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DRAFT REPORT OF THE

PROSPER

(Peer **R**eview of the **O**perational **S**afety **P**erformance **E**xperience **R**eview process**)**

MISSION

to

EDF NUCLEAR OPERATIONS CORPORATE ORGANISATION

FRANCE

24 November to 3 December 2003

DIVISION OF NUCLEAR INSTALLATION SAFETY

Peer Review of Operational Safety Performance Experience
IAEA-NSNI/PROSPER/2003

PREAMBLE

This report presents the results of the IAEA-led **P**eer **R**eview of the effectiveness of the **O**perational **S**afety **P**erformance **E**xperience **R**eview process (PROSPER) of the Electricité de France (EDF) Nuclear Operations corporate organisation, France. It includes recommendations for improvements affecting the operational experience feedback programme for consideration by the Electricité de France (EDF) management, and identifies good practices for consideration by other utilities corporate organisations and nuclear power stations. A unique number identifies each recommendation to facilitate communication and tracking.

Any use of or reference to this report that may be made by competent Electricité de France (EDF) staff is solely their responsibility.

This PROSPER peer review is the first regular mission to a utility corporate organisation of the new service provided by the International Atomic Energy Agency to the Member States following the Pilot Mission conducted at Hartlepool Power Station, UK in 2001 and the first regular mission to the Armenian Nuclear Power Plant, at Metsamor, Armenia in 2003.

FOREWORD

The IAEA PROSPER programme assists Member States in enhancing the safe operation of their nuclear power plants (NPPs). Although good design, manufacture and construction are prerequisites, safety also depends on the ability of operating personnel and their conscientiousness in discharging their responsibilities. Through the PROSPER programme, the IAEA facilitates the exchange of knowledge and experience between team members who are drawn from different Member States, and utility and station personnel. It is intended that such advice and assistance should be used to enhance nuclear safety performance in all countries that operate nuclear power stations.

A PROSPER mission, carried out at the request of the relevant Member State, is directed towards a review of the use of operational experience information in enhancing operational safety performance. The mission can be tailored to the particular needs of a corporate organisation and station. A full scope review covers the complete process: identification and reporting of deficiencies, events, degradation of performance etc., analysis of the information and the implementation of corrective actions to prevent recurrence. Depending on individual needs, the PROSPER review can also be directed to review specific individual problem areas or significant events.

Essential features of the work of the PROSPER team members and their counterparts is the comparison of a corporate organisation and station's operational experience process with expected international practices and the joint search for ways in which operational safety performance can be enhanced. The IAEA Safety Standard Series documents and the expertise of the PROSPER team members form the bases for the review. The PROSPER methods involve not only the review of the Utility Self Assessment Report and discussions with staff but also a review of the quality of performance through observations. It is recognized that different approaches are available to an operating organisation for achieving its safety objectives. Proposals for further enhancement of operational safety performance may reflect good practices observed at other nuclear organisations and power stations.

An important aspect of the PROSPER review is the identification of areas that should be improved and the formulation of corresponding proposals. In developing its view, the PROSPER team discusses its conclusions with the operating organisation and considers additional comments made by counterparts. Implementation of any Recommendations or Suggestions, after consideration by the operating organisation and adaptation to particular conditions, is entirely discretionary.

Each review starts with the expectation that the utility meets the safety requirements of the country concerned. A PROSPER mission attempts neither to evaluate the overall safety of the utility nor to rank its safety performance against that of other utilities reviewed. A PROSPER mission is not a regulatory inspection to determine compliance with national safety requirements nor is it a substitute for an exhaustive assessment of a utility's overall safety status, a requirement normally placed on the respective utility by the regulatory body. The review represents a `snapshot in time'. Care must be exercised when considering the conclusions drawn since programmes at nuclear operating organisations and power stations are constantly evolving and being enhanced. To infer judgements that were not intended would be a misinterpretation of this report.

The report that follows presents the conclusions of the PROSPER review, including good practices and proposals for enhanced operational safety performance, for consideration by the Member State and its competent authorities.

Effective use of operational performance information is an important element in any plant operator's arrangements for enhancing the operational safety of nuclear power stations (NPPs). This has been recognized in the IAEA Safety Fundamentals "The Safety of Nuclear Installations" (Safety Series No. 110). Under the Technical Aspects of Safety, one of the Principles of Operation and Maintenance is that "*The operating organisation and the regulatory body shall establish complementary programmes to analyse operating experience to ensure that lessons are learned and acted upon. Such experience shall be shared with relevant national and international bodies".*

The Convention on Nuclear Safety, which came into force in July 1996, also recognizes the importance of operational experience feedback as a tool of high importance for the safety of nuclear plant operation and its further enhancement. Article 19 of the Convention concerning Operation requires that each contracting party shall have appropriate steps to assure, among others, that:

- *Incidents significant to safety are reported by the holder of the relevant license to the regulatory body;*
- *Programmes to collect and analyse operating experience are established; that results obtained and the conclusions drawn are acted upon; and that mechanisms are used to share important experience with international bodies and with other operating organisations and regulatory bodies.*

It also follows that the arrangements and results achieved under the operation experience feedback process in Member States will be outlined in the national report under the Convention and will be subject to periodical review.

These principles are further expanded in the IAEA Requirements "Safety of Nuclear Power Plants: Operation (Safety Standard Series, No. NS-R-2, 2000) under "Feedback of Operating Experience" which requires that:

- *"Operating experience at the plant shall be evaluated in a systematic way. Abnormal events with important safety implications shall be investigated to establish their direct and root causes. The investigation shall, where appropriate, result in clear recommendations to plant management who shall take appropriate corrective action without undue delay. Information shall be fed back to the plant personnel."*
- *"Similarly, the operating organisation shall obtain and evaluate information from the operational experience at other plants to derive lessons for its own operation. To this end, the exchange of experience and the contribution of information to national and international organisations is of great importance."*
- *"Operating experience shall be carefully examined by designated competent persons to detect any precursors of conditions adverse to safety, so that any necessary corrective action can be taken before serious conditions arise."*
- *"All plant personnel shall be required to report all events and encouraged to report any "near misses" [1] relevant to the safety of the plant."*[1]
- *"Plant management shall maintain liaison as appropriate with the organisations*

[1] The term "near miss" is used for a potentially significant event that could have occurred as the consequence of the sequence of actual occurrences but did not occur owing to the plant conditions prevailing at the time.

(manufacturer, research organisation, and designer) involved in the design, with the aims of feeding back operating experience and of obtaining advice, if necessary, in the event of equipment failures or abnormal events."

- *"Data on operating experience shall be collected and retained for use as input for the management of plant ageing, for the evaluation of the residual plant life, and for probabilistic safety assessment and periodic safety review."*

The IAEA-led PROSPER safety service and its associated guidelines have been developed to provide advice and assistance to utilities or individual power plants to strengthen and enhance the effectiveness of operational safety performance experience review programmes in achieving these fundamental objectives. The objectives of the previous IAEA-led Assessment of Significant Safety Events (ASSET) service have been expanded to include an evaluation of the effective use of all operating performance information available to the plant (e.g. external operating experience, internal low-level and near miss event reports and other relevant operating performance information, such as performance indicators and Quality Assurance non-compliance reports).

A PROSPER mission is a review of the effectiveness of the utility's operational performance experience review programmes and/or a review focused on identified specific significant events or issues. The guidelines, published in April 2003 as IAEA Safety Series No. 10, are primarily intended for PROSPER team members as a basic structure and common reference. However, the guidelines have also been designed to provide guidance to utilities or NPPs carrying out self-assessments. The guidelines are intended to be generic, recognizing that there will be differences between utilities and that the scope of the reviews may vary.

PROSPER missions compare, as far as possible, the operational performance experience review programmes for a utility with guidance and equivalent good practices elsewhere. These are based on guidance on safety practices produced by international organisations and the expertise of the PROSPER members themselves.

PROSPER reviews are process and performance related in that they accept different approaches to the implementation of operational performance experience review programmes, depending on the organisation of the utility. Recommendations are made on items of direct relevance to operational safety performance. Suggestions made may enhance the effectiveness of the operational performance experience review programmes and may also stimulate the nuclear operations organisations and NPP staff to consider other ways and means of improving it. Commendable good practices identified should be communicated to other utilities or NPPs for improvement consideration.

The findings of the PROSPER peer review are formally reported to the utility management along with the corrective actions agreed by the utility. It is suggested that, at the request of the operating organisation or member state, an IAEA-led follow-up review is conducted within 18 months of a full PROSPER peer review. The PROSPER Follow-Up mission will review the progress achieved by the utility in implementing the agreed Recommendations made by the Peer Review and also in correcting the deficiencies identified through the Self Assessment. This evaluation will determine the effectiveness of those actions in improving the operational safety performance programmes.

CONTENTS

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the invitation of the Government of France, the French Nuclear Safety Authority and Electricité de France (EDF) Nuclear Operations management, a two week PROSPER mission was conducted at the corporate organisation. It was agreed that the scope of the mission would be focussed on the operating experience feedback program activities of the EDF corporate Nuclear Operations Division including interfaces with other divisions, national units and external organisations.

The French nuclear power plants fleet is composed of 58 units with a total nuclear capacity installed of 63.000 MWe. The Nuclear Operations Division (DPN) is organized into four corporate units, 19 Nuclear Power Plant (NPP) sites, and one unit in dismantling. The senior corporate management team consists of a Senior Vice-President, two Deputy Senior Vice-Presidents, one Nuclear Inspection service, nine Operating Vice-presidents and 15 Executive Advisors. The four corporate Units are; the Technical Support Unit (UTO); the Materials and Chemistry Laboratories Department (GDL); the NPP Operational Engineering Department that deals with fuel, modifications, procedures and documentation (UNIPE) and the Operations Support Centre (CAPE). The Nuclear Inspection Department (IN) is responsible for performing inspections and assessments as scheduled or required by the Nuclear Operations Division. For the purpose of the PROSPER mission, the Operating Vice-President Safety was the "Director by Delegation" of the Nuclear Operations Division for the EDF activities.

The PROSPER team consisted of three external team members, one host peer from the hosting organisation, one observer and three IAEA staff members, as shown in team composition section of this report. The team arrived in Paris on Sunday, 23 November 2003. Monday, 24 November was spent in team training activities and the team review of the Advance Information Package. Following the entrance meeting, which took place on Tuesday 25 November, the team started the review process. The PROSPER review was finalized on Tuesday, 2 December by completion of the initial report. On Wednesday, 3 December, the team presented its comments and conclusions to the EDF Management Team and invited guests at an exit meeting.

The main purpose of the mission was to review the operational experience feedback practices and comment on the comprehensiveness of the Self Assessment Report. In addition, an exchange of technical experience and knowledge took place between the experts and their counterparts on how the common goal of excellence in operational safety performance could be further pursued. Towards this aim, a comprehensive review was conducted to enhance EDF organisation capabilities to avoid recurrent events, shield the fleet from a generic deficiency and become a learning organisation. As a result, Recommendations with some Suggestions for their implementation are offered in this report (see Detailed Findings, Sections 1 to 10).

The PROSPER team also identified some important long-term challenges that may be faced by the Senior Management of EDF and they are referenced in the section PROSPER Team's Main Conclusions below.

Throughout the review, the exchange of information between the PROSPER team members and corporate personnel was extremely open, frank and productive. Emphasis was placed on assessing the effectiveness of operational experience feedback rather than simply the content of programmes. The conclusions of the PROSPER team were based on the overall performance compared with IAEA Safety Standards and good international practices.

PROSPER TEAM MAIN CONCLUSIONS

The PROSPER team concluded that the senior management at EDF Nuclear Operations Division are committed to improving the operational safety performance of the NPPs through the use of operational experience. The team identified several good areas of performance including the following:

- The strong willingness of the management and all personnel to manage and implement the existing operating experience process as effectively as possible. Every interview with staff showed a dedication and determination to do a good job
- The evident desire of the management and personnel to improve and use all available information to further enhance EDF's safety performance. This was also demonstrated by the assistance provided by the Nuclear Operations Division during the preparations for the PROSPER mission
- A strong and powerful organisation with sufficient resources to develop the activities of the Operating Experience (OE) process.
- A comprehensive self-assessment report on the OE programme at EDF Nuclear Operations organisation was conducted during 2003. The evaluation was a part of the preparations for the PROSPER mission. Much of this self-assessment report supports the recommendations and findings of this mission. It is essential that this activity be repeated regularly (typical every 18-24 months) to evaluate improvement.

However, although the EDF Operating experience feedback process for improving the operational safety performance of the NPPs has many good operational safety features, the team observed some areas for improvement. The most significant include the following:

- The complexity and compartmentalization of the organisation make it difficult to establish a clear integrated oversight process, a consistent understanding at individual level of the overall ownership of the process, and individual awareness of the implications of their contribution to the overall operational experience feedback activities.
- The follow up programme to monitor the effectiveness of the corrective actions program needs improvement.
- Low-level events and near misses are not considered in the OE process and therefore are utilised as effectively as possible to identify weaknesses, error likely situations and early warnings of potential declining performance.

Sections 1 to 10 of this Report provide detailed descriptions of the recommendations. The Appendix P.1 to P.16 to this Report provide the results of the detailed review of each of the individual sub process and suggestions for their improvement.

EDF Nuclear Operations management expressed a determination to address the areas identified for improvement and indicated a willingness to accept a follow up visit in approximately 18 months.

DETAILED FINDINGS

The following sections (1 to 10) describe detailed mission findings and recommendations in all reviewed areas:

1. Strategy and organisation
2. Event/deviation reporting and tracking
3. Screening of report for significance
4. Investigation/analysis process
5. External operating review
6. Trend and trend review
7. Corrective actions management programme
8. Immediate review of events with significant plant impact
9. Utilisation and dissemination of operational experience
10. Monitoring and assessment of effectiveness

1. STRATEGY AND ORGANISATION

Attributes for this area are that the Utility/NPP operator should take account of policy and guidance when establishing and implementing an OE process. The regulatory requirements and guidelines are regarded as minimum criteria.

The OE process should have a structure and organization that facilitates the satisfactory progress of all functions. This requires a systematic OE process that contributes to the ability of the organization to systematically utilize OE information effectively to enhance operational safety performance. Organizational problems may be anticipated because the division of responsibility for relevant OE process is distributed among several organizations. As a result, gaps may exists between OE processes relevant to managing operational experience. Due to possible gaps Utilities/ NPPs may not have the most effective process as possible. To effectively gather, manage and utilize OE information to prevent recurring problems, shield the fleet from a generic deficiency and become a learning organization, these divisions of responsibility require coordination and integration.

1.1 Complex Organisation undergoing change.

Comments

1.1.1 The strategic organisation of the Nuclear Operations Division (DPN) is currently undergoing change to place emphasis on 'Management by Processes'. This is being introduced at both Divisional (DPN) and Departmental (e.g. CAPE) level to allow:

- Enhanced performance coordination.
- Greater responsibility of players in the field.
- Enhanced interfaces between subsidiary departments and
- Greater organisational responsiveness

leading to Total Quality Management.

1.1.2 Nine divisional processes have been identified including five "operational processes". The operational processes are:

- Generate in function with market needs
- Constantly improving and controlling nuclear safety performance
- Constantly improving and controlling radiation protection performance
- Constantly improving and controlling environmental performance, and
- Making the most of the Nuclear Fleet effect.

1.1.3 These overall processes are supported at Departmental level by subsidiary processes. For example, in the DPN Operations Support Centre (CAPE) there are eight Processes, three of which are Operational Processes. The most significant operational process concerning the organisation of operational experience activities is "Veille, REX, Contrôle" – "Watch, Operational Experience Feedback and Control". However, CAPE is also functionally structured into 13 distinct operational groups, and has the responsibility to manage ten activities associated with Operational Experience Feedback (Event-based, Corporate Analysis, Potential Issue Identification, Reports and Indicators, Fast Track Operating Experience (RER), Good Practices, Technology Challenges, Human Factor Operating Experience, Industrial Safety and Radiation Protection Operating Experience, and Safety Analysis).

1.1.4 During interviews and observations many staff that are actively involved in the defined activities of Operating Experience have appeared to be confused with the interfaces created by the organisation of processes and activities and their role in the overall programme. It was observed that many staff continue to work in a compartmentalised way, without an overall knowledgeable of the processes or its objectives.

1.1.5 While demonstrating a good level of competence in their specific activity they demonstrate little "ownership" of their position in the achievement of the objectives of the overall process of Operating Experience. (Preventing events and mitigating the effect of those that occur as stated in the Technical Safety Objective defined in IAEA Safety Standards).

Conclusion

Many staff demonstrated some confusion with the new process oriented way of working and continue to work in a very compartmentalised way. Many do not demonstrate an understanding of their position within the overall process.

Without a full understanding of their roles and responsibilities under the overall organisation of the Operating Experience activities there is a risk that confusion may result in some aspects of safety not being adequately considered.

Recommendation

Reinforce the communication to all involved staff, including other staff who interface with the Operating Experience processes, on the need to adopt the new organisational process concept, its objectives and their roles and responsibilities under the new organisational structure. Encourage feedback to enhance the individuals 'ownership and involvement' in the overall process. Ensure that feedback on concerns are considered and acted upon to resolve any misunderstanding.

1.2 Lack of Standardised Processes across the fleet and at Corporate Office

Comments

1.2.1 Within EDF there is a stated policy of maintaining the technical standardisation of the fleet in order to take full advantage of the standard designs, etc. However, there is also a desire to allow diversity in application of processes to enhance local accountability, encourage initiative, and to foster the search for continuous improvement.

1.2.2 While this is commendable in principle, the level of autonomy of the nuclear power plant sites and corporate units can create complexity and difficulties especially at interfaces between processes and/or activities.

1.2.3 For instance, the Special Evaluation Report conducted prior to the PROSPER Mission identifies that the experience review programme controlled by the application of directives and instructions from corporate management is generally processed

correctly. However, the daily use of experience review procedures beyond national prescriptions has only been developed adequately at a few sites.

1.2.4 The Special Assessment Report also highlights that situations vary considerably from one site to another. Most detect and report deviations as required by Directives DI-19 and 30, however, the difference between sites lies in the relevance and quality of the analysis, and to a lesser extent, in the way they implement corrective actions and measure effectiveness.

Without standard and integrated guidance it is difficult to establish common programmes at plant level to take full advantage of all the operating experience available.

For example, integrated and standard guidance for the collecting, processing and trending of low-level event information would assist in co-ordinating the corporate analysis of emergent issues that have not necessarily been identified by significant event analysis. Since all event information (low-level and significant) can be utilised for trending purposes the identification of issues is then not dependent upon high level screening criteria.

1.2.5 The provision of an integrated Directive on Event Declaration criteria has been requested by the plants to eliminate the apparent confusion created by the several current specific directives for declaration. This confusion could result in some events not being declared correctly either to the Regulatory Authorities or the utility. An integrated directive is in the process of preparation.

The Inspector General for Nuclear Safety and Radiation Protection has also identified the need for more harmonisation between plants in his 2002 Annual Report. As well as highlighting the advantages towards efficiency, he states that it would further enhance the appropriation of experience feedback and make it easier for contractors working at different plants to orientate their efforts.

1.2.6 Because diversity and complexity also hinders the effective corporate oversight of the Operating Experience cross-functional activity, it is difficult to measure effectiveness of global Operating Experience process accurately.

Conclusion

Lack of basic uniformity can create confusion especially when there is a use of common resources (e.g. contractors) across sites. To obtain maximum benefit from the operating experience information gathered throughout the extensive EDF fleet it would be beneficial to have standardised and integrated sub-processes within the global process structure. Lack of basic uniformity can lead to missed opportunities in identifying lessons to be learned from processes such as low level event identification programmes.

There have been many events (significant and at lower level) around the world that have been directly attributable to confusion associated with non-standardised company administrative procedures across sites.

Recommendation

Assess the advantages of establishing an overall framework of standardised and integrated operating experience guidance procedures across the sites and at the corporate to enhance the effectiveness of the operational experience process.

Develop, as necessary, overall integrated management guidance procedures to establish the framework for each of the main sub-processes of the Operating Experience process. In each of these management guidance procedures consideration should be given to include an effectiveness feedback loop to facilitate the follow up/measurement of the effectiveness of actions implemented. The interfaces and interconnection of these management guidance procedures should also be defined.

1.3 Goals and Objectives not fully established

Comments

1.3.1 The corporate office has placed considerable focus on the processing of significant event information. However, less attention has been given to the goals and objectives of the global operating experience feedback process in being utilised to identify and correct common precursors to events.

1.3.2 Some areas of the Operating Experience process do not have measurable goals or objectives established. This is evident in the emphasis that is placed at corporate on controlling technical issues to maintain the advantages of fleet standardisation, and preventing a significant generic technical issue having a major impact on performance. Less emphasis has been placed on ensuring control of the overall system for gathering and processing operating experience to prevent a significant organisational or human performance issue having a significant impact on the company's performance. It is recognised that considerable efforts are being made to establish programmes to place more emphasis to these areas.

1.3.3 For instance, the DPN direction issued in September 2002 identified areas where it was recognised that the global operating experience programme was deficient. It required the plants to promote the operating experience programme and motivate the sites to implement it. The directive highlighted several symptoms and proposed actions to be in place to correct them by the end of 2003. The areas identified as requiring enhancement included

- Insufficient quality of collected information and included in the National Event Reporting Database (SAPHIR)
- Isolationism of the OE co-ordinators at each plant site
- Diversity of approach of the OE programme from plant to plant
- Insufficient visibility of the benefits obtained from the use of OE

1.3.4 Attached was a set of actions requested to be in place by the end of 2003. These were to address the following weaknesses

- Complexity of the OE organisation, in particular too many channels

- Too many different computer tools. SAPHIR is supposed to be the national tool, but each site uses other additional site specific tools and data-bases
- Focus of management on the big safety issues, but insufficient attention to the rest of OE
- Insufficient cross-vision and multi-disciplinary-participation to analyse events
- OE group discussions are often centred on how to (or who) manage/administer the event but not there is insufficient attention on the technical and human factors aspects of the event
- Selection criteria not clearly established or understood or properly implemented
- Insufficient attention to the detection and treatment of recurrent event

Considerable effort is being placed on correcting these issues, an action plan has been produced and it is being co-ordinated through the CAPE OE Group (CAPE-GRE). However, while this action plan is designed to correct the identified symptoms, a comprehensive and integrated set of goals and objectives for the global programme has yet to be fully established.

Conclusion

The organisation has put in place comprehensive control processes to maintain standardisation of the design etc, but has not placed sufficient emphasis on 'focussed ownership' of the global OE process. Without establishing comprehensive goals and objectives for the effectiveness of the process it may be difficult to maximise the ability to achieve the objective of continuous improvement.

Recommendation

Review the stated goals and objectives of the processes and activities that are associated with the utilisation of Operating Experience.

By identifying the strengths and weaknesses of the current process and making recommendations for enhancing the process, establish the necessary goals and objectives of the process. Ensure that any changes necessary are communicated to all involved personnel.

2. EVENT/DEVIATION REPORTING AND TRACKING

The attributes for this area are that OE is reported in a timely manner to reduce the potential for recurring events in-house and in the industry. The reporting is performed according to well established criteria and procedures. Problem identification and reporting is strongly encouraged and reinforced at all levels in the organization. Significant events, minor events, low level events, near miss and potential problems are identified and reported, including equipment failure, human performance problems, procedure deficiencies and documentation inconsistencies.

2.1 Reporting procedures

Comments

2.1.1 Operating experience reporting practice is based on the requirements stated in a number of diverse directives (e.g. DI-19, DI-30, DI-55, DI-103, DI-60, etc.) that are of prescriptive nature and have to be followed by the plants. However the development and use of low-level experience review procedures beyond national prescriptions has been implemented at only a few sites. Comprehensive integrated generic guidance has not been provided from the corporate organisation.

2.1.2 There are several ways of reporting (Fast Track Reporting (RER), Safety Significant Event Reporting (DI-19), Industrial Safety Reports, Reporting requesting corporate support (Alert), weekly reports, etc) depending on the nature of the event and on the different requirements for timeliness. Normally all events should be reported into the SAPHIR database for archiving of the information. SAPHIR is a large database, and has many optional fields to enter information about an event. However, it takes some time (after local entry and analysis at the plant) to publish at national level (after approval). So information is often transmitted faster through other information channels.

2.1.3 During a recent divisional Nuclear Inspectorate routine inspection at an NPP, several events were identified that had not been declared as required by the relevant directive. Several NPPs have complained about complexity of declaration criteria (numerous directives) that sometimes cause confusion and possibly lead to inadequate assessment of the event for appropriate declaration. Currently a new directive (DI-100) is being developed to encompass all declaration requirements and this will replace DI-19, DI-30, Radiation Protection events, etc.

2.1.4 If plants do not enter the events into SAPHIR in a timely manner, it can cause inconsistency and incompleteness in the database. CAPE-GRE has to monitor and remind the NPPs to complete the information. There is a Performance Indicator to monitor plant performance on timely reporting.

2.1.5 The notification of an Industrial Safety Event has to be send immediately by the NPP to the Corporate office via a FAX. The data is then placed in the SAPHIR database. However there is no time limit specified officially to complete the report of the event and consequently further analysis, corrective action implementation can be delayed.

Conclusion

There are several Directives that require declarations to be made and reports to corporate prepared by the NPPs following deviation from prescribed conditions. However the number of various directives and other requirements for declaring and collecting information may cause confusion. Proper information may not always be provided by the NPPs to the corporate office (or regulator) as required by the directives. Sometimes this may also cause delay in proceeding with further screening and analysis. This issue is already under consideration within the corporate organisation.

Suggestion

Finalize and implement a user-friendly reporting procedure that groups all reporting and declaration requirements as stated in the current Directives. This procedure should describe all the categories for reporting/declaring. It would be further enhanced if it also encompassed all the reporting criteria at the various different levels and clearly defined timeliness and the sequence of actions to be performed by the initiator at the NPP.

2.2 Reporting low level events and near misses

Comments

2.2.1 The corporate definition of an event - "deviations from the references" does not permit tracking of low level events or potential problems & hazards. Everything that can be corrected within the normal process is not considered as an event. Therefore other inputs are required such as questionnaires for Potential Sensitive Problem Identification (PPS), and corporate Technical Support Department (UTO) outage reports, etc.

2.2.2 Reporting of OE is based on the requirements of several directives such as DI-19, DI-30, DI-55, DI-60 and DI-103 etc. These are of a prescriptive nature and are required to be complied with by the NPPs. However, the reporting and utilisation of other operating experience in addition to national prescriptions has only been significantly developed at a few NPPs.

2.2.3 UTO OE is processed according relevant procedures. The criteria for declaring an Outage Outstanding Event are specified (1 day loss during the outage itself, 0.4 day loss during the starting-up phase). However, events that are not on the critical path at the time they occur and therefore do not affect the duration of the outage are not considered as "Outstanding" since they are out of specified criteria. They are therefore not considered within the OE feedback system.

2.2.4 Some organisations and/or processes utilize other means of collecting OE information. For instance, PPS and hazards are identified by a special group at corporate (and their contacts at the plant) or following a annual inquiry to the Technical Managers of all the NPPs.

Conclusion

The requirements for event reporting are established at the Corporate Organisation and stated in the prescriptive documents that are to be complied with by Plants and other units. This enables the Corporate Organisation to collect operating experience and trend data to identify organisational and technical weaknesses and improve NPPs performance. However, some valuable data and experience is not considered. Thus other databases have been created with distinct input sources. Separate non-integrated databases and information systems disintegrate information and can dilute the overall reporting picture and effectiveness of OE feedback.

Recommendation

The requirements for reporting low-level events and near misses should be clearly stated in the Corporate Organisation operating experience policy. Consequently this policy should be reflected in the Directives and relevant underlying Corporate and plant procedures. Consideration should be given to interfacing the various databases to allow transfer and trending of all information available between the various OE processes.

2.3 Outage OE feedback reporting

Comments

2.3.1 The Outage OE feedback system is managed by UTO. OE reports on "Outstanding" events that occur at NPPs are prepared by UTO in conjunction with the Plant Outage Manager. UTO engineers develop the summary reports remotely by maintaining contacts with Plant Outage Manager by phone and /or E-mail. An Outage OE Sheet (FER) is developed from the summary report. The FER has to be approved by the UTO manager and is then sent to all NPPs for the consideration of Plant Outage Managers. However, further utilization of the FERs at the NPPs is not specified. UTO has limited feedback from the NPPs as to how FER conclusions and Outage Organization OE Sheets (FOR) are utilized.

2.3.2 FERs are recorded in the UTO database. However, there is no feedback established to upgrade outage documentation using FER conclusions as a basis. Approximately 52 FERs are included in the UTO database each year.

Conclusion

The reporting system within UTO has been established with a close relationship with NPP Outage Managers. This enables information to be received in a timely manner and distributed promptly to other sites. However, the information exchange is not comprehensive and this may affect quality of the reports. Also feedback on issues raised in FERs could be enhanced to assure that the information is effectively utilized at the NPPs and integrated into relevant documentation.

Recommendation

The effectiveness of communication between UTO and plant organisations should be evaluated. A feedback system should be established to ensure that corrective actions associated with issues identified in FERs and FORs are being effective. If it is not done both

the plant and operating experience program may miss the opportunities to learn from experience.

2.4 Good Practice: "FER and FOR sheets to improve outages"

The use of event base experience feedback sheets (FER) and organizational experience feedback sheets (FOR) as a tool to improve outages is considered a good practice.
Outage-related operating experience falling within the scope the PEX program includes experience feedback from refueling outages and the sharing of this feedback with the various plants and corporate entities. It supplements DPN corporate experience feedback, which is coordinated by the GRE within CAPE.

Weekly exchanges take place between UTO and CAPE/GRE on the occasion of CID committee meetings.

Outage-related feedback from the PEX program is intended for outage managers, who can use it to compile their risk assessment for the outage schedule, particularly with regard to the critical path.

On the basis of "notable outage events" detected from week, events selected by the CID committee, good organizational practices and summary reports drafted after each outage etc., UTO complies experience feedback sheets: FER (event-base experience feedback) and FOR (organizational experience feedback). These documents are used by outage teams to familiarize themselves with events having a significant impact on the critical path and having occurred during other outages (notion of exchange).

Five months prior to disconnection from the grid, UTO submits these FER and FOR sheets to the outage manager. The outage manager conveys them to plant departments involved in the process, for incorporation into outage risk assessments.

The plant's outage planning committees check that these FER and FOR sheets are taken into consideration and acted upon where necessary.

During outage, implementation of any preventive measures adopted by the outage teams is checked against the schedule.

At the end of outage, the usage of these sheets is discussed at a review meeting attended by representatives of the UTO and the NPP. If other preventive measures have been set in place, UTO adds them to the FER or FOR sheets.

FER and FOR sheets are reviewed by UTO on a monthly basis. Sheets that have been incorporated into new procedure, as well as sheets that have become obsolete, are withdrawn. This is an effective way of preventing an eventual build-up of too many sheets.

3. SCREENING OF REPORT FOR SIGNIFICANCE

The attributes for this area are that operating experience information should be appropriately screened to select and prioritise those items requiring further investigation .The effective utilization of resources depends on appropriate screening of event reports after submission to determine significance of the event and the type of analysis performed. The screening process should consist of the review of the event report by appropriate personnel against specific criteria to determine the significance of the event for impact on plant safety, consequences and ability to learn the lesson. The screening criteria should establish thresholds, consistent with the significance of the event, which determine the depth of analysis or for instance, if only trending should be carried out or a full root cause analysis conducted.

3.1 Screening OE in several separate processes

Comments

3.3.1. Screening of OE information is carried out by several different groups for different purposes. Most of the information available (and utilised) is on event-based OE. This information is entered into the SAPHIR database for archiving purposes. It is not always easy to retrieve the information from the database and to conduct queries or prepare reports. In order to follow-up ongoing processing of information and to communicate this information to relevant staff at the NPPs and corporate offices, an automatic transfer from SAPHIR to Lotus Notes (the Cross Functional Consultation/Corporate Screening Meeting (CID) FIREX-database) is made.

Selection is focused on the detection of generic problems. About 5-6% of SAPHIR archived events are selected for their corporate interest. The selection of events that will have further analysis is mainly done by several engineers within CAPE-GRE, based on their experience and knowledge. This selection is approved during a weekly CID screening meeting were all interested parties involved are represented. All responsible engineers and personnel at the NPPs have access to this information.

3.1.2 For Outage related OE, FER and FOR reports are prepared from selected Outstanding Event facts (from the refuelling outage reports). These outage related events are grouped and coded so that the information can be utilised to improve future outage performance. There are 52 FERs and 16 FORs grouped into 40 and seven topics respectively. Nominated engineers (11 in total) are responsible for these areas (groups). However there is no screening of these events in SAPHIR.

3.1.3 The Human Factors group considers events selected for FIREX and from the CID meeting report. As a consequence, their conclusions and trending are based on this subset of information since they do not screen the other events in the SAPHIR database. To complement or validate their data, they also have contacts with local Human Factor coordinators at the NPPs who send them relevant local analysis reports with human factor relevance. This information is kept in a human factors database for internal use by the group. (In the future this will be integrated in CID).

3.1.4 Potential problems and hazards are categorized and a decision for further treatment made at the Survey and Anticipation Committee of Senior Executive Advisors (CVA/DEM) before starting further analysis (by Corporate Analysis (AnP), Corporate Engineering Project (AI), Corporate Project (AP)). Follow up is done in separate

databases (Lotus Notes). The CAPE Performance and Monitoring Group (CAPE-GVP) processes potentially sensitive problems (PPS) to predict eventual failures at NPPs, however they only use data received directly from the NPPs or the engineering groups. They do not utilize Event-based OE information or trend information from the SAPHIR database.

3.1.5 There are interconnections between the various OE processes through participation at meetings and the sharing of the reports.

Conclusion

Selection of events, other than Safety Significant Event (ESS) reports, for further treatment by the CID are based on the experience and judgment of a group of engineers within CAPE-GRE. This results in the selection of mainly technical problems that can be solved within the different engineering groups. This is in opposition to international practice that shows that 70-80 % of events have human performance related causes. ESS analysis shows that this expected percentage is present.

Some of the processes are separated from the "main" or event-based OE process (except for the events declarable under the DIs). The consequence of this is that other sources of information are required for these processes in order to achieve their objectives. Separate databases have also been established to manage their information that is not easily available to others outside the group.

Recommendation

The opportunity for integration should be considered whenever upgrading existing tools to ensure that interfaces are compatible for allowing sharing of information and data between the various OE systems.

Suggestion

Consideration should be given to utilizing the considerable amount of data and information on the SAPHIR database for trending of common causes etc.

3.2 Timeliness of the screening events process

Comments

3.2.1 When an event occurs and is selected by CAPE-GRE, a FIREX is created and considered by the CID. In the majority of cases (except when really urgent) screening and discussion about the events at CID is conducted after the analysis report from the plant is received (after two or more months). The average time to process an event (FIREX) between opening and closure in the CID is 100 days but some remain open for more than a year. Currently there are 550 FIREX in process.

3.2.2 For important events, other, more responsive arrangements to process the event information are utilized. (RER-analysis).

Conclusion

Following detection of a problem after an event at a NPP, it can take some time before a decision is made about further treatment and analysis beyond that conducted by the NPP. This can delay the agreement and execution of corrective actions.

The time between detection of a problem, or the occurrence of an event, and the final execution of the corrective actions should be short and in correspond to the importance of the event, in order to avoid recurrence.

Recommendation:

A set of indicators and challenging objectives should be established and monitored to assist in achieving reduced time between occurrence of an event and the commencement of further analysis. These indicators and objectives should be accordance to the importance of the event.

Suggestion

Consideration should be given to enhance the timeliness of the process by effectively implementing the different stages associated with the proper treatment of events.

3.3 Usage of the available information

Comments

3.3.1 From the large number of events that are reported into SAPHIR, only 6% are actually visible and utilized by relevant personnel at the corporate level. This makes it difficult to detect recurrence or identify emergent problem areas. The collective memory of all personnel participating in the CID can create a new topic in which to investigate recurrence. In that case, SAPHIR and periodical reports are used to find the necessary information.

3.3.2 The SAPHIR database is designed for archiving information on events. A lot of additional information (and codes) has to be entered. The majority of the information is technical and details the event and the consequences. Some fields give a description of the causes (e.g. material or human factor) but as this is a very large database, it is not easy to use this information for further treatment and analysis.

Conclusion

In the CID database there are 30-40 types of events monitored for recurrence. These are chosen by CID when there is a common feeling that some events (not significant enough when considered individually) are recurring. Following identification of possible recurring

problems there is a review of the CID database. However, there is no systematic approach to detect recurrent problems from the database and, once a recurrence problem has been identified, there is no systematic looking-back for past events.

As a consequence SAPHIR is only occasionally used for trending or common cause analysis (e.g. in the human factor area).

Suggestion

Make relevant personnel aware of the amount of valuable information that is available and how it can be utilized for different purposes. This should be relevant to those working in the various departments and groups in addition to those at the NPPs,

3.4 Good practice: "Survey for technical challenges"

Once a year, DPN Senior Management asks NPP engineering structures to notify corporate engineering units of any technical problems that could be hazardous to the power plants in the medium or long term.

On average 200 hazards have been raised each year since the year 2000. Each hazard is analysed by the corporate engineering units, with a view to establishing whether the hazard is:

- genuine but is not addressed at corporate level,
- a problem currently being addressed,
- a problem that has been resolved.

Once each hazard has been analysed it is returned to all power plants with the name of the corporate contact person assigned to the problem in question, the existing or future type of follow-up, as well as a summary of all hazards (type of equipment, challenges, etc.).

The purpose to this exercise is to:

- encourage power plants to adopt a proactive approach towards potential problems by urging them to consider future difficulties and by notifying them of potential problems raised by other plants.
- Create a link between plant engineering structures and corporate engineering units, by providing the names of relevant plant and corporate contact persons for each hazard,
- Ensure that corporate engineering units are adequately addressing issues raised by the power plants, and take the necessary corrective actions if this is not the case (initiate different type of follow-up, modify scope of case file, etc.).

4. INVESTIGATION/ANALYSIS PROCESS

Attributes for this area are that investigation and analysis of an event report allows for determination of the causes of an event. From this information, corrective actions can be initiated to equipment, human performance and processes to preclude further occurrence. An investigation is performed of the event to gather all relevant information. Events with high significance /safety impact utilizes a formal root cause analysis process. Personnel performing the analysis are trained in the process used and their proficiency monitored. The analysis is reviewed by management to ensure concurrence.

4.1 Analysis at NPPs versus Corporate analysis

Comments

4.1.1 First level analysis and investigation is performed at the NPPs. Different technical specialists as well as the local Human Factors consultant may contribute to this first analysis.
The CID checks the quality of these local analyses (including Human Factor aspects) and provides feedback to the NPPs.
At corporate level it may be decided to conduct a second level analysis to detect and deal with potential generic problems or threats to the fleet.
At the CID meeting it is decided which of the different possibilities for further treatment or analysis is appropriate, based on the nature of the problem and the available experience.
Once the further analysis or treatment is decided, the FIREX is considered closed. As there is no dedicated follow-up to the chosen treatment, it is difficult to track and overview ongoing analysis and actions.

4.1.2 Analysis of problems that can affect several plants (AnP, AI, AP, R&D studies, PPS, hazards, etc.) is coordinated by corporate committees (Corporate Feedback Committee (CARP), Operational Technical Review Committee (CTE), etc). In several cases an ad-hoc (project) group is established to conduct further analysis and propose solutions. Follow up is carried out through the Documentary Reference Database (GTP) database in Lotus Notes. Identified potential future or long term problems are also tracked by CARP.

Conclusion

Before starting a further analysis, there are several intermediate steps that have to be taken. As this can take a lot of time, it can cause a problem when additional information is identified as necessary. This is especially relevant when human factors are involved, when information has to be collected from peoples' memory or when more analysis has to be conducted following a quality check by the CID.

Suggestion

During the initial investigation, extensive information and records should be retained to ensure that any secondary analysis is as comprehensive as possible. This is especially relevant for events involving human performance as contributing factors.

4.2 Guidance and training in event and human factor analysis techniques

Comments

4.2.1 The Human Factor group at the corporate office perform second line analysis especially regarding the areas for improvement that have been identified by the Operational Safety Review Committee (CSNE). As the existing tool SACRE is not adapted to support this, a new tool is being developed (integrated) into the CID database to provide new coding and enhance reporting.

4.2.2 In addition to the input from the event reports, other information from CID together with specialized literature on the subject can be combined.

4.2.3 Note: The decision for the Human Factor areas for improvement to be investigated are decided within the CSNE. Once the second line analysis report is available, NPPs are required to take action, which is followed up by the local quality and safety organizations. A local Human Factors network is to be established at the NPPs to enhance this process.

4.2.4 To conduct an effective second line human factors analysis, additional input is required. The Quality of the Analysis of Significant Event Reports (CRESS) is insufficient and therefore Low Level Event reporting is required to allow better analysis of human factors issues. A working group with some pilot NPPs has been established by the CAPE Human Factors group and is exchanging good practices on how this may be achieved.

4.2.5 The OE analysis guide dates from 1998. Since then, worldwide, analysis tools (e.g. on human factors) have become more developed and in initial training for personnel involved in analysis more emphasis is placed on human factors analysis. There is no up-to-date training available in this area. Without adequate training in up-to date analysis methods the CID will continue to find reports of insufficient quality.

4.2.6 For several outage related events there is a compilation of all available information (from their own UTO database), and lessons learned are defined. If necessary other organisations or the NPPs assist in finding solutions.

FERs and FORs are created from selected event information (in each refuelling outage report). These outage related events are grouped and coded so that they can be used as lessons learned for future outages. These reports do not contain a comprehensive root cause analysis and consist of a compilation of information and conclusions based on engineering judgement.

4.2.7 The information gathered by the declaration requirements of DI-103 allows the creation of high quality reports that are meeting the expectations of the Plant Operations Maintenance Branch (UNIPE- BEM). However, the results of the analyses are generally based on statistics rather than the causes of recurrent events. The results are utilized as input for PSA studies and the optimisation of Reliability Centred Maintained (RCM). Currently there is a proposal to utilize this information for the analysis of recurrent issues in CID.

Conclusion

Except from the quality check performed on the individual ESS reports, second level, or in depth human factor analysis is oriented towards trend analysis and less on event analysis. Sometimes human factor analysis can be part of an AnP, in other cases a further analysis is performed when indications make it obvious that there is a problem. The first and most important analysis to determine the causes (including human factors) is conducted at the NPPs. However, the reference documents used to do this analysis do not reflect the importance of root cause analysis and human factor analysis.

If there are indications that at certain NPPs there is a problem in the adequate quality of analysis, there should be a clear signal so that corrective actions are taken in order to improve.

For other OE processes within departments or groups, the main activity is the collection, grouping of information and looking at trends, instead of doing analysis of the problem.

Recommendation:

Improve the quality of the root-cause analysis performed at the different levels. Consider the application of enhanced methodologies and dedicated event analysis techniques such as root-cause analysis, change analysis and barrier analysis, etc.

Suggestion

Introduce the updated OE event analysis guide and promote the use of the corresponding techniques through a comprehensive training programme.

5. EXTERNAL OPERATING REVIEW

The attributes for this area are that the use of external operating experience allows the NPP to learn from the experience of other NPP and implement corrective actions to preclude similar events from occurring at their NPP. The OE process provides for the collection of significant external OE for review. Personnel qualified to determine applicability to the NPP performs the review. Appropriate corrective actions are initiated to preclude occurrence of a similar event at the NPP.

5.1 External international Operating review

Comments

5.1.1 A considerable number of sources are available from which to obtain external operating experience (e.g. WANO, INPO, IAEA, NRC, FROG, WOG, etc) however external OE information is primarily obtained from the WANO database. There is no dedicated group to manage the process of screening of external OE. Also there are not many external events that are selected for screening by CID (19 in 2000 and decreasing) . As a consequence some departments act on their own initiative to pursue and screen external and international events for significance and applicability.

5.1.2 Senior management supports the use of external OE and accept the process. However specific criteria have not established to select and screen external OE.

5.1.3 The CAPE GVP Group has been created to process potentially sensitive problems (PPS). It operates effectively to predict potential failures at NPPs. However, it uses only data received directly from the NPPs or the engineering groups. External OE is not considered.

5.1.4 The Human Performance department takes information from outside of the company from conventional sources to apply it to the nuclear industry. However, WANO information is not used significantly.

5.1.5 External event information that has been reviewed but not considered useful is not available for future reference purposes by the corporate units or NPPs.There is no reference to what external information has been reviewed, why it was not considered useful and why it was rejected.

Conclusion

The external operating experience feedback process is considered as a corporate level activity. NPPs receive the information from the Corporate in the form of FIREX in addition to the original WANO papers. NNPs are encouraged to utilize external OE, however, little attention is paid to learning the potential lessons available from worldwide experience.

The selection and screening activities are performed at the corporate level according to established procedures. However the criteria for selection and screening are not specified clearly. The justification of the decision to reject events is infrequently recorded. The numbers of selected and screened events are decreasing from year to year. Further attention could be applied to this potential improvement area.

Recommendation :

Encourage the consideration and utilization of external operating experience at all sites by providing additional guidance to the screening process to ensure potential significant lessons learned are disseminated effectively.

6. TREND AND TRENDING REVIEW

The attributes for this area are that trending of wide range of recorded events, in addition to detailed analysis of significant events, allows to recognize developing generic, emergent problems or to identify precursors for significant events. By recognizing developing problems, proactive action may be taken to restore positive trends.

Typically, it should be possible to trend equipment, human performance and process (system or procedures) problems. In order to do this effectively, coding (typology) of events can be adopted. This allows plant, component type, root causes, event, action significance, priority, reporting criteria (threshold) etc. to be recorded and easily sorted. Comprehensive reviews of trends and application of proactive corrective action can then be taken to reverse adverse trends or to enhance/support positive trends.

When this process complements the process of detailed and comprehensive analysis of significant safety related events it is recognized as best international practice.

6.1 Trending

Comments

6.1.1 DI-55 "Processing of deviations pertaining to quality-controlled or safety related equipment or activities" requires root cause analysis for all events that comply with the criteria of the directive. From this group of events, the Safety Related Events (EIS) are identified by using the criteria of DI-30 and Safety Significant Events (ESS, reportable events to regulatory body) are identified by using DI-19 criteria. There are about 450 ESS events and 10,000 EIS events identified within the total of 14,000 records reported annually to the SAPHIR database. All known data and necessary information for trending of safety related events and other events identified in the areas such as radiation protection, environment, etc. are recorded in SAPHIR database.

6.1.2 The EDF Directive DI-103 "Trending of important equipment used on PWR plant" requires the collection and use of data related to failures of safety–related equipment, equipment important for plant availability and maintenance cost control. The UNIPE Plant Operations Maintenance Branch (UNIPE-BEM) group reviews all relevant data included in the SAPHIR database at corporate level. However, the output of this review is only utilized for updating data for Probabilistic Safety Analysis (PSA) and Reliability-based Maintenance Optimization. Recently, in a few specific cases, this data has been used for the analysis of OE trends and it is intended to use it systematically in the near future. However, currently this data is not used adequately to identify reoccurring events or generic technical problems, etc.

6.1.3 The CAPE Safety Management Group (CAPE-GMS) group conducts regular annual trending of events from the human performance aspect. The coding (typology) currently used for this purpose is appropriate, but has not been standardized throughout all of the EDF NPPs and the corporate groups. The coding will be modified to address current needs in the very near future. After this update it will become also the standard coding for all EDF NPPs. However, only the group of significant safety related events (ESS) is trended to identify generic issues throughout the corporate organisation.

6.1.4 Trending analysis of data included in OE Annual Reports and the SAPHIR database is conducted by the "function engineers" (system engineers) of the CAPE-GVP group. The triennial report for each function (group of systems) includes recommendations for corrective actions, which have to be approved by DPN. This report also tracks the implementation of corrective actions approved in previous years and evaluates their effectiveness by trending analysis.

6.1.5 The UTO department is responsible for Outage management at the corporate level. They also manage the OE information directly effecting the planning or scheduling of all fleet unit outages. The department does its own trending using a database called the "Capitalization Database".

Conclusion

The EDF corporate OE program uses a very limited amount of available information included in SAPHIR database for trending purposes, in order to identify reoccurring events, common technical or other emergent generic problems.

Various groups do their own trending of OE information related to their specific interests provided from different sources (SAPHIR, Capitalization database, etc.). However, at the working level of the corporate organization, it is difficult to identify who has the overall overview of trends in the OE process.

Recommendation

The EDF corporate should lower the threshold for significance of events that are used for trending of human performance to better identify reoccurring, generic and/or emergent issues.

Suggestion

Although the trending of technical issues is carried-out currently according to DI-103, the corporate organisation should consider how the information could be utilized more beneficially for the purpose of identification of reoccurring events, common technical or other emergent generic problems.

Although efforts have been made to integrate coding systems for trending of human factors and technical issues, the corporate organisation should consider further improvements to allow an overview of the major generic challenges.

6.2 Precursors

Comments

6.2.1 The CAPE Safety Group (CAPE-GSN) reviews all identified safety related events in order to classify them in groups of noteworthy events from M1 to M10. The group M10 represents "precursors" to severe accidents where the possibility of melting the core is challenged. These precursors are events which resulted in a situation in which the Probabilistic Safety Analysis (PSA) shows a Core Damage Frequency (CDF) exceeding the level of above 10^{-6}. However, the M10 group of events are already noteworthy safety related events which comply with DI-30 criteria.

6.2.2 Generally in the nuclear industry the "precursor event" is expanded to near-miss or

low level events, which provides information and insight in determining advance warnings or the increased probability for a significant event. Significant events, low-level events and near-misses all share something in common, latent weaknesses that can result in failed barriers and many share common root causes. All these events differ only in their resulting consequences. That is why the near-miss or low level events can be considered precursors to more significant events.

Conclusions

Whereas the precursor concept is applied in EDF to severe accidents where the possibility of melting the core is challenged, the industry best practice has expanded this concept to advance warnings obtained from near miss and low level events.

Suggestion

EDF should consider expanding the understanding (definition) and proper treatment of "precursor events" according to the best international practices.

7. CORRECTIVE ACTIONS MANAGEMENT PROGRAMME

The attributes of this area are that investigation activities (event investigation, trending, external OE, etc.) result in the placement of corrective actions to correct root causes and prevent repeat events. The aim of improving safety and availability of the NPPs, which is the core mission statement of any operational experience feedback programme, requires that the actions derived from the analyses of operating experience are implemented in a timely manner.

To achieve this goal, international best practices show the convenience of setting, within the scope of the operating experience feedback programme, an action management system that includes:

a) Tracking - a system which allows actions, target dates and those responsible for completion to be recorded. This tracking system should be capable of generating reports, status of actions, completed actions, overdue actions, actions by department, type, origin, etc.
b) Accountability Review - methods for the management review of in-process or overdue actions such that any difficulty with the timely closing of an action can be resolved.
c) Effectiveness Assessment - methods for assessing how effective have completed actions were in preventing recurrence of events.

7.1 Overall tracking of corporate corrective actions

Comments

7.1.1 Generally the corrective actions on events are developed and implemented at NPP level. However, the corporate CAPE-GRE group conducts a review of NPP reports. As a result, for selected events, FIREX reports (that include the description of the event, analysis, corrective actions taken at NPP level, and can include additional analysis and additional corrective actions developed by the corporate organization) are approved by CID and provided to all NPPs. Selected FIREX reports are submitted to CARP for further processing.

The decision of CID implies an approval for the implementation of the actions on the affected NPP, which are not prescriptive for other NPPs. According to EDF policy, it is the responsibility of the NPPs to evaluate the applicability and use of these recommended actions at their own site. However, no corporate group maintains an overall tracking system (systematic information system) of these recommended corrective actions approved at the corporate level. In case of problems or misunderstanding, the NPPs provide some feedback to corporate organization on the use of FIREX reports, however, there is no systematic feedback to the corporate organization on the usage of proposed actions and recommendations and whether they are implemented at NPPs or not.

7.1.2 For significant safety issues the CARP decides the need of a corporate analysis, called Analysis Parc (AnP). Further developed corrective actions as a result of this additional analysis, once approved by CARP or the Operational Technical Review Committee (CTE), are obligatory for the NPPs to implement. Implementation is managed either directly by the NPP or by an assigned corporate group. Corrective actions are tracked by the different assigned groups that are responsible for their implementation.

However, no corporate group has an overall view (systematic information system) of the prescriptive corrective actions decided at the corporate level, together with their implementation progress towards completion.

Some of the prescriptive actions are in the form of "Immediate or Temporary Specific Requests" (DP or DT forms). In these cases, the DP or DT reference number is included in the text of the corresponding OE Reports (FIREX).

7.1.3 There is an independent process for the analysis of "Technical Challenges". The input is from an annual survey requested of the NPP Technical Managers, and also from the PPS identified through continued surveillance. Once a problem has been addressed in a "resolution framework", it is sent to the concerned Unit. The process is considered as a Good Practice by the PROSPER team, however, again there is no systematic corporate tracking of the actions derived from the programme.

7.1.4 CAPE-GMS may suggest corrective actions to CSNE, based on their review of events related to human performance. Once there is a decision by senior management of DPN to implement these corrective actions, the plants are requested to do so by a CSNE or specific DPN letter. However, CAPE-GMS does not track the implementation of these corrective actions.

7.1.5 The PROSPER team observed the ability to track the actions backwards, departing from the specific treatment of them (design modification, procedure modification, temporary instruction, etc.) The following was noted:

- Design modifications, developed at corporate level, that originate from OE corporate reports (FIREX or AnP) do not systematically include reference to the OE report. This makes it difficult to track them and to see how many modifications are implemented as a result of the OE feedback process.
- The "Specific Requests" (DP and DT) are controlled within a specific Database that does not include the reference of the corresponding OE Report(s). This makes it difficult to track them backward to the original reason for developing the action.

Conclusion

At the EDF corporate level, there is no systematic overall tracking system to facilitate easy tracking, accountability review, timeliness and effectiveness assessment of the actions derived from the corporate analyses of Operating Experience. Even though the responsibilities in each sub-process are shown to be well defined, there is a weakness in the information available at the corporate level to monitor the timelines and effectiveness of the OE process in the area of corrective actions.

The number of organisations involved in the corrective action process adds uncertainty due to the interfaces between them. Therefore, it is necessary for an owner of the OE process to have a tool to evaluate weaknesses in the area of implementation of corrective actions that should include feedback.

Recommendation:

In order to ensure the effectiveness of the corrective action programme, an overall tracking system of prescriptive corporate corrective actions should be established. This system should include tracking, accountability review and timeliness of the actions at the corporate level and feedback on the effectiveness of the actions from the plant level.

7.2 Good practice: "Pilot-plant concept for testing modifications prior to implementation in the fleet. "

Before being implemented on all the fleet, the modification has to be pilot-tested on one unit. Gathering experience feedback about these modification is a great part of the corporate modification process.

Pilot-plant test is used to check:
- The content of the implementation file
- Upgrading of documentation
- Respect of targets and stakes
- Human factors, guidance, training,…

The pilot unit collect all these information and Implementation leader (UNIPE) use them to provide an operating experience feedback report. The OE report includes: accordance with the orders, integration of new objectives, cost and implementation program.

Experience feedback of implementation assess different areas such as Scheduling, General services, Dosimetry, Specific tools waste, and Environment.
Final decision to implement on all the fleet is based on OE reports. In case of difficulties, Implementation leader reports to Strategic leader.
Implementation leader draws up an annual assessment report of implementation on pilot units.

8. IMMEDIATE REVIEW OF EVENTS WITH SIGNIFICANT PLANT IMPACT

The purpose of the immediate review of significant challenges to power plant operations (reactor trip, safety system actuation, fuel handling event, etc.) is to ensure that all conditions are reviewed and acknowledged prior to changes in plant status or restart of an operation to preclude recurrence of the event. Determination is made of time frame for the implementation of corrective actions, e.g. prior to re-start or after re-start. This will allow the NPP to correct deficiencies that have immediate effect on safe operation. Management should ensure that all required actions have been completed prior to re-start of the reactor or re-start of the operation.

8.1 Immediate response at the corporate level

Comments

8.1.1 The PROSPER team noted that there is an on-call duty engineer at EDF corporate office ready to provide assistance to the NPPs in the immediate review of significant events. This service is available during normal working days (business hours) This process, called "permanency", has an objective of coordinating the efforts of corporate support to NPP requests when standard procedures prevent to reach the solution being achieved in a timely manner.

8.1.2 The process is described in EDF corporate documentation. Twelve engineers from the CAPE-GAP and CAPE-GRE groups are involved in on-call duty roster on weekly rotation basis. The roles and responsibilities of on-call duty engineers and the other specialists in the ad-hoc build-up team are sufficiently clear and understood. The on-call duty engineers are adequately qualified and trained. Corrective actions including the immediate short-time corrective actions developed and agreed during the activation are incorporated in standard OE processes.

Conclusions

The process used for the immediate review of events with significant plant impact at the EDF corporate level is adequate.

Recommendations

None

8.2 Good Practice: "The DPN Engineering On-Call Unit"

When a difficult situation cannot be dealt with within the framework of the usual agencies (CID, Engineering and Specialities' Network…), because it requires multi-skilled resources and short reaction times, the executive management of an NPP or of DPN can call upon the Engineering On-Call Unit (using the dedicated phone line).

The DPN's Engineering On-Call Unit is a cross-cutting arrangement, set up by the corporate organisation in order to assist an NPP in the solving of a problem which is degrading or liable to degrade performances (nuclear safety, availability, etc). This set-up is available during business hours and is built around an operational facilitator (a CAPE engineer) with the support and under the supervision of the DPN Executive Management (in the person of the Engineering Senior Executive Advisor or his deputy).

In practice, after identifying the problem and what is at stake, the on-call engineer calls upon the necessary skills within the fleet's engineering departments (CAPE, UTO, UNIPE, GDL, NPPs, DIN, DC, DRD, etc) and if necessary the vendors. The on-call engineer is also the team facilitator until the Engineering On-Call Unit's activities are stood down.

9. UTILIZATION AND DISSEMINATION OF OPERATIONAL EXPERIENCE INFORMATION

In a learning organization, individuals at all levels of the organisation use the operating experience to resolve current problems. It is important that experiences are shared and timely communicated to the personnel most likely to be involved in a recurrence of problems. In addition relevant operating experience is disseminated to nuclear industry for improving safety and reliability of nuclear installations through the sharing of lessons learned.

9.1 Using the Alerts

Comments

ALERTs is a tool for NPP management to directly and weekly inform the corporate management of technical, organisational or other difficulties at the plant level that do not necessarily require formal declaration under the prescribed criteria. DPN Senior Management examines the Alerts on a weekly basis. The events based Alerts are passed to CAPE-GRE for preparation and processing at CID meeting. The CID meeting minutes (CR-CID) are forwarded to other EDF sites.

Since the process started three years ago, there has been a continuously increasing number of ALERTs related to plant events, while the number of significant safety related events (ESS, DI-19) is stable. The number of corporate analyses (AnPs), which resulted from standard OE process is relatively low in comparison with number of corporate analyses resulted from ALERTs or other corporate decisions.

Conclusion

There is an increasing tendency to bypass the standard OE process by using the alerts. It may indicate that the normal way of proceeding OE information is not comfortable for the plants to use.

Suggestion

EDF should consider conducting an analysis to determinate if the guidance and implementation of the use of the ALERT communication chain is always appropriate.

9.2 Dissemination of EDF information to nuclear industry

Comment

The CAPE International Activities Group (CAPE-GAI) is responsible for reporting of internal EDF events into the WANO database. Although some improvements have been made recently, the number of reported events is not appropriate for the number of EDF plants (19 operational sites with 58 reactor units) and the number of events that occur in such a large fleet.

Suggestion

EDF should continue in improvements in reporting internal EDF events to the international nuclear industry.

9.3 Good Practice: "Reporting good practices from peer review missions"

All DPN Staff returning from international missions as Peer Reviews are required to report two good practices examples (1 page description) . These are then processed to CAPE-GAI for checking and dissemination.
An annual Peer Review Good Practices report is published and shared with NPP's International Delegates.

9.4 Good Practice: "Dissemination of OE through publications"

DPN corporate organize OE information dissemination through publication and intranet.
Different products answering expectation of wide range readers are available. It provide general information on events occurred as well on EDF plants as external NPP's events. Most of these publications are managed by an editorial committee:
- "C'est arrive dans les centrales" (quarterly) and "la lettre du REX en chimie et radiochimie" (half-yearly) highlight technical events and nuclear operating issues.
- "OUF" (quarterly comics strip) dedicated to aware staff on industrial safety. This leaflets reports near misses occurred on NPPs. Events, root causes analysis and correctives actions are set out.
- "Les Faits Marquants de la DPN" (weekly technical information) is widely disseminated. It's stake is to provide, a good understanding, also to non technical staff, of current domestic NPP's events and major external events occurred. Selected topics take into account their teaching aspect to focus on a generic problem or difficult potentially issue.

10. MONITORING AND ASSESSMENT OF EFFECTIVENESS

The attributes of this area are that operational experience monitoring is a review of the effectiveness of the OE process to enhance operational safety, including all the mechanisms necessary to facilitate continuous improvement of the OE process. Indicators are used to monitor the safety performance of the plant as well as the effectiveness of the OE process. The trends of indicators are evaluated during self-assessment.

To provide for on-going OE process optimisation such self-assessments should be performed regularly (e.g. on an annual basis) by the operational experience review organization. These self assessments are carried out through the monitoring of activities and evaluation of performance indicators. The monitoring and self-assessment allows those responsible for the OE process to take timely actions to improve activities and organizational interfaces as necessary.

10.1 Enhancement of the effectiveness of the Global Process

Comments

10.1.1 A comprehensive process self-assessment should be a structured, objective and visible process or set of processes whereby individuals, groups and managers within an operating organisation evaluate the effectiveness of their own operational activities against predetermined targets, goals and other performance expectations.

10.1.2 The advantages of a critical self assessment can be considered to be:

- Identification of problems in the process before they become significant
- Finding ways to improve the process (quality and economy of work at the most relevant organisational level).
- Minimisation of unnecessary actions.
- Creation of a better awareness of the reasons why things are done the way they are done.

10.1.3 A study of the overall OE process was conducted by Nuclear Inspectorate as part of the preparation of the PROSPER mission. This study could be considered as a DPN Self Assessment since it was conducted by one of the internal departments (Nuclear Inspectorate), however, since the assessment was not conducted by personnel actively involved in the process it is an evaluation that highlights problem areas and makes recommendations to eliminate them. While the assessment was comprehensive in nature and identified several issues that have also been recognised by the PROSPER Team, the assessment was mainly effectiveness based in that it evaluated if items, processes, activities, etc. met requirements and resulted in the expectation being achieved. Additional focus could have been placed on the opportunities to identify areas where better practices could be beneficial.

10.1.4 For instance, there are three indicators regarding the reporting of events into the corporate process from the plants: timeliness of submitting the initial analysis report, number of reports submitted per unit and quality of submitted report. By integrating these indicators it can be seen that at least one plant submits fewer reports, takes longer to present the initial analysis report and also has a lower quality of report. No

corporate action from within the operating experience central organisation had been considered necessary to establish if there is a problem at this site. Subsequently during a routine inspection, the Division's Nuclear Inspectorate identified that the plant had not reported several significant events into the corporate system as required by the declaration criteria.

Conclusion

PIs associated with Operating Experience are not always fully utilised to question anomalies in performance within the process, this maybe be partly due to the complex nature of the various Operating Experience activities, the non-standardisation of the processes and the lack of an identified 'owner' of the overall process.

Recommendation

Conduct a survey of the appropriateness of the PI's associated with the Operating Experience process. Consider how the PI's can be utilised to prevent early detection of degraded performance or good practice for replication.

APPENDIX

OPERATING EXPERIENCE PROCESS

ANALYSIS OF 16 OE EDF PROCESSES

OPERATING EXPERIENCE (OE) PROCESS

16 PROCESS – OPERATING EXPERIENCE EDF

1. Event based OE process
2. Corporate Analysis (AnP)
3. Fast Track OE Reporting (RER)
4. Potential Sensible Problems (PPS)
5. Process Indicators Program
6. Good Practices
7. Technical Challenges
8. Safety Analysis of Events
9. Human Performance Analysis
10. Risk Prevention OE
11. Alerts
12. Reliability / Availability OE (DI-103)
13. Modifications OE
14. Fuel OE
15. Outage OE
16. Committees and Executive Meetings

P.1 EVENT BASED OE PROCESS

Purpose
Basic mainstream process for the treatment of OE information.

Process Management procedure
Chapter 7 of QA Manual, but not developed into a top-level procedure.

Owner
CAPE-GRE

Tools
SAPHIR database and CID meetings.
FIREX

Timeframe
Meetings once a week (Thursday).

Numbers
800 - 900 events selected from 14000 events declared per year for the total fleet of 58 units (20 sites).

Weaknesses
- Difficulty of use of SAPHIR database by the sites (due to complexity, unfriendliness and training needs).
- Number of entries to SAPHIR varies very much from one site to another.
- Requirements criteria for reporting are not always clearly understood.
- Although the average (37 days) in the timeliness for the treatment of information fulfil well the established goal (60 days), certain number of events have their analysis. completed (80 days) outside the specified deadline.
- Complexity of the management of the overall process from start to finish.

Strengths
- Tool used to support the CID meetings.
- Involvement and interactions with the plants (OE meetings, assigned liaison engineers from CAPE-GRE).

Suggestions
- Assess the adequacy of SAPHIR database to fulfil user requirements.

P.2 CORPORATE ANALYSIS (ANP)

Purpose
To extent the Local Analysis (AnL) for the events of significance to the fleet.

Process Management procedure
Procedure D4008.27.11 MGY/GRE/03-131.

Owner
Délégué d'Etat Major Affaires et Ingénierie (Engineering Safety Executive Advisor)
Decision to initiate: CARP.

Tools
GTP database (Gestion Technique du Parc).

Timeframe
Milestone to be completed in : <10 months.

Numbers
20 to 30 corporate analysis per year.

Weaknesses
- Establishing a follow-up process to monitor the effectiveness of the corrective actions.

Strengths
- AnP and AnL may be done simultaneously for events requiring a fast response.
- One pilot person per AnP.
- Closing of AnP by CARP when corrective actions are implemented.

Suggestions
- Consider establishing a follow-up process to monitor the effectiveness of the corrective actions.

P.3 FAST TRACK OE REPORTING (RER)

Purpose
To make a fact known to other sites rapidly.

Process Management procedure
Rapid OE Utilisation Guide.

Owner
Each NPP manager for the decision to communicate and the content of the communication
CAPE for coordination of the process.

Tools
N/A

Timeframe
N/A

Numbers
52 RER in 2002, 28 RER in 2001.
Significance is increasing: 50% were ESS type in 2002, 25% in 2001.

Weaknesses
- Not identified.

Strengths
- Considered strong tool for communicating OE between sites for significant events
- The process advantages and usefulness have been confirmed (to be used in addition to the classical OE circuit).
- Circuits of communication and treatment have been clarified.

Suggestions
- N/A

P.4 POTENTIAL SENSIBLE PROBLEMS (PPS)

Purpose
Anticipative approach to predict potential problems

Process Management procedure
Décision Commune DIS DPN 00/05/09-06-2000

Owner
Each Division
Inside DPN is CAPE-GVP
Directeur Délégué Technique (Deputy Technical Director)

Tools
Analysis sheets by each division of problems predicted
PPS monitoring table
Questionnaire
PPS Data base

Timeframe

Numbers
40 to 50 per year

Weaknesses
- Lack of feedback loop on the effectiveness in practice of the decision taken through this process.
- Integration and exchanges of the system in the overall OE process

Strengths
- Effective to collect/predict potential problems
- Allows for proactive support in determining the estimated potential consequences/impact on nuclear safety and reliability
- Indicators of backlog process ratio, timeliness and reinvestigation are follow up to assess the effectiveness of the process

Suggestions
- Reinforce the procedure by including a feedback loop on the effectiveness in practice of the decision taken through this process.
- Consider expanding the concept on events precursors and error likely situations (refer to INPO human performance foundation course and the applicable IAEA TEC-DOCs)

P.5 PROCESS INDICATORS PROGRAM

Purpose
To monitor the management and performance of the.Fleet operating experience

Process Management procedure
Procedure for structuring scope of a summary report and setting goals and objectives.

Owner
CAPE

Tools
Performance indicators
Process indicators

Timeframe
Yearly and quarterly

Numbers

Weaknesses
- The performance and process indicator is not always complemented by setting quantitative goals in the different areas of the OE program.

Strengths
- Well-structured process with is own set of monitoring indicators for measuring timeliness and quality of the reports.
- Satisfaction questionnaire attached to each report to ensure feedback loop.

Suggestions
- Review the process of establishing goals and objectives in order to ensure that important process are always complemented by a set of quantitative measurable goals.
- Review the integrated assessment process of identifying degraded performance through combinations of existing PI'S

P.6 GOOD PRACTICES

Purpose
To identify, collect, distribute Good Practices.

Process Management procedure:
Not developed.

Owner
CAPE

Tools

Timeframe
Continuous process

Numbers

Weaknesses
- A systematic approach is not fully defined. As a result good practices are not always identified
- Except for CAPE, consideration of good practices does not always receive sufficient priority. As a result good practice sheets are not distributed and used in an appropriate timely manner.
- A reward system to enhance the identification and reporting a good practice does not exist.

Strengths
- Management expectations that everybody coming from Peer Review has to report the good practices identified during the review mission.
- Good practices sheet evaluation

Suggestions
- Develop a top-level procedure of this process and establish a systematic approach.
- Consider establishing rewarding system to enhance the identification and reporting of good practices.
- Consider adding into the database the feedback results on the replication of Good Practices.

P.7 TECHNICAL CHALLENGES

Purpose:
To identify medium terms hazard for plant performance.

Process Management procedure:
Procedure D4002 – GVP/2002 - 0056

Owner:
CAPE - GVP

Tools:
List of hazard
Questionnaire

Timeframe
Once a year

Numbers

Weaknesses
- Industrial Safety has not been reported as a hazard in 2002, while the indicator shows low performance and is a long-standing issue.
- Once a year exercise based on a questionnaire. The idea is good but consider to reasonably increase the frequency of the exercise.

Strengths
- The action of identifying technical hazards was deemed of interest and useful by several NPP units.
- Instrument of feedback between site and corporate engineering structure organisation.
- Helps checking that hazards are handle in an appropriate manner by the nuclear engineering team.
- Contribute to the site engineering structure to gradually monitoring and forwarding planned actions to the corporate organisation.
- Bring visibility to what is handle by the corporate engineering structure and enable certain NPP units to better identify their corporate contacts.

Suggestions
- None

Good Practices:
The PROSPER team consider this process a Good Practice

P.8 SAFETY ANALYSIS OF EVENTS

Purpose
To investigate and analyse events to identify the root causes.

Process Management procedure
Safety analysis and investigation guide.

Owner
CAPE – GSN
Plant for on site analysis

Tools
Annual report on plant operational safety
Annual report on the precursors program

Timeframe
N/A

Numbers:

Weaknesses
- Numbers of analysis are reduced to very high significant events reportable to the Regulator (DI-19). International practice is to reasonably extend this analysis to additional significant events.
- Insufficient implementation of systematic H.P analysis methodology.
- High percentage of line-up deficiencies, both in terms of management and field performance (7% in 2002, 4% in 2001). Development of H.P. analysis should contribute to identify underlying issues, and thus to clarify areas for improvement.
- Increase of unplanned automatic Scrams after year 2002 (index from 1.28 to 2.12 in the worst quartile frame) well above the worldwide worst quartile. Major contributor is the N4 fleet and 900 MWe fleet.

Strengths
- Well structured selection criteria for significance from M1 to M10.
- Completing the potential accident scenario identification process through an approach based on PSA techniques.
- Analysis of global effectiveness assessment features, allowing for assessment of evolution of fleet safety through the use of a global Probability Risk Index.

Suggestions
- Consider reasonably expanding the analysis to additional significant events such DI-30.
- Implement a systematic HP methodology such as root cause analysis, change analysis and barrier analysis. Although graphical representation is used for the description of the event, consider enhancing this representation by including direct causes, root causes, contributing causes and barriers, in order to facilitate analysis and verification at different levels of review.
- Verify adequacy and effectiveness of corrective actions for the performance weaknesses identified.

P.9 HUMAN PERFORMANCE ANALYSIS

Purpose
To identify root caused related to human performance weaknesses.

Process Management procedure
Not developed.

Owner:
CAPE - GMS

Tools:
SACRE database
Annual human performance report
CRESS evaluation criteria for the quality of significant operating event reports.

Timeframe
N/A

Numbers

Weaknesses
- Although the H.P. group has been recently created, the structure has not been fully defined and consolidate.
- The application of H.P. analysis has not yet been expanded to lower events than the very significant DI-19.
- Short cuts, breach of rules, lack of rigorous individual actions and communications are the most recurrent root causes identified in the H.P. area.

Strengths
- A group of H.P. has been recently created at corporate for the purpose or coordinating the network of H.P. site resident consultants.
- H.P. expert permanently at each site to analyse and advice on human performance issues.
- Establishing a low level events think tank coordinated by Nogent in 2003.
- Use of CRESS evaluation criteria for the quality of significant events report (6 criteria).

Suggestions
- Enhance, promote and provide visibility to the process of H.P. and organisational factors, lessons learned. Expand the analysis to lower level events than the very significant DI-19. Consider expanding the concept on events precursors, error likely situations, trending of low error events (refer to INPO human performance foundation course and IAEA TEC-DOC on low level events and near miss)

P.10 RISK PREVENTION OE

Purpose
OE feedback process on risk prevention activities in the area of radiation protection (RP) and industrial safety (IS).

Process Management procedure
Not developed

Owner:

Tools:
PRISME Internet system
ARIANE database for IS
Significant IS accident dealt through SAPHIR

Timeframe

Numbers

Weaknesses
- Although it is one of the process identified in the area of OE, the process is not well established and does not have fully in place the attributes and characteristics of an OE feedback loop.
- Performance average in industrial safety is well under the average. 6,43 versus world average of 3,65 for the worst quartile.
- The SAPHIR database has not been used very often in the past. It is planned that a section of SAPHIR will be devoted to R.P., but not yet in place. A testing phase is planned.
- A new directive for R.P. reporting criteria is being produced but not yet in place.

Strengths
- The team consider that the present decision to issue a common directives for all reporting criteria is a movement to the right direction .

Suggestions
- Establish the R.P. process including all the necessary systematic attributes for ensuring effectiveness.

P.11 ALERTS

Purpose
Direct line to inform Senior Management and to have resources available to solve urgent problems.

Process Management procedure:
Not developed

Owner
Directeur Adjoint (Deputy Senior Vice - President)

Tools
Weekly reporting alert (Friday)
Weekly alert meeting (Monday)

Timeframe
Weekly

Numbers:
87 in 2002 / 52 in 2001 (5 from UTO)

Weaknesses
- Increased use of the process may circumvent the normal path due to resources allocation commitment and/or lack of confidence in the normal path to timely solve the problem.

Strengths
- This communication reporting path is consider important because it covers some events that can not always be effectively managed, due to time constraints, through the SAPHIR path.

Suggestions
- None

P.12 RELIABITITY / AVAILABILITY OE (DI-103)

Purpose:
To follow up and improve the reliability and availability of plant equipment.

Process Management procedure:
Directive DI-103

Owner:
UNIPE-BEM pilot coordinator / each plant is the owner of its data.

Tools:
DI-103 database

Timeframe:
N/A

Numbers:
3300 events per year

Weaknesses:
- The process of coupling the type of materials and equipment together with the mode of failure and type of deficiency is facing difficulty in its practical implementation.
- Understanding and use of data entered by site not always clear or easy.
- The result of the analysis performed by UNIPE–BEM related to recurrent events is not always used properly and/or remain unused.

Strengths:
- One DI–103 coordinated at each site
- 100 equipments families, 30 identified as the most sensitive.
- Each plant is considered the owner of its equipment DI–103 data.
- The DI–103 data is included / integrated in the SAPHIR database
- Very comprehensive format

Suggestions:
- Continue the effort to ensure that the quality concept reported by the site is consistent with the definition and well understood.
- Establish interactions with CID to deliver data on recurrent events

P.13 MODIFICATIONS OE

Purpose:
To introduce operating experience lessons learned into the design of modification packages.

Process Management procedure:
Procedure on organisation of OE at UNIPE. D4510 NA BPS EM 03 0517 Recently published (June 2003)

Owner:
UNIPE – BA for coordination of package
UNIPE – BPS for planning and support
UNIPE – BEM for technical specification and modification of other generic plant procedures

Tools:
OEDIPE – GAP database for physical modifications
OEDIPE – DOC database for document modifications
SAPHIR database for event based modifications

Timeframe:
N/A

Numbers:
1300 physical modification packages per year for the all fleet.
1050 modifications to generic documents per year for the all fleet

Weaknesses:
- It is difficult to identify the OE utilised in the modification via the modification package.

Strengths:
- The effectiveness of a modification once implemented is followed through the sub process REX–exploitation.
- The procedure requests the support of CAPE-GMS in considering human factors during the development of the modification.
- Pilot unit concept for testing modifications prior to the implementation at the whole fleet

Suggestion:
- Improve traceability by including a section of the modification package to reference the OE used in the modification.

Good Practice:
The PROSPER team consider a Good Practice the concept of testing modifications on a pilot unit prior to the implementation of a modification in the fleet.

P.14 FUEL OE

Purpose:
To feedback operating experience from the fuel and core management processes and to verify efficiency of strategic decisions in fuel handling and core management.

Process Management procedure:
D 4002.42.01 / 99 NT 150 revision 1

Owner:
UNIPE -BC
CAPE - GIP

Tools:
SAPHIR / CID used for fuel handling events
Technical operating report (weekly)
CGC core management review committee
Monthly liaison meetings UNIPE with CAPE - GIP
Forum IEC
UNIPE – BC summary report to CAPE - GIP
6 months summary report

Timeframe:
Refuelling outage and operation cycles

Numbers:
N/A

Weaknesses:
- For fuel handling events UNIPE do not use SAPHIR but information from other groups or from the plant input network. The internal database utilized is independent from SAPHIR.
- External international operating experience is not considered.

Strengths:
- Exchange of information to UTO through yearly report

Suggestions:
- Consider enhancing the use of international OE in this area.
- Enhance the interactions with the OE process main stream line

P.15 OUTAGE OE

Purpose:
To feedback operating experience from lessons learned during outages.

Process Management procedure:
UTO D4507-00/827 Ind 2

Owner:
UTO

Tools:
Capitalisation database FER / FOR for reporting equipment and organisation deficiencies.

Timeframe:
T-4 before outage
During the performance of the outage
T+1 and T+3 following an outage

Numbers:

Weaknesses:
- FER / FOR are introduced into the T-4 outage report but are not included in the procedure.
- Insufficient feedback to UNIPE to upgrade outage documentation using FER / FOR as a basis.
- Important events during refuelling outages, mostly those that are useful to shorten outage or schedule, are treated through the outage coordinator. However, other events / anomalies are not always recorded for OE analysis. UTO only looks at its own events.
- Base of capitalization of UTO is a database parallel to SAPHIR and interconnexion does not exists. How lessons from outages can be learn from SAPHIR database is not defined.
- OE process attention is not focused for unscheduled non-refuelling outages. Feedback from unscheduled non-refuelling outages is not included in the process. Lessons learned from these situations are very important because unexpected situations may arise when the possibility of events / deficiencies is higher.

Strengths:
- Good effectiveness in capturing OE experience when affecting the critical path and result in significant schedule delays.
- Considers organisational problems
- Well managed and monitored for customer satisfaction and use of data base.

Suggestions:
- Consider expanding the use of FER / FOR to other lessons learned during the outage in addition to those affecting schedules. Expand the concept to unscheduled outages.
- Consider using FER / FOR for upgrading the procedures and outage documentation through lessons learned.

Good Practices:
The PROSPER team considers a Good Practice the use of FER/FOR as a tool to improve outages.

P.16 COMMITTEES AND EXECUTIVE MEETINGS

Purpose:
Selecting, initiating and reviewing analysis. Deciding, validating and approving analysis conclusion and follow up actions, for OE feedback process.

Process Management procedure:
Specific procedure for each committee.

Owner:
DPN

Tools:
CSNE, CRPE, CTE, CARP, CID, COREX, CVA, CNA-MNA

Timeframe:
Defined for each committee
CTE = Monthly
CARP = Monthly
CID = Weekly
COREX = Monthly / bi-monthly depending of the site

Numbers:
N/A

Weaknesses:
- The established main stream line is not always supplied with information of other stand-alone databases and meetings.
- Provision for following up the effectiveness of committee decisions once implemented are not always established.

Strengths:
- The redundancy overlap of the different activities and committees ensures good identification, discussion and communication of the issues.
- The level of decision makers at each committee is well defined.

Suggestions:
- Since some committees serve several purposes, consider assessing the network of the committees and meetings to define and reinforce the main stream line for the global OE process. Establish ways to ensure communications into this main line.
- Consider reinforcing the presence of H.P. representatives in the appropriate committees and meetings to enhance the reporting, screening, analysis, and decision making in this area.

DEFINITIONS

RECOMMENDATIONS :

A Recommendation is advice on how improvements in operational safety can be made in the activity or programme that has been evaluated. It is based on proven, good international practices and addresses the root causes rather than the symptoms of the identified concern. It very often illustrates a proven method of striving for excellence that reaches beyond minimum requirements. Recommendations are specific, realistic and designed to result in tangible improvements.

GOOD PRACTICE

A good practice is a proven performance, activity or use of equipment that the team considers to be markedly superior to that observed elsewhere. It should have broad application to other nuclear power stations and be worthy of their consideration in the general drive for excellence.

SUGGESTION

A suggestion is either an additional proposal in conjunction with a recommendation or may stand on its own following a discussion of the pertinent background. It may indirectly contribute to improvements in operational safety but is primarily intended to make a good performance more effective, to indicate useful expansions to existing programmes or to point out possible superior alternatives to ongoing work. In general, it is designed to stimulate the plant management and supporting staff to continue to consider ways and means for enhancing performance.

ACKNOWLEDGMENTS

Electricité de France (EDF) and the French Nuclear Safety Authority provided valuable support to the PROSPER mission. In particular, the staff of Electricité de France (EDF) Nuclear Operations Division provided excellent support throughout the preparation and conduct of the mission. Team members felt welcome and enjoyed good co-operation and dialogue with managers at all levels and all plant personnel. This contributed significantly to the success of the mission. Electricité de France (EDF) managers and staff, especially the team's counterparts, engaged in frank discussions and assisted the team in understanding organisation's current operational safety performance and the basic factors contributing to it. Electricité de France (EDF) managers and staff were receptive to comments and suggestions made by team members and seemed dedicated to achieving operational safety performance improvements, where possible. The personal contact made during the mission should promote continuing dialogue between team members and Electricité de France (EDF) Nuclear Operations Division staff. The support of liaison personnel was outstanding. Their help was highly professional and greatly appreciated by the team.

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