Operating Experience Program
Benchmarking

by the Metrics Task Team

Introduction

At a meeting in Oak Ridge, March 2008, a Task Team was formed to address operating experience program metrics/effectiveness. The Task Team which includes federal personnel and contractors established a goal to conduct a benchmarking project to identify the traits of "effective" operating experience programs. The benchmarking effort initial results were presented in Idaho at the ISM Conference in August 2008. After comments and final benchmark meeting by the Task Team in Carlsbad in April 2009, this report contains the final recommendations.

The benchmarking project started with benchmarking nuclear power plants, contacting six nuclear utilities/plants. These were chosen after discussions with INPO based on their records of being models for improvement. The Task Team requested the facilities how effectiveness of their Operating Experience Program/Lessons Learned Program was measured. The Task Team received lists of metrics, procedures, and some great tools. The companies agreed the Task Team could share their results but without reference to the specific plant or utility. No Department of Energy (DOE) facilities were included in this portion of the benchmarking effort.

Background

High performing organizations should develop an operating experience program for several reasons, regardless of requirements, to improve safety, ensure effective operations, improve cost effectiveness, and because it is an "effective" management approach to build mission success. DOE Order 210.2 requires

- Implementation of an Operating Experience Program
- Self-assessments to include evaluation of organizational performance in Integrated Safety Management (ISM) and effectiveness of the organization's operating experience program
- Development, implementation, and tracking of actions to correct problems identified by causal analysis and develop Lessons Learned on the effectiveness of these actions
- Evaluation of program performance and the effectiveness of actions implemented from Lessons Learned
- Establishment of metrics to measure program performance and evaluation of the effectiveness of actions implemented from Lessons Learned

Discussion

Nuclear plants and companies were chosen based on marked improvement in performance and considered to have effective operating experience programs. One company had gone from an INPO 4 (shutdown) to INPO 1 (excellent) in less than two years. Measurements of performance and correlating metrics were evaluated for applicability to DOE facilities. The Task Team evaluated the metrics and analyzed with historical data from Waste Isolation Pilot Project (WIPP), which includes scientific research and multiple operations, to determine "Are we a learning organization?"

The learning organization criteria are based on B&W Pantex's publications, "High Reliability Operations" and "Causal Factors Analysis Approach to Organizational Learning." The criteria were compared to the metrics reviewed in order to focus on the most effective indicators as related to a learning organization. The resultant indicators were based on the following learning organization criteria:

- Learning from external events
- Benchmarking

- Causal factor analysis related to event investigations and corrective actions
- Tracking and trending of occurrences, precursors, and other data mining
- Daily supervisor-worker feedback
- Readiness Reviews, Authorizations, and Oversight

The learning organization facilities practiced change management, prevention, detection, and correction. The facilities' metrics were compared to DOE site-specific metrics submitted by Task Team members. This report provides the comparison results. DOE site-specific Lessons Learned metrics include:

- Screening for applicability
- Distribution
- Feedback and corrective actions
- Drill and exercise performance
- Other metrics, such as Safety (injuries, illnesses, and exposures)

A unique performance indicator/metric identified for operating experience programs at nuclear facilities included the use of "warning flags." Warning flags point out common causes of extended plant shutdowns and Lessons Learned from nuclear utility consolidation activities, resulting in a set of indicators. These monitor current values and behaviors in support of a prevention/detection strategy. Some facilities literally monitor hundreds of indicators; however, the common metrics monitored by the facilities INPO considered as "models" are listed as:

- Improvement in "Rating" of Root Cause Analyses conducted – A variety of tools and mechanisms used focused on overall improvement in root cause analysis, and fits the "organizational learning" criteria.
- Equipment Reliability – Important equipment issues linger and repairs are postponed. Many DOE sites monitor some type of performance indicator in this realm; however, the overall impacts may not be tied to the learning organization, as evidence of implementing effective Lessons Learned to improve the overall safety culture. The INPO sites used a number of items to measure this indicator, including:
    - Operator workarounds
    - Fire Protection Impairments
    - Corrective maintenance work packages required to maintain production
    - Work Order average age
    - Number and length of time of operational shutdowns due to equipment failure
- Preventive Maintenance (PM) Effectiveness – This has the same potential impact as the equipment reliability indicator monitoring areas. PM measurement indicators include the backlog, programmatic audit findings, maintenance preventable rework, and post-maintenance issues.
- Human Performance – Index elements include average number of days between critical equipment failures, radiological worker error rate, average days between human initiated incidents, and supervisory effectiveness components. Several indicators used for the supervisory effectiveness components depending on the facility, including supervisory time in the field, crew repeat issues, assignments overdue, assignments with multiple extension requests, etc.
- Self-Assessment Program – This index includes self-assessment schedule adherence, quality of the self-assessments, and integration of results with the operating experience program.
- Corrective Action Program Health – This index is based on identification of repeat issues, effectiveness review findings, quality of corrective actions, corrective actions past due, timeliness of corrective action implementation, extension requests, and corrective actions in progress.
- Procedure Health – The factors in this index include the procedure revision backlog, procedure use and adherence, procedural accuracy, length of time to get procedure changes approved for use, and percentage of technical procedures in the review process.

- Training Health – This index includes the percentage of employee qualification status, timeliness of line management training reviews that include classroom and field observations, and retraining based on performance issues.
- Production Milestone Status – Percentage of the time production goals and objectives being met, including the support factors of quality and safety.
- Design Basis – The index includes Technical Safety Requirements (TSR), Unreviewed Safety Question (USQ), etc.
- Work Management Health – The index includes schedule adherence, scope stability factor (workload management), conduct of operations compliance, assessment findings, human factors findings, near misses, and actual incidents.
- Benchmarking – This index includes interactions within their industry and INPO with a focus on benchmarking versus isolationism. Results are expected to be integrated in continuous improvement efforts.
- Reactivity Management – Plant operational focus overshadowed by other issues, initiatives, or special projects. These factors determine a final score inclusive of non-routine assignments per manager, the average number of corrective actions open, the median age of open routine assignments, number of occurrences within the past twelve months, and percent of management change within the organization.
- Effective Supervision/Leadership – Number of injuries (negative score), number of occurrences (negative score), and number of benchmark projects (positive score).

Specific elements monitored for the performance indicators may be obtained from INPO.

The draft results were presented at the October 2008 Operating Experience Committee meeting in Idaho that included specific tools for use, as applicable. Subsequent monthly Operating Experience Program conference calls indicated a need to focus on the metrics specific to the Operating Experience Program in addition to the broad performance indicators for a learning organization per se, but also. The Task Team met in April 2009 to review the performance indicators previously recommended by the Society for Effective Lessons Learned Sharing (SELLS) and those currently in use throughout the DOE complex. As a result, a refined set of recommended metrics are provided below.

Recommendations

Site-specific programmatic performance indicators to monitor statistical information such as the number of Lessons Learned distributed or reviewed are not addressed in these recommendations, as each facility may have programmatic metrics applicable to their site.

The Task Team focused on recommended metrics related to the benchmark efforts, previously identified SELLS metrics to support organizational learning, and provide long-term Operating Experience Program improvement.

The recommended metrics include:

Feedback – One or more implementation methods (training, procedure/process change, work planning, corrective actions).

- Metrics
    - Lessons Learned issued resulting in change
    - Level of utilization of the Lessons Learned

Success Stories – Operating experience/Lessons Learned incorporated into a work process or research with documented evidence of continuous improvement.

- Metrics – Number of success stories trend demonstrating continuous improvement

Lessons Learned Origin – Lessons Learned sources including a significant focus on day-to-day operating experiences.

- Metrics
    - Internal Lessons Learned sources (assessments, critiques, daily operating experience)
    - External Lessons Learned sources

Operating Experience Program Preventable Events

- Metrics
    - Lessons Learned issued that could have prevented an event

Timeliness

- Metrics
    - Lessons Learned feedback received within a site specific time period from distribution
    - Lessons Learned from internal events issued within site specific time period following causal analysis
    - Subject Matter Expert (SME) review of Lessons Learned of external events for applicability

Search / Request for Assistance

- Metrics
    - Requests for specific Lessons Learned search
    - Webpage user hits

Conclusion:

While there are ample metrics and user feedback collected and analyzed, the Task Team determined the methods used in one facility may not be applicable or useful to another facility. The metrics recommended by the Task Team in the FY09 Benchmarking Project are intended to enhance the current metrics for evaluating the effectiveness of Operating Experience Programs.

Goals for the Task Team for FY10 include:

- Examples of FY09 recommended metrics
- Focus on the quality of Operating Experience evaluations

Additional focus areas for continuous improvement in operating experience identified include:

- Focus on Vendor/Subcontractor use of Lessons Learned
- Recommendations Occurrence Report form
- Mindset of customer service and transparent compliance
- New approaches – quick capture, Blog hazardous categories
- Identification of new resources (Corp of Engineers, etc.)

The chairperson for the FY10 Metrics Task Team is Teresa Cochran.