

EFCOG Best Practice #85

Best Practice Title: ISMS and Safety Culture

Facility: EFCOG ISMS/QA Working Group/Safety Culture Task Team

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Brief Description of Best Practice: Based on extensive operating experience, certain cultural elements have been shown to have significant influence on overall operational and safety performance in various industries. These events prompted the development and refinement of various safety culture models considered by the Team within ISMS. Lessons learned from related industries and organizations such as INPO, NRC, NASA, OSHA, and IAEA were evaluated by The Team, including relevant information on cultural issues from DOE oversight and enforcement.

Why the best practice was used: The DOE's ISMS has had a positive impact on overall performance improvement within the DOE complex since inception. However, periodic revitalization is necessary to account for new industry information and lessons learned; it is a never ending journey.

What are the benefits of the best practice: The primary result of the Team effort was the identification of three ISMS Safety Culture Focus Areas and Associated Attributes that are considered by The Team to offer the most impact on improving ISMS, safety, and production performance within the DOE complex.

What problems/issues were associated with the best practice:

- Culture change starts at the top; management change at the beginning is probably most important.
- The pilot was used by multiple facilities to attempt to reach breakout performance.
- Culture change is a long journey, there is no easy fix; but it is a worthwhile journey with potential high payback.
- There is need to share lessons learned and provide an ongoing discussion forum within DOE.
- One size or approach to improving safety culture does not work for all organizations. It was difficult to write an exact cookbook for improving culture.
- Lots of employee and management involvement and engagement is needed.
- If possible, it is good to build culture activities into existing processes.
- DOE and contractor participants learned a lot during the 2 years this subject was under development.

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How the success of the Best Practice was measured:

The strong correlation between good safety performance with good mission performance (or productivity or reliability) has been observed in many different contexts, including industrial, chemical, and nuclear operations. The reasons behind this strong correlation are many and include the following: (1) an organization that excels at attention to and satisfaction of work-related requirements can do so regardless of whether the requirements relate to safety, quality, schedule, or mission, (2) strong safety performance can preclude facility shutdowns as a result of accidents or safety concerns and thereby avoid associated negative impacts on mission performance, (3) demonstration of leadership and organizational core values for worker health and safety, as well as public health and safety, can garner increased worker commitment and efforts toward mission accomplishment for the organization, and (4) the same human principles related to learning and continuous improvement of safety performance (such as communications, trust, questioning attitude, modeling, worker engagement, learning from experience, etc.) also apply to learning and continuous improvement of mission performance.

Description of process experience using the Best Practice:

Safety culture has a significant impact on organizational issues which influence individual behavior in the organization. INPO has concluded that safety culture has a significant impact on improving safety. In turn, safety performance has had a direct impact on mission or operational performance in the commercial nuclear industry. As an example, INPO has developed safety culture attributes for use in the commercial nuclear power industry with impressive results which can be seen in the figure below. Corresponding improvement in safety directly correlates with across the board improvement in various indicators of plant operational performance. INPO recognized the need for safety culture principles that included emphasis on leadership and continuous improvement. An example is recognition of fairness related to the identification and resolution of human performance problems, and distinction between honest mistakes and intentional shortcuts with respect to discipline. This approach can result in positive benefits such as free flow of information across all levels of an organization and high level of self-reporting at lower thresholds in the organization. Open communication and reporting helps assure that events with minor consequences are being evaluated and addressed before events with more significant consequences occur. The IAEA has used a similar approach.

Within DOE, the Team reviewed DOE occurrence reports for the last several years, specifically Category 1, 2, and R reports. The cause codes were examined for causes

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relevant to the forces that either shape (Management) or define (Human Performance) culture in the organization. The task group concluded that:

- Management and Human Performance issues make up the majority of the primary causes of Cat 1, 2 and R ORPS Events
- Almost every Cat 1 and R ORPS events has a cause tied to Management or Human Performance
- A “Strong Safety Culture” should lead to a reduction in ORPS Cat 1, 2 and R Events

The Team also reviewed the causes of the events leading to Type A and Type B investigations for the years 2002 – 2007. There were twenty-two investigations issued during this time period that were available for review and each the root and contributing causes were evaluated that the affected process areas (e.g., work management, hazards analysis) were determined. On this basis it was found that there was a:

- Low correlation between ISM contractual commitments and accidents
- High correlation between less than adequate (LTA) commitment to ISM and accidents
- High correlation between LTA oversight and accidents
- High correlation between LTA hazard analysis, training, work procedures and implementation of work procedures and accidents

The common theme for the areas that are highly correlated with accidents is a lack of a learning organization. Less than adequate commitment to ISM, implementation of ISM core functions and oversight are the primary areas that require focus for culture change to occur. Review of number, type and causes of significant events within the DOE complex indicates DOE and contractors need to focus on safety culture as a common way to improve overall performance. Safety culture related issues have been present in significant DOE events.