Bickford (FHI) for their programmatic review. Dr. William R. Corcoran graciously offered to review the draft document, material from his Root Cause Analysis Workshop was fundamental to this paper. This presentation was funded by the United States Department of Energy.

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