

W.2.6 - Exercise: Identification of Safety Culture Characteristics and Attributes related to Inspection Findings

The purpose of the exercise is to test the use of the safety culture attributes promoted by the IAEA in assessing the relevance of inspection findings.

The participants to the exercise are expected to:

- Be familiar with the safety culture attributes outlined in the IAEA publications GS-G-3.1 and GS-G-3.5;
- Review the inspection findings provided, try to establish a link with the safety culture attributes that they find relevant and explain why a particular finding is relevant for certain attributes;
- Formulate requests for additional information to be obtained from the licensees in order to allow for an objective assessment (it may happen that the information provided in the findings is not sufficient to make a judgement on the attributes affected and in such cases clarifications should be sought).

Examples of findings from an inspection in the area of Operational Experience Feedback

Process inspected: the issuance and processing of the abnormal condition reports
Inspection performed by the regulatory authority X at plant Y.

Findings:

1. *In 2005, the threshold for the issuance of Abnormal Conditions Reports (ACRs) has been lowered (the reporting criteria have been revised) such that low level events are now reported and analysed.*

This has resulted in a significant increase of the number of ACRs. The total number of ACRs issued in 2005 was of 1250. In 2006, only in the first quarter, there have been 1060 ACRs issued.

In 2005, the OPEX unit has 7 persons performing the processing of the ACRs. At the date of the inspection (July 2006), only 6 persons from the OPEX unit were involved in the processing of the ACRs. In the opinion of the inspectors this might impact on the quality of the process for review and classification of ACRs (because of the increase in the number of ACRs to be processed, without a corresponding increase in the number of persons responsible for the processing of the ACRs).

2. *Starting with 2004, all NPP staff takes part in the training course “Abnormal Conditions Reporting and analysis” (according to the licensee’s procedures, all staff has to be involved in the reporting of abnormal conditions).*

The training course was revised in May 2006 and the training for all staff based on the new revision was not yet finalized at the time of the inspection. The inspectors have found that the structure and content of the course are acceptable.

However, the inspectors have found that the abnormal condition reports do not respect all the requirements in the ACR procedure, i.e. they do not include all the information required to be specified in the ACRs. In the opinion of the inspectors, this may affect the results of the ACR process.

3. *For one of the ACRs reviewed by the inspectors, it was found that one of the corrective actions assigned appeared as closed in the records, although its implementation was not finalized (the review of the associated operating documentation was still in progress).*

4. *In accordance with the ACR procedure, the ACRs are reviewed and classified, based on their importance, into 3 categories: minor, important and events.*

For the ACRs classified as minor and for the ACRs classified as important only the direct causes and contributors are determined. For the ACRs classified as events, a root cause analysis is performed.

The ACR procedure does not include a provision for re-classifying the recurrent abnormal conditions initially classified as important, in order to have a root cause analysis performed for such conditions. In the opinion of the inspectors, if “important” abnormal conditions are also recurrent, a root cause analysis should be performed. Also, examples were found of abnormal conditions classified as important which could have constituted “events” had they occurred in slightly different circumstances.

5. *Upon review of an event analysis report, the inspectors have found that not all the causes of the event are addressed by the corrective actions proposed. This deficiency is due to the drafting of the event analysis report based on a root cause analysis report which was not yet discussed and approved by the Root Cause Analysis Committee. The committee has issued supplementary corrective actions which were not included in the event analysis report (i.e. the event analysis report was not revised to take account of the final dispositions resulting from the root cause analysis).*

- 6. The ACR procedure requires that in case more time is needed for the analysis of an event, the extension of the deadline has to be justified and documented. The inspectors have found a case of a reportable event (notified to the regulatory organization X), for which the analysis had not been performed in the time frame required by the procedure and for which no records existed to justify the extension of the deadline for completing the analysis.*

For all the findings, the inspectors have required the licensee to analyse the deficiencies identified and to transmit to the regulatory organization X the measures taken to solve them.

Example: One of the findings (no.1) relates to a possible mismatch between the workload and the qualified human resources. The increase in the workload was due to a change in a process (in this case the abnormal conditions reporting process was amended with regard to the criteria for reporting, resulting in a greater number of events requiring processing).

Examples of attributes that may be considered affected: B.7. Safety implications are considered in change management processes; D.7. Good working conditions exist with regard to time pressures, work load and stress; D.4. The quality of processes, from planning to implementation and review, is good.

Look also for positive implications associated with the change of the abnormal condition reporting process, e.g. increased involvement of all staff, open reporting of deviations is encouraged (relevant attributes: B.6. Management seeks the active involvement of individuals in improving safety; E.2. Open reporting of deviations and errors is encouraged)

For each of the attributes you have identified as relevant, ask yourself whether, from the findings alone, you can make a judgement on the relevance of the attribute in relation. Do not rush to make a judgement. What other information would you need to decide? Who can provide that information and how can it be obtained (e.g. the licensee, the site inspectors, additional review of licensees' documentation, etc.)? Work in groups and challenge each other on the decisions regarding the relevance of certain attributes given the information available and the potential need for further clarifications).

Support information:

1. IAEA attributes for a strong safety culture

With the issuance of the safety guides on management systems for nuclear installations, the IAEA has provided a framework for the assessment of safety culture, based on a set of 37 attributes, grouped into 5 areas corresponding to safety culture characteristics:

- (A) Safety is a clearly recognised value;
- (B) Leadership for safety is clear;
- (C) Accountability for safety is clear;
- (D) Safety is integrated into all activities;
- (E) Safety is learning driven.

#	SC Attributes (GS-G-3.1)
A.1.	The high priority given to safety is shown in documentation, communications and decision making
A.2.	Safety is a primary consideration in the allocation of resources
A.3.	The strategic business importance of safety is reflected in the business plan
A.4.	Individuals are convinced that safety and production go hand in hand
A.5.	A proactive and long term approach to safety issues is shown in decision making
A.6.	Safety conscious behaviour is socially accepted and supported (both formally and informally)
B.1.	Senior management is clearly committed to safety
B.2.	Commitment to safety is evident at all management levels
B.3.	There is visible leadership showing the involvement of management in safety related activities
B.4.	Leadership skills are systematically developed

#	SC Attributes (GS-G-3.1)
B.5.	Management ensures that there are sufficient competent individuals
B.6.	Management seeks the active involvement of individuals in improving safety
B.7.	Safety implications are considered in change management processes
B.8.	Management shows a continual effort to strive for openness and good communication throughout the organization
B.9.	Management has the ability to resolve conflicts as necessary
B.10.	Relationships between managers and individuals are built on trust
C.1.	An appropriate relationship with the regulatory body exists, which ensures that the accountability for safety remains with the licensee
C.2.	Roles and responsibilities are clearly defined and understood
C.3.	There is a high level of compliance with regulations and procedures
C.4.	Management delegate responsibility with appropriate authority to enable clear accountabilities to be established
C.5.	'Ownership' for safety is evident at all organizational levels and for all individuals
D.1.	Trust permeates the organization
D.2.	Consideration for all types of safety, including industrial safety and environmental safety, and of security is evident
D.3.	The quality of documentation and procedures is good
D.4.	The quality of processes, from planning to implementation and review, is good
D.5.	Individuals have the necessary knowledge and understanding of the work processes
D.6.	Factors affecting work motivation and job satisfaction are considered
D.7.	Good working conditions exist with regard to time pressures, work load and stress

#	SC Attributes (GS-G-3.1)
D.8.	Cross-functional and interdisciplinary cooperation and teamwork are present
D.9.	Housekeeping and material conditions reflect commitment to excellence
E.1.	A questioning attitude prevails at all organizational levels
E.2.	Open reporting of deviations and errors is encouraged
E.3.	Internal and external assessments, including self-assessments, are used
E.4.	Organizational and operating experience (both internal and external to the facility) are used
E.5.	Learning is facilitated through the ability to recognize and diagnose deviations, to formulate and implement solutions and to monitor the effects of corrective actions
E.6.	Safety performance indicators are tracked, trended, evaluated and acted upon
E.7.	There is systematic development of individual competences

2. General description of the Operational Experience Feedback Process for Plant Y

The Reference Document "Operating Experience Programme" contains the Plant policies for Operating Experience. Specific guidance is given in other documents, such as Station Instructions (SI), Internal Department Procedures (IDP) and Information Reports (IR), which include provisions for the reporting, analysis of events (including low level events) and the determination and tracking of corrective measures required.

The Operating Experience (OPEX) Programme is defined and supported by the following set of station procedures:

- SI "Abnormal Condition Reporting" (ACR)
- SI "Reportable Events to X"
- IR "ACR Process Guidance"
- IDP "Processing ACRs"
- SI "The Root Cause Analysis"
- IDP "Trend Analyses"
- SI "Operating Experience Feedback"

- IDP "Processing External Information"
- IDP "Performance Indicators for OPEX - self-assessment window".

The procedure "Abnormal Condition Reporting" describes the process of identification, evaluation and analysis of the Abnormal Conditions occurred at Plant Y or at other nuclear power plants worldwide, the final objective being to establish corrective actions to preclude occurrence of major events or their recurrence in case that they already have occurred.

The plant personnel is responsible for:

- Identifying and reporting the abnormal conditions occurred at the plant;
- Maintaining a focus on lessons learned from in-house and industry experience and actively promoting the use of operating experience in current activities;
- Implementing the corrective actions resulted from operating experience process;
- Reporting of the actions implemented to the next level of management.

The list of ACR Initiation Criteria is given in an annex to the procedure "Abnormal Condition Reporting", with the specification that it represents only the main groups for classification of the problems defined in abnormal condition report, more details on the criteria inside each group being included in ACR Process Guidance document.

Any person that identifies something abnormal should define the problem and evaluate the impact on nuclear or personnel safety, or production. When there is not clear that the event has no impact, the person shall initiate an ACR, completing the necessary forms in accordance with the procedure and classify the condition in one or more of the groups in the list, which is reproduced below for exemplification:

1. Equipment/ Component failures (critical equipment list);
2. Materials/components deficiencies (installation/functioning)
3. Procedures/ Manuals/ Documentation discrepancies;
4. Drawing discrepancies;
5. Procedural Violations;
6. Inadequate Review/ Resolution;
7. Discrepancies Associated with alarms, setpoints, calibrations;
8. Personnel Error/ Work Practice deficiencies;
9. Incorrect scoping of systems, equipments, and components;
10. Un-analysed conditions, safety analysis discrepancies, safety issues not previously identified or reviewed;
11. Radiological event;
12. Any violation of OP&P specifications;
13. Procurement/ Spare Parts deficiencies;
14. Industrial Safety deficiencies;
15. Deficiencies, concerns or issues resulting from regulatory authorities, industry and internal operating experience, inspections, observations or publications;
16. Reportable events to X or to other regulatory authorities;
17. Fire Protection deficiencies;

18. Deficiencies that have a potential for affecting the environment;
19. Deficiencies/problems occurred in the normal processes of the station;
20. Modifications of chemical parameters;
21. Rework.

The abnormal conditions discovered in the plant which can or could have effect on nuclear safety, personnel safety, environment or production are registered, classified by their importance and systematically analysed. Actions resulting from the analysis of the plant events are concurred by management and have assigned responsibilities and target dates for completion. The corrective actions address causes and contributors, and they might be corrective, preventive or for improvement. Specific processes are formalised within departments/sections, through which information and lessons to learn from internal and external operating experience are systematically searched and used within current activities (jobs evaluation and planning, pre-job briefing, modification processing, training, industrial safety, etc).

Coordination of all these processes is done by OPEX contact personnel who support the Performance Monitoring / OPEX section.

Events Reportable to X

The Operating Licence requires reporting of abnormal conditions/ events according to the station procedure “Events Reportable to X”, which establishes the criteria and the method for reporting of events to X.

The document includes 35 criteria related to public safety, environmental protection, radiation protection, production, and security. The procedure was kept updated by periodic revisions to address the current Regulatory reporting requirements, and to clarify the scope and intent of the reporting criteria regarding the impact of the event on the nuclear safety, in accordance with the latest international practices.

In addition to this procedure, a Protocol for communicating events of interest to the regulatory (outside the scope of the reportable events) was agreed by Y NPP management and X.

Process for collection of operating experience – Abnormal Conditions Reporting

Note: the scope of the Abnormal Conditions Reporting (ACR) is wider than the events reportable to X; low level events and near misses are reported through the ACR process; the ACR reports on low level events are made available to the regulator on request but only the reportable event reports are formally required to be transmitted to the regulator.

The current process for reporting the abnormal conditions within Plant Y ensures that for any abnormal occurrence a report is issued immediately when the condition occurs or when it is acknowledged.

Classification of the abnormal conditions is based on their impact (actual or potential) on nuclear safety, personnel safety, environment or production. The detail of level investigation is based on the classification of the abnormal conditions, starting from registering trend analysis for the minor abnormal conditions, to systematic analysis of root causes for major impact events.

For each event investigated, previous similar conditions are taken into account and if an emerging trend is identified, the classification of the abnormal condition will be upgraded to reflect the significance of the condition because of the re-occurrence (i.e. even if an abnormal condition, considered as a singular occurrence, is deemed to be classified “minor”, it will be investigated as “important”, if a series of similar occurrences is identified).

In the case of abnormal conditions classified as “events”, the report for an abnormal event will be issued immediately after stabilising the situation and having the plant in a stable and safe state. This report will be analysed according to station procedure for “Abnormal Conditions Reporting”, which means taking necessary steps for investigating, determining causes and taking adequate corrective actions to prevent recurrence.

At the end of investigations, when the corrective actions plan is approved by Management, but not later than 25 working days, a written Assessment Event Report will be submitted to X. This report will contain information related to the chronology of the event, significance to safety, causes and corrective actions taken by the plant to prevent recurrence.

Assessment Event Reports (AER) are prepared for those events that could have significant adverse impact on the safety of the environment, the public, the personnel, such as: serious process failures, failures of the special safety systems, trips of the shutdown systems, actuation of the ECCS or Containment system, violations of the OP&P/ licence conditions, release of radioactive materials in excess of target, doses of radiation which exceed the regulatory limits, events which interfere with IAEA safeguards system, etc.

According to the current station instruction “Abnormal Condition Reporting” (ACR), events that meet the investigation threshold established by this procedure are investigated using root cause analysis methodologies. A management sponsor (at management/senior superintendent level) for each root cause analysis event is responsible for establishing investigation scope and depth, and provide oversight of the investigation team. The investigation team is formed of specialists from all disciplines involved in the analysis of the event. Members of analysis team are responsible to

provide technical support for all steps of investigation using a root cause methodology (HPES or ASSET).

Each stage of the investigation is requested to be performed within a specific time frame. For instance, a root cause analysis will be performed within 20 working days from the occurrence of the event, an apparent cause investigation in 10 days and an evaluation (assignment of corrective actions at supervisory level) will be normally done in 5 days. These targets are assigned and followed using the computerized database for the event reports.

The process of event investigations and identification of corrective actions is standardised. A standard format for Root Cause Analysis Reports is issued, together with instructions for filling in the reports. The reports evaluate previous similar events and determine if previous corrective actions were effective, and also generic implications of the events are taken into account.

When the root cause analysis is finalised, and the proposed Action Plan is prepared, a Root Cause Analysis Review Committee (RCARC) meeting is arranged. The meeting is chaired by the Station Manager; RCARC approves the root cause analysis and the corresponding action plan. Proposed actions are then transferred into Station Action database, and followed to completion.

The Operating Experience (OPEX) group prepares and distributes the OPEX information packages throughout plant's departments and working groups including shift teams. These packages are available for everybody and discussed in regular (monthly/quarterly) meetings. Relevant parts of OPEX information are brought to the attention of working groups via pre-job briefings and just-in-time training.

If necessary, specific training and reinforcement actions are set for specific working groups, to discuss the lessons learned from these events. For most important events, like plant upsets or serious human performance events, training materials and station information bulletins are issued, with emphasis on the most important aspects of the events. The root cause analysis reports are available in the station events database for further reference

An overview of the evolution of numbers of ACRs for Plant Y

Starting with 2005, following the recommendations from an OSART Review Mission, the criteria for the initiation of the ACRs have been modified (the threshold has been lowered) to allow for the reporting of low level events and all NPP staff, including contractors, have been trained in reporting. Ever since, the number of ACRs has continuously increased.

Starting with 2007, since commercial operation of Y Unit 2, the operating experience program at Y NPP comprises both Units, based on the same set of procedural guidance which was accordingly revised to reflect operation with two Units.

The number of ACR recorded has increases continuously, reaching 3634 ACR in 2009, with more than 4000 events in 2010 (the graph shows the results for only the first quarter of 2010). The increase in number is related to the overall preoccupation to report low level equipment event and minor human performance problems, in order to capture every opportunity of improvement. The steady safety performance is demonstrated by the number of reportable events which has been maintained at less than 10 events/unit for the last three years.

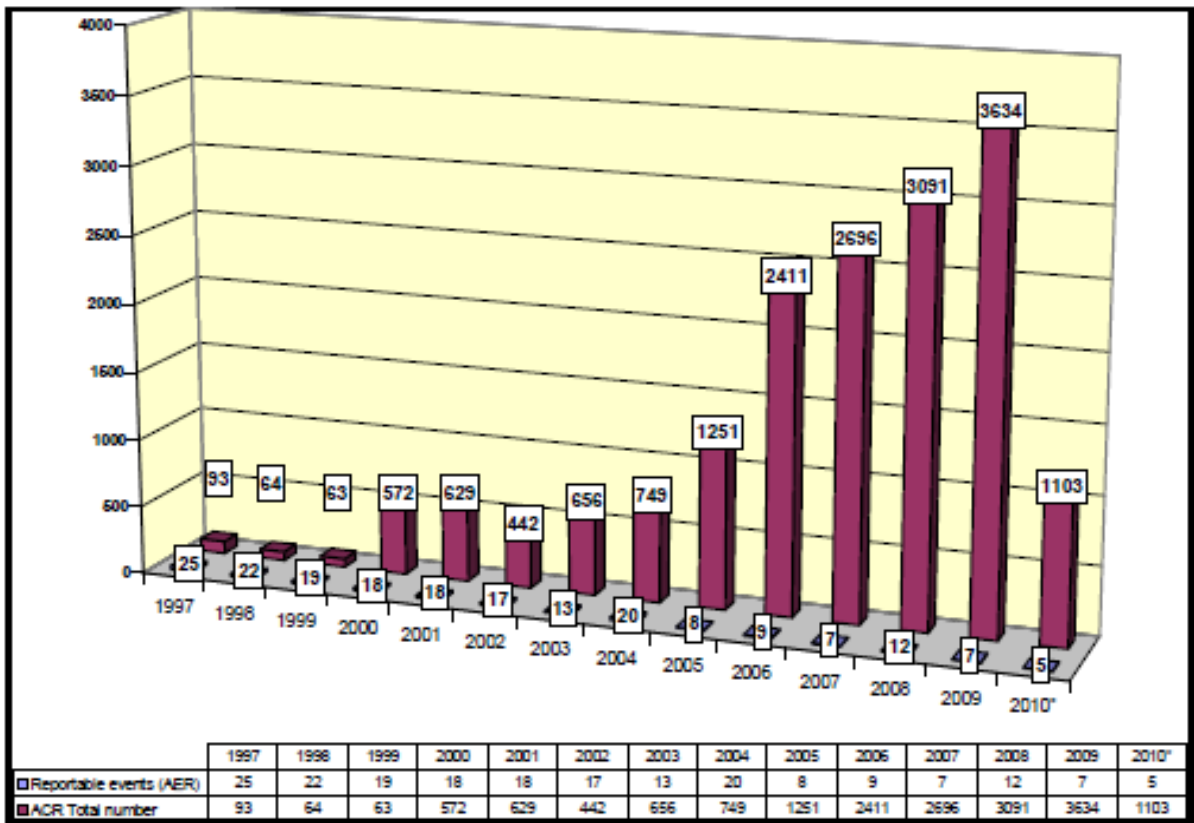


Fig. 19.1 Trending of Abnormal Condition Reports and of Assessment Event Reports