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**NUCLEAR ENERGY AGENCY
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES**

**NEA/CNRA/R(2010)7
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INSPECTION OF LICENSEE'S CORRECTIVE ACTION PROGRAMME

Working Group on Inspection Practices (WGIP)

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- to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes, as well as
- to provide authoritative assessments and to forge common understandings on key issues, as input to government decisions on nuclear energy policy and to broader OECD policy analyses in areas such as energy and sustainable development.

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The NEA Data Bank provides nuclear data and computer program services for participating countries. In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

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The Committee is responsible for the programme of the NEA, concerning the regulation, licensing and inspection of nuclear installations with regard to safety. The Committee's purpose is to promote co-operation among member countries to feedback the experience to safety improving measures, enhance efficiency and effectiveness in the regulatory process and to maintain adequate infrastructure and competence in the nuclear safety field. The CNRA's main tasks are to review developments which could affect regulatory requirements with the objective of providing members with an understanding of the motivation for new regulatory requirements under consideration and an opportunity to offer suggestions that might improve them or avoid disparities among member countries. In particular, the Committee reviews current management strategies and safety management practices and operating experiences at nuclear facilities with a view to disseminating lessons learned.

The Committee focuses primarily on existing power reactors and other nuclear installations; it also considers the regulatory implications of new designs of power reactors and other types of nuclear installations.

In implementing its programme, the CNRA establishes cooperative mechanisms with the Committee on the Safety of Nuclear Installations (CSNI) responsible for the programme of the Agency concerning the technical aspects of the design, construction and operation of nuclear installations. The committee also co-operates with NEA's Committee on Radiation Protection and Public Health (CRPPH) and NEA's Radioactive Waste Management Committee (RWMC) on matters of common interest.

FOREWORD

The Committee on Nuclear Regulatory Activities (CNRA) believes that safety inspections are a major element in the regulatory authority's efforts to ensure the safe operation of nuclear facilities. Considering the importance of these issues, the Committee established a special Working Group on Inspection Practices (WGIP) in 1990. The purpose of the WGIP is to facilitate the exchange of information and experience related to regulatory safety inspections among NEA member countries.

A fundamental goal a regulatory authority's oversight of nuclear facilities is to establish confidence that each licensee is identifying and correcting problems in a manner that ensures nuclear safety is a top priority and limits the risk to members of the public. A key premise is that weaknesses in licensees' corrective action programmes (CAP) will manifest themselves as safety performance issues which could be identified during the inspection programmes. Therefore, the WGIP determined that it would be prudent for member countries to share good inspection practices associated with corrective action programmes. This project was approved by CNRA in June 2008.

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1. EXECUTIVE SUMMARY

Effective corrective action programmes (CAPs) are a foundation to sustained safe operation of nuclear power plants. The Working Group on Inspection Practices (WGIP) concluded that when an operator has an effective CAP which identifies and corrects conditions adverse to quality promptly then the overall operating safety of the plant is improved and the protection of public health and safety enhanced. Therefore, it is important for operators to implement a strong CAP to ensure that non-conformances associated with regulatory and design requirements are maintained and that regulators promote operators to use CAPs to identify and fix problems. Specifically the following conclusions were reached and commendable inspection practices identified:

- It is important for operators to implement a strong CAP to ensure operators identify and fix problems.
- Inspectors of CAPs require a mix of both technical and soft skills.
- Inspection preparations should be specific and tailored to the needs of the inspections being performed.
- Inspectors should assess the adequacy of whether operator organisations are accountable for correcting problems in their areas.
- The best indicator of an effective CAP is whether it addresses issues identified from both industry and plant specific operating experience

Overall, the WGIP members concluded that the benefits of a strong CAP clearly outweighed the difficulties associated with operator implementation of a CAP and inspector evaluation of the programme. It was also concluded that CAP should be risk-informed to ensure that the most safety significant problems are promptly identified and corrected.

2. INTRODUCTION

This task originated at the 35th meeting of the Working Group for Inspection Practices (WGIP). Members were unanimous in recommending a proposal to Committee on Nuclear Regulatory Activities (CNRA) to examine and evaluate the extent corrective action programmes (CAPs) are inspected and the benefits of the inspections. This information would then be used to identify areas of importance for the development of good inspection practices. The CNRA approved the task request in June 2008.

The main objective of the task was to compare the inspection activities related to CAPs between the member countries. This will include the scope of inspections, bases and reference documents, frequency and duration of inspections, qualifications of the personnel performing these inspections, type of inspections, and other related issues. Observations made and (possible recurring) problems identified during these inspections will also be traced. A further comparison between the outcome of the inspection and actual failures from past experience could be investigated.

The aim is to identify good inspection practices that can be used to determine whether the operator is effectively implementing a corrective action process that identifies, follows, and corrects conditions adverse to quality. The main focus would be to identify commendable inspection practices which determine whether operators have and use processes to effectively identified the conditions adverse to quality, prioritise the problems based on safe significance, and eliminate both problem recurrence and occurrence of similar problems.

For the purposes of this WGIP task, the CAP is defined as the programme of actions that are needed for the resolution of identified problems. This programme should be the licensee's programme, and the regulatory body should have oversight of the licensee's programme.

It is expected that each licensee uses some type of mechanism to ensure that potential safety issues are being identified and corrected (e.g., internal and external audits, event follow-up, and identification of deviations).

Corrective action programmes play a significant role in identifying, correcting, and preventing problems at nuclear power plants. An operator that has a strong corrective action programme is likely to require less regulatory oversight than one that does not. Therefore, inspections of corrective action programmes provide a significant benefit for regulatory bodies.

3. BACKGROUND

A fundamental goal of the regulatory oversight of nuclear plants is to establish confidence that each licensee is detecting and correcting problems in a manner that ensures nuclear safety is a top priority and limits the risk to members of the public. A key premise of the CAP is that weaknesses in an operator's performance are identified and problems are corrected on a routine basis.

The role of a CAP is to efficiently and effectively identify and correct safety significant issues before they affect plant performance and potentially risk public health and safety. The inspections performed in this area are therefore of special interest. Based on initial discussions within WGIP, there is no documented information shared among the members regarding specific CAPs. As such, the WGIP initiated this task to share observations and commendable inspection practices. The outcome of this task is to inform member countries, and other countries that currently regulate or in the future may regulate nuclear power plants, on methods to implement or improve their inspection of CAPs.

4. QUESTIONNAIRE

For the purposes of this WGIP task, the CAP is defined as the programme of actions that is needed for the resolution of identified problems. This programme should be the licensee's programme, and the regulatory body should have oversight of the licensee's programme.

The questions were finalised at the 37th WGIP Meeting in April 2009 and were categorised into eight areas:

- Type of Programme
- Inspector Training
- Examples of Experience from this Oversight Programme
- Evaluation of the Licensee use of the Corrective Action Programme
- Evaluation of the CAP Effectiveness
- Frequency and Resource Expenditure of Corrective Action Programme Inspections
- Areas Reviewed during CAP Inspections
- Pre-inspection Preparations

Fourteen member countries responded; Belgium, Canada, Czech Republic, Finland, Germany, Hungary, Japan, Korea, Mexico, Netherlands, Spain, Sweden, United Kingdom, and United States. France and the Slovak Republic also participated in the WGIP discussions on the results of this questionnaire. The NRC response was prepared by the fire protection specialists in the Region I field office. Results of the analysis are described in the following section of the report. Recommended Best Inspection Practices and individual country responses are attached as an Appendix to this report.

4.1 Final Questionnaire

Introduction

In the questionnaire the WGIP members were requested to elaborate on the details of the inspection process as implemented by their regulatory body. The questionnaire noted that the responses should be formulated to identify examples of best inspection practices. Eighteen questions were asked in eight categories as follows:

Type of Programme

1. Do licensees within your country have corrective action programmes? Is there a specific regulatory requirement for this to exist?
2. If yes, provide a short description of the CAP (e.g., existence of internal and external audits, event follow-up, monitoring arrangements and identification of deviations). If not, explain how licensees establish completion of corrective action.
3. Do you have regulatory oversight of this programme?

Inspector Training

4. Do inspectors receive specific training to qualify them to assess the CAP? Briefly describe.

Pre-inspection Preparations

5. Where do you prepare for the inspection (in the regulator's office, at the site or both places) and how much time is devoted to preparation?
6. What types of information is typically requested of the licensee in advance for review? How are specific issues selected for review (if identified by the regulator what criteria are used? If provided by the licensee/power plant how are they selected?)?

Areas Reviewed during CAP Inspections

7. What areas are evaluated during inspections (e.g., engineering, operations, health physics, security, maintenance, chemistry, etc.)?
8. Are inspections reviewing the process/programme, performance/results, or both?

Frequency and Resource Expenditure of Corrective Action Programme Inspections

9. How often and when do you inspect licensee CAPs (e.g., routine resident inspector inspections, team inspections, inspections following operating events)?
10. What inspection effort is used (inspector hours per plant) for CAP inspections (if more than one type of inspection is performed for this purpose at a licensee, discuss the resources for each type of inspection)?

Evaluation of the CAP Effectiveness

11. How do you assess whether the licensee has appropriately prioritised items in its CAP (based on safety significance)?
12. How do you assess whether the licensee is effectively trending and using information within the CAP to prevent recurrence of similar problems?
13. How do you assess the effectiveness of licensees' CAP (e.g., are problem recurrences minimised)?
14. How do you evaluate licensee self assessments and independent assessments of its CAP?

Evaluation of the Licensee use of the Corrective Action Programme

15. How do you evaluate whether the licensee staff is willing to use the CAP?
16. How do you evaluate whether the licensee management promotes staff usage of the CAP process?

Examples of Experience from this Oversight Programme

17. Discuss any regulatory benefit you have experienced from the use of this oversight process.

18. Identify any difficulties in implementing this oversight process.
19. Provide examples of safety significant inspection findings related to the licensee CAP (are there any trends in the nature or subject matter of the findings; e.g., inadequate corrective actions to preclude recurrence, untimely corrective action implementation, poor prioritisation, non-completion of corrective actions)?

5. ANALYSIS OF RESPONSES

5.1 Type of Programme (Questions 1, 2, and 3)

This three part question focused on whether countries have regulatory requirements for CAPs, how operators establish and implement CAPs (even if regulatory requirements do not exist), and how do regulators monitor the implementation of CAPs by operators.

Out of the 14 countries that responded, 13 indicated that operators in their country implement some type of CAP. Six countries have regulatory requirements for the implementation of a CAP. While the regulators in the remaining six countries strongly recommend that operators use a CAP. One country indicated that while it did not have regulatory requirements for a CAP, and the operators did not have an integrated CAP, that the operator is required to ensure that it evaluates itself and maintains a plan for improvements in certain areas.

In most countries a combination of internal and external audits of the CAP are performed by operators to determine the effectiveness of the CAP. Most regulatory bodies monitor the implementation of the CAP by operators either by direct inspection of the CAP or through inspection of the operator's quality assurance (QA) programme. The regulatory authority of one country evaluates and approves all non-conformance reports generated by the operator.

Ten of the countries have periodic inspections of the operator CAP and those that have full time onsite (resident) inspectors have them perform additional routine inspections.

Observations

The WGIP members found that it is important for operators to implement a strong CAP to ensure that non-conformances are identified and corrected such that the plant's conformance to regulatory and design requirements is monitored. Therefore, regulators should promote operators to use CAPs to identify and fix problems. In addition, it is important for regulatory bodies to implement inspection programmes to assess the effectiveness of operator CAPs.

5.2 Inspector Training (Question 4)

This question focused on the depth and breadth of the training that inspectors receive prior to performing inspections of operator CAPs.

Five countries indicated that they have no formal training in this area and rely on on-the-job training. Three countries utilise ISO-9000 training. One country indicated that in addition to 80 hours of ISO-9000 training it requires an additional 60 hours of specialised QA training. The remaining two countries rely on their inspector qualification training.

Observations

The WGIP members identified that inspectors of CAPs require a mix of both technical and soft skills. For example, inspectors should be trained in technical areas such as plant operations and root cause analysis but also need the soft skills required to evaluate the operator's safety culture and willingness to perform meaningful self assessments.

The WGIP members also noted that new reactor construction may have different inspector training needs including how to assess problems associated with cultural and language barriers on large construction sites.

5.3 Pre-inspection preparations (Questions 5 and 6)

These two questions focused on the types of pre-inspection preparations that are performed and what type of documents are reviewed by the inspectors.

Almost all pre-inspection activities are performed in the regulator's office. For regulators that have onsite resident inspectors, some preparation is also usually performed onsite. Preparations typically takes 2 to 3 days, however, for more extensive inspections preparations could take up to 2 weeks.

The types of information that inspectors use to prepare for a CAP inspection was fairly consistent amongst the regulators and was quite extensive. The following is a list of the typical documents used to prepare for a CAP inspection:

- Monthly and annual audit reports, and self assessments
- Reports on human performance and safety culture
- Operating experience
- Event report analysis
- Operator implementing procedures
- Non-conformance reports
- Monthly operational reports
- Plant modifications

In addition, one country reviews outage radiological dose reports. One country discussed the use of risk insights to select samples.

Commendable Inspection Practices

Inspection preparations should be specific and tailored to the needs of the inspections being performed. For example, team inspections (performed on an annual or longer basis) should focus on programme implementation and finding resolution, and whether the operator has appropriately translated regulatory requirements into its operating procedures. While more routine (site inspector reviews) should focus on whether day-to-day operating experience is being adequately incorporated into the CAP.

5.4 Areas Reviewed during CAP (Questions 7 and 8)

These questions focused on the areas that are inspected and what is evaluated in those areas. All countries indicated that their CAP inspections assess both the implementation of the CAP process and the performance of that process.

When selecting areas to review all countries noted that all operator activities could be subject to inspection, however, the focus should be on significant safety systems. The following are some examples of areas that should be inspected:

- Management and Organisation
- Quality Assurance
- Personnel and training
- Operations
- Maintenance
- Fuel management
- Chemistry
- Radioactive waste treatment and emissions
- Emergency preparedness
- Fire protection
- Containment
- Emergency cooling systems
- Emergency power supply
- Ventilation systems
- Water chemistry of cooling circuits
- Radiation protection
- Radiological control of the environment
- Plant security
- Human factors
- Safety culture
- Safety management system
- Security

Commendable Inspection Practices

Inspectors should assess the adequacy of whether operator organisations (e.g., Maintenance and Health Physics Departments) are accountable for correcting problems in their areas. In addition, inspectors should evaluate the effectiveness of how organisations interact to resolve problems which affect multiple organisations.

5.5 Frequency and Resource Expenditure of CAP Inspections (Questions 9 and 10)

These questions focused on how often regulators perform CAP inspections and how many resources are expended. There was a broad range of inspection frequencies amongst the regulators. Most of the regulators with onsite resident inspectors expended several hours per week reviewing operating events and the subsequent corrective actions taken by the operator. Nine of the countries perform team inspections on a periodic basis.

There was a large variance in the inspection frequency and team size of the CAP inspections from the responses to the questionnaire. Therefore, it was difficult to compare the inspections. However, there did appear to be a correlation between the number of hours spent by regulators that had onsite resident inspectors and those that did not. Those with resident inspectors performed fewer team inspections than those without resident inspectors. Team inspection size varied between 2 and 6 inspectors and inspection hours increased as the frequency of the team inspections decreased. Team inspections normally occurred on at least a biennial basis and supplemented, as necessary, to follow-up on corrective actions associated with operating events. In addition to routine, biennial, and event follow-up inspections, one country performs extensive team inspections every 10 years that require between 1000-1500 hours.

Observations

The WGIP members agreed that the completion of corrective actions should be reviewed on a routine basis. By doing so, the regulator has a “real time” evaluation on the importance that operator management is placing on the CAP and the effectiveness of the CAP.

It was noted that periodic team inspections are beneficial in identifying problems with CAP programmes that cross several organisational boundaries at an operator and indicate a lack of attention to the CAP by operator management.

5.6 Evaluation of the CAP Effectiveness (Questions 11, 12, 13, and 14)

These questions focused on how to evaluate the effectiveness of CAPs. Overall, the responses noted that the best indicator of the effectiveness of an operator’s CAP was whether it routinely prevents the recurrence of problems. To evaluate this, the regulators used a variety of tools including engineering experience, plant operating experience, routine meetings with operator management, interviews with operating staff, and assessments of the operator’s trending of CAP findings. In addition, some regulators reviewed the operator’s trending of corrective actions.

Commendable Inspection Practices

The WGIP members concluded that one of the best indicators of an effective CAP was whether it addressed issues identified from both industry and plant specific operating experience. Therefore, it is important to evaluate how operators classify the significance and prioritise the issues in its CAP. Inspectors should evaluate on the effectiveness of how well the CAP has prevented the reoccurrence of problems. Inspectors should also evaluate the effectiveness of the communication of problems between organisations.

5.7 Evaluation of the Licensee use of the CAP (Questions 15 and 16)

These questions focus on how well operator management promotes the use of the CAP, to what extent the operating staff uses it and how does the regulator evaluates this.

All responses to these questions noted that the evaluation is performed during the aforementioned inspection process. Four countries specifically noted that they assess the use of CAP by operators through inspection of the operator's safety culture and other "soft indicators" such as periodic management meetings. The inspections normally used interviews of plant staff and management to evaluate how effectively the CAP programme was used and implemented. Two countries stated that they assessed whether plant problems were self revealing, identified by the operator, or found by the regulator to assess use of the CAP.

One country noted that it looks at the operator's objectives for the coming year to assess whether the appropriate management attention was focused on the CAP. Another country identified that operators may promote the staff's use of the CAP by offering them financial incentives.

Other ways to evaluate the licensee's use of the CAP were to interview operating staff regarding their willingness to identify issues and assess operating management communication of expectations for implementing the CAP during staff meetings. One country also discussed the importance of reviewing an operator's Employee Concerns Programme to ensure that operator management supported it and staff felt comfortable using it.

Observations and Commendable Inspection Practices

Observations

The WGIP members agreed that the best way to evaluate the effectiveness of an operator's CAP is based on operating experience – has the operator had repeated problems in an area previously identified. An operator that is not effectively fixing its problems has a CAP has not been properly implemented.

Another indicator of a strong CAP is the transparency if it implementation to the operator staff and the regulator and the prioritisation and timeliness of problem resolution. These items are an indicator on the resource commitment of the operator to the CAP.

Commendable Inspection Practices

Inspectors should assess the effectiveness of the operator's programme to review and integrate industry operating experience into its CAP.

Inspectors should assess whether the operators performance indicators are consistent with its operating experience and CAP findings. In addition, the operator should be assessing the applicability of generic operating issues (e.g., reactor coolant system leakage) to its plant operating experience on a regular basis.

5.8 Examples of Experience from this Oversight Programme (Questions 17, 18, and 19)

The focus of these questions was to identify the benefits from inspecting CAPs, the difficulties that are encountered during the inspection of CAPs, and some of the findings which are identified during the inspections. The following is a summary of the responses to these questions:

Benefits

- Performance improvements by the operator
- Continual improvement of nuclear safety and safety culture
- Ability to focus on weak areas of operator performance
- Transparency of resolving non-conformances
- A reduction in the timeliness to take corrective actions
- Transparency of resolving problems at nuclear facilities
- Reduction of regulatory effort and enforcement activities
- Establishes confidence that operators are identifying a fixing safety related problems

Difficulties

- Findings rely mostly on inspector experience
- Some countries do not have a regulatory requirement for a CAP
- Sometimes involves significant resources
- Lack of inspector training
- Inspection inconsistencies
- Differences in the assessment of safety significance between the regulator and the operator

General Inspection Findings

- Inadequate prioritisation of issues by the operator (resulting in large backlogs)
- Delays by the operator in implementing corrective actions
- Improper classification of safety significance of issues by operators resulting in inefficient use of resources
- Ineffective corrective actions
- Lack of trending by operators

Observations

The WGIP members concluded that the benefits of a strong CAP clearly outweighed the difficulties associated with operator implementation of a CAP and inspector evaluation of the programme. It was also concluded that a CAP should be risk-informed to ensure that the most safety significant problems are promptly identified and corrected.

Lastly, it was noted that strong inspector training and development programmes were required to ensure consistency of inspections.

6. CONCLUSIONS AND COMMENDABLE INSPECTION PRACTICES

This section summarises the key conclusions and commendable inspection practices from the report and feedback provided by WGIP members.

6.1 Key Conclusions and Commendable Inspection Practices

- It is important for operators to implement a strong CAP to ensure that non-conformances with regulatory and design requirements are addressed and monitored. Regulators should promote operators to use CAPs to identify and fix problems.
- Inspectors of CAPs require a mix of both technical and soft skills. New reactor construction may have different inspector training needs including how to assess problems associated with cultural and language barriers on large construction sites.
- Inspection preparations should be specific and tailored to the needs of the inspections being performed. While more routine regulatory activities (e.g., site inspector reviews), should focus on whether day-to-day operating experience is being adequately incorporated into the CAP.
- Inspectors should assess the adequacy of whether operator organisations (e.g., Maintenance and Health Physics Departments) are accountable for correcting problems in their areas.
- The best indicator of an effective CAP is whether it addresses issues identified from both industry and plant specific operating experience. Inspectors should evaluate on the effectiveness of how well the CAP has prevented the reoccurrence of problems.

Overall, the WGIP members concluded that the benefits of a strong CAP clearly outweighed the difficulties associated with operator implementation of a CAP and inspector evaluation of the programme. It was also concluded that a CAP should be risk-informed to ensure that the most safety significant problems are promptly identified and corrected.

APPENDIX – QUESTIONNAIRE RESPONSES

Type of Programme

Question 1

Do licensees within your country have corrective action programmes? Is there a specific regulatory requirement for this to exist?

Belgium

CAP exist, whether no regulatory requirement exists.

Canada

Yes, requirement in CSA N286 series of QA requirements.

Czech Republic

Operator has covered this area in managing documentation “Manual of Integrated management system”, which is as a main Q-A document under approval of SONS. There are described requirements of SONS decree 132(Q-A) – system of audits including reporting for top management CEZ company, event follow-up etc.

Finland

Yes.

Government Decree on the Safety of Nuclear Power Plants (733/2008), Section 29 Safety and quality management:

Systematic procedures shall be in place for identifying and correcting deviations significant in terms of safety.

YVL Guide 1.4 sets forth requirements for management system and corrective action programmes.

Management systems for nuclear facilities, 9 January 2008

7 Assessment and improvement

The characteristics of an evolved management system are the gathering of information relating to quality of operation and safety management, active monitoring and analysis, regular self-assessment, independent assessment, and, based on these, a continual improvement of the management system and procedures.

When the timing of self-assessments, independent assessments and management reviews is defined, the object of assessment and its impact on nuclear and radiation safety shall be considered.

7.1 Monitoring

The effectiveness of the management system shall be monitored and measured to confirm ability of the process to achieve the intended results and to identify opportunities for improvement.

7.2 Self-assessment

Senior management and management at all other levels in the organisation shall carry out self-assessment to evaluate and improve performance of work and safety culture.

Self-assessment means that the organisation's own personnel evaluates performance of work or a process against pre-determined criteria.

The personnel shall be able to contribute to assessment and improvement and the feedback provided by them shall be collected and processed.

7.3 Independent assessment

The management system shall include requirements and procedures for the regular, independent assessment of the system's conformity, performance and effectiveness. The following in particular shall be assessed

- *effectiveness of processes from the viewpoint of the achievement of goals and the realisation of strategies and plans*
- *results of work performance and management*
- *the organisation's safety culture*
- *quality of products.*

These assessment may be conducted by an own organisational unit with sufficient authority and independence to discharge its responsibilities. Individuals participating in independent assessments shall not assess their own work.

In addition, the licensee shall periodically assess the functionality and coverage of the management system. The assessment team shall be composed of individuals whose duties do not include co-ordination of the management system's improvement and implementation, and the system's regular assessment.

For the improved effectiveness of the management system, assessments conducted by external independent experts shall be utilised.

In order to support assessment and improvement, domestic and international R&D into the management, development and culture of organisations shall be followed.

In addition to the above, comparative assessment of the performance of work in relation to the company or concern's external organisations shall be conducted. Every now and then comparative assessment shall be applied to equivalent foreign organisations as well. Suitable indicators shall be employed for indicating development trends.

7.4 Management system review

The licensee and the nuclear facility management shall conduct a management system review at planned intervals to ensure the management system's continuing suitability and effectiveness. The reviews shall include an assessment of the opportunities for improvement and the need for changes in the management system, including quality and safety policy as well as safety and quality objectives. As input data for the reviews, the following shall be used: outputs from audits, assessment of processes, realisation of safety and quality goals, status of corrective and preventive actions, follow-up measures after previous management system reviews, suggestions for improvement, and changes that could affect the management system.

7.5 Non-conformances, corrective and preventive actions

The management system shall contain procedures for the handling of non-conforming processes and products.

The conformity of processes and products to the specified requirements shall be monitored. The significance of potential non-conformances shall be evaluated. Their causes shall be identified and corrective and preventive actions to eliminate them shall be determined. The facility's structure, the procedures in use or the management system shall be improved, where necessary. The effectiveness of development projects that were launched to improve corrective actions and operation shall be systematically monitored and evaluated.

Every employee shall be given the opportunity to bring forth non-conformances and defects in products, performance of work and the management system, and to propose improvements as well as be informed about their handling. The management shall promote an open atmosphere that improves the identification and handling of non-conformances and needs for improvement.

There shall be guidelines on the handling of non-conformances, defects and improvement proposals as well as the making of records. Individuals assessing non-conformances shall be independent of the matters under scrutiny. They shall have adequate competence and a good knowledge of the matter assessed.

Germany

In Germany there is no requirement for a specific form of a corrective action programme (like IAEA Tecdoc 1458).

However, all licensees are required to perform corrective actions in a timely manner. These requirements are laid down in different documents, in particular plant specific technical specifications, operation manual, and the Nuclear Reporting Ordinance (AtSMV).

Specific regulatory documents, approved plant manuals and license provisions regulate e.g.:

- The maximum unavailability time during power operation is individually specified for all safety important systems and components (otherwise the plant must be shut down)*
- Related to each reportable events, information is to be given for corrective actions taken or planned (repair, replacement or modification of equipment, modification of procedures, training of personnel, timeframe) to prevent recurrence of a similar event*
- Safety relevant events in other plants have to be analyzed and in the case of transferability corrective actions have to be taken*
- Every minor event, incident, deviation, finding etc. has to be documented, evaluated and corrected.*
- In-service inspections and function tests, that a licensee has to carry out (about 1000 per year), are supervised by RB with assistance of RB's expert organisation according to the licence. Any deficiencies detected by these tests have to be removed until a fixed date. The correct and complete removal of deficiencies in time is an essential part of the corrective action activities. This is complemented by a statistical evaluation of the development of deficiencies over the years.*
- Regulatory approval for start-up after plant outage is required for all NPPs. This approval is granted only after all necessary in-service inspections and function tests have been performed and documented, and the safety status of all systems is proved to be satisfactorily as required by the operating license.*

The licensees comply with these requirements. Some operating organizations have implemented a process "evaluation of events and experience feedback" within their management system covering also the CAP activities. Triggered by OSART, WANO and other peer reviews the process will be optimized regarding trending of small events, use of performance indicators and efficiency control.

Hungary

Yes, main elements of corrective action program were implemented at Paks NPP as a part of OEF program.

No specific requirement in our regulations about CAP. The relevant OEF Guidelines - the regulatory suggestion on implementation requirements – contains detailed explanation related to CAP. The reviews of regulations were performed and these regulations contain requirements related to CAP.

Japan

Answers: Licensees within the country have a CAP.

Quality assurance is required by Paragraph 3 of Article 7 of “the Rules of Installation and Operation of Commercial Power Reactors” (hereafter referred to as the “Ministerial Order”) to be built up and improved continuously, and the procedures are required by Paragraph 3-7 of Article 7 to be established and implemented for corrective action, preventive action and an analysis of primary cause.

In addition, the quality assurance plan including corrective action and an analysis of primary cause is required by Article 16 of this Ministerial Order to be described in the safety preservation rules of the licensees.

Licensees create their “safety preservation rules” based on the abovementioned Ministerial Order and submit an application for approval to the regulatory body responsible for a review of its contents and approval.

Korea

- *Yes. Korean utility (KHNP) developed and applied CAP.*
- *No. There is no specific regulatory requirement for the licensee’s CAP.*

Mexico

Yes, Laguna Verde Nuclear Power Plant has implemented a corrective action programme.

A specific regulatory requirement for this does not exist. However, there is a general regulatory requirement which establishes measures to assure that conditions adverse to quality are promptly identified and corrected. The cause of the condition is determined and corrective action taken to preclude repetition.

Netherlands

Yes.

Spain

Yes. In Spain, licensees must fulfil the CSN (RB) Safety Instruction IS-19 that applies to all NPPs and requires the implementation of a CAP.

Sweden

Swedish licensees' do not have an integrated corrective action programme (CAP) and they are not required to have it. Instead they have specific action lists for different activities (e.g. internal audits, event follow-up) and the completion of these lists are reported up in the licensees organization. One plant (OKG), has plans to implement a corrective action programme, CAP.

In some areas it's required that the licensee shall evaluate themselves and maintain a plan for improving actions. Therefore, a required action list exists for internal audits (SSMFS 2008:1 2kap 8§), safety program (SSMFS 2008:1 2kap10§), PSR (SSMFS 2008:1 4kap 4), maintenance & aging (SSMFS 2008:1 2kap).

SSM do not have any specific oversight program for corrective action programme and for different action lists. Some action lists are discussed between licensees and SSM on yearly meetings (e.g. internal audits). Sometime SSM ask licensees to send in there action lists to SSM for review.

If SSM conducts an inspection in areas like internal audits or safety program, of course the action list will be inspected. We normally prepare for the inspection in the regulatory office. We plan for the inspection in a specific program. However, it can also be planned very quick if we have a reason. Preparation of an inspection takes a couple of days. This depends on if it is a regularly inspection or if it is a new theme.

In inspections we always look at the licensees Manage system but also at praxis. If we would like to inspect their system for assuring competence i.e. we ask them to send in relevant material to answer those questions. If we do not find answers in the material we ask them to complement.

United Kingdom

Yes – implied requirement under several license conditions, LC 7 & 17 in particular.

United States

NRC Response: Licensees in the United States have corrective action programs. The requirements for these programs are contained in Title 10 of the Code of Federal Regulations, Part 50, Appendix B.

Question 2

If yes to Question 1, provide a short description of the CAP (e.g., existence of internal and external audits, event follow-up, monitoring arrangements and identification of deviations). If not, explain how licensees establish completion of corrective action.

Belgium

CAP may be the result of:

- o incidents, leading to the definition of CAP commensurate with the problem identified;*
- o internal audits (QA, evaluation of the operational processes by specific independent department of the licensee, experience feedback coming from any employee);*
- o external audits (WANO Peer Review, OSART, observations coming from Regulator's resident inspectors, ...).*

Depending on the nature and potential importance of the problems identified, punctual actions are taken or task groups (up to specific project and organization) are created to solve them and track the progress made.

Canada

Expected program to include Problem Identification and Resolution, Trending and application of key QA activities such as self assessment and independent assessment.

Czech Republic

ČEZ CAP-system consist of:

- Roof guideline ČEZ_SM_0127_r01 (description of all implemented diagnostic (system, processes) tools, rules for monitoring of the processes, classification of non-conformances, potential non-conformances, obliged procedure for grading settlement of non-conformances);*
- Specific procedures are defined and implemented for:*
 - o Internal audits of quality and environment*
 - o Independent safety inspection of the NPP processes (reported to the senior management)*
 - o Independent audit subordinated to the senior management*
 - o Evaluation and audits focussed to suppliers are implemented*
 - o Every NPP has its own internal inspection system*
 - o Procedure for settlement of the operational, technical or system faults is implemented for every NPP*
 - o Feed back from external events is implemented in every NPP*
- Other procedures supports management of the corrective action*
 - o Database for support of settlement of all non-conformances and findings in area of safety insurance (shared by both NPPs)*
 - o Database for support of the plant commissions (for settlement of the operational problems)*
 - o Several specific databases which are supporting processes, organization units etc.*
- As part of program for improvement of safety culture are set actions for improvement of the ČEZ CAP:*

- o The program of implementation of the self-assessment is in the stage of a pilot project in EDU NPP (support WANO, British Energy).*
- o New model of the Improvement system (former Inspection system) is developing and will be finished in 2010. Main principles of final solution:*
 - § Plan, Do Act, Check (PDCA) cycle implementation over all system and processes*
 - § Implementation of principles IAEA GS-R-3, GS-G-3.1, GS-G-3.2 and DS349 connected to the CAP*
 - § Self-assessment implementation*
 - § Connection and cooperation for existing CAPs over all company*
 - § Support by up-to-date relevant methodology*

Finland

Corrective action programmes include the following processes:

- failure reporting and work order system*
- operating experience feedback process, event reporting including corrective and preventive actions*
- internal and external audits*
- self assessment and management system review*
- independent management system reviews*
- NCR (Non-Conformance Report) and CAR (Corrective Action Request) procedures*

In addition, licensees' activities and equipment failures CAP process includes supplier's reports from their NCR-processes.

Germany

Important elements of the CAP are:

- Every individual staff member is obliged to enter appropriate data on faults (fault reports) immediately into a data base.*
- Fault reports are reviewed by the shift leader regarding safety significance, urgency, and necessity of immediate corrective measures.*
- The responsible technical departments conduct technical review and planning of corrective actions.*
- All fault reports are reviewed in addition by a dedicated event review group. This group analyses also events reported by other plants. The analyses comprise technical factors as well as human and organizational factors contributing to individual events.*
- For simple events involving minor technical measures only maintenance orders are issued and implemented according to the respective maintenance procedures. Documentation is performed within the data base mentioned above.*
- Corrective measures resulting from a more complex or difficult event or safety review are proposed within the above mentioned analysis, reviewed by the plant management or by specialised bodies and filed into the current plant action plan. Implementing related corrective measures may require submitting a modification licence application for approval by the regulatory body.*
- In many NPPs the event review group is in charge to manage the plant action plan, to follow up related completed measures, to perform trend analyses and review the effectiveness of performance indicators.*

Hungary

Re-qualification (prioritization) of corrective actions by reviewing events reports

Checking fulfillment of CAs

Safety significant CAs – detailed report by Licensee

Less safety significant CAs – We review of summaries of the status of CAs in the Quarterly Reports

Comprehensive Inspection in every 3 years as a part of OEF

Annual review and evaluation of relevant safety indicators

The effectiveness of relevant corrective actions are evaluated in event investigation report when similar events is occurred.

Japan

Answers: Licensees shall manage nonconformity from the results of an internal audit, the surveillance and measurement of the process, inspection, testing, etc. and take corrective action and preventive action needed to prevent recurrence.

- (1) Corrective action: Licensees shall take action to eliminate the cause of nonconformity in order to prevent recurrence if discovered.*

As for the nonconformity event important to safety, licensees shall analyze the primary cause thereof.

- (2) Preventive action: Licensees shall take action to eliminate the cause of nonconformity utilizing the knowledge obtained from the implementation of safety preservation activities and that obtained from other facilities, in order to prevent the occurrence of possible nonconformity.*

Also, for the event which itself is not important to safety, but is similar to nonconformity or shows a tendency of frequent occurrence, licensees shall analyze the primary cause thereof.

Korea

- Self Assessment by the licensee is conducted biennially in accordance with Self Assessment Program*
- At first, Importance grades are classified into 4 groups depending on the event and conditions. Secondly, cause analysis including root cause and common cause is followed. Thirdly, derive the corrective actions in accordance with the results of cause analysis. Finally, the implementation status of corrective actions is checked and managed within the program.*

Mexico

The corrective action programme is developed to promote staff reporting conditions adverse to quality. This programme consists of a set of actions needed to resolve identified problems. These adverse conditions are classified as:

- a) Condition 1. Problems that resulted or could result, if it is not corrected, as degradation significance to safety, to operation of the plant, to personnel safety, to regulatory compliance, to environmental impact or to financial resources.*
- b) Condition 2. Problems with enough risk to safety or to operation of the plant; which required the determination of the causal factor, generic implications, operational experience and the corrective actions*

- c) *Condition 3. Problems with low risk to safety, to operation of the plant or personnel safety that require correction and trending.*

Each condition is treated in the following way:

- a) *Identify (Review)*
- b) *Evaluate (Disposition)*
- c) *Resolve (Implementation)*
- d) *Close (Verification)*

The CAP is internal audited by Quality Assurance Department and external audited by the Regulatory Body, WANO and ISO.

Netherlands

See table 1.

Table 1.

		<i>Programme</i>	<i>Prescribed in License/OLC</i>	<i>Inspected by R.B.</i>
<i>Short cycle</i>	<i>1</i>	<i>Breakdown maintenance</i>		<i>o</i>
	<i>2</i>	<i>Preventive maintenance</i>	<i>X</i>	<i>+</i>
	<i>3</i>	<i>Working orders</i>		<i>-</i>
	<i>4</i>	<i>Control rounds by operators</i>		<i>-</i>
	<i>5</i>	<i>Testing equipment according to OLC-programme</i>	<i>X</i>	<i>+</i>
<i>Medium cycle</i>	<i>6</i>	<i>Incident reporting</i>	<i>X</i>	<i>+</i>
	<i>7</i>	<i>Incident investigation</i>	<i>X</i>	<i>++</i>
	<i>8</i>	<i>Management walk around</i>		<i>+</i>
	<i>9</i>	<i>Internal Auditing</i>	<i>X</i>	<i>+</i>
	<i>10</i>	<i>Inspections by R.B.</i>		<i>N.A.</i>
<i>Yearly cycle</i>	<i>11</i>	<i>Business plans and -reports</i>		<i>-/o</i>
	<i>12</i>	<i>In-service inspections</i>	<i>X</i>	<i>++</i>
	<i>13</i>	<i>Doses report of outage period</i>		<i>++</i>
	<i>14</i>	<i>Report over outage period</i>		<i>+</i>
	<i>15</i>	<i>Report over occurred incidents</i>	<i>X</i>	<i>++</i>
	<i>16</i>	<i>Evaluation of the effectiveness of the organisation</i>		<i>+</i>
<i>Long(er) cycle</i>	<i>17</i>	<i>Learning from major incidents at other facilities</i>	<i>X</i>	<i>++</i>
	<i>18</i>	<i>Audits by R.B.</i>		<i>N.A.</i>
	<i>19</i>	<i>2-yearly evaluation reports</i>	<i>X</i>	<i>+++</i>
	<i>20</i>	<i>Missions by IAEA / WANO</i>		<i>+</i>
	<i>21</i>	<i>10-yearly evaluation reports</i>	<i>X</i>	<i>+++</i>

- : Not inspected.

o : Inspected sometimes.

+ : More + 's a more extensive inspection is carried out.

N.A.: Not applicable.

Spain

The CAP is an integrated system for the management and identification of non conformities, proposals and opportunities of improvement and commitments with the RB.

Non conformities (NC) must be categorized according its significance to the nuclear safety and radiological protection.

There are four categories graded by its safety significance as A, B, C y D. The NC must be assesses depending on its importance, and also the corresponding corrective actions and its time to be implemented must have an associated priority.

All NC, proposals, commitments, and actions are controlled by a computer program which is accessible for the consults of the whole organization.

It is necessary to carry out a trend analysis and the verification of the efficacy of actions.

Sweden

Not Applicable

United Kingdom

CAPs arise from weaknesses/concerns identified from one or more of the following:

- *Internal audits*
- *Corporate audits*
- *Corporate inspections*
- *WANO reviews and similar*
- *LC7 processes (OEF/LFE)*
- *Regulatory inspection*
- *Routine operations, testing and maintenance.*

These issues are carried forward through licensee or site specific action tracking processes. The CAP itself may be subject to internal and corporate audit

United States

NRC Response: Licensees typically have personnel responsible for overseeing the CAP and software that implements the CAP. When plant personnel identify issues, the issues are entered into the software program, and meetings are held to disposition the issues (assign significance, closure responsibility, interim corrective actions, trending codes, cause analyses).

Question 3

Do you have regulatory oversight of this programme?

Belgium

Regulatory oversight is obtained from inspections and meetings. Inspections are devoted to evaluate the processes and their performance. Meetings are usually done to follow the progress of a specific important CAP.

Canada

Yes, QA activities audits and inspections, review of completion of sampled corrections and closures, review of effectiveness.

Czech Republic

It is inspected by special team from Prague headquarter, which is established from the well experienced inspectors. The first inspection was unplanned, next one was planned. Both inspections were under rigorous control from top management of SONS. Next way is routine inspections in both site inspectorates.

Finland

STUK provides oversight to the Licensees' CAP-processes by

- *reviewing and assessing the relevant CAP-process procedures,*
- *approving all major NCR reports (deviations from YVL-guide requirements or equipment specifications),*
- *performing periodic inspections. Usually one process is assessed once in 3-4 years. In last couples of year STUK's emphasis has been in OEF-process,*
- *assessing supplier's NCR processes through e.g. STUK's construction inspections.*

Germany

Yes. Regulatory oversight is performed by structured plant inspection programmes, and by the review of the required routine reporting by the licensee. This oversight includes:

- *the fault reports and their management (review of documentation in the data base)*
- *the results of event analyses,*
- *the measures taken resulting from other reviews (e.g., audits, safety reviews requested by the regulatory body),*
- *the implementation of corrective actions (measures to avoid recurrences) resulting from reportable events and proposals given by GRS information notices.*
- *remedy of deficiencies resulting from regulatory inspections*

- *remedy of deficiencies detected by in-service inspections and functional tests*
- *performance of the process “evaluation of events and experience feedback”*

The regulatory body receives in-service inspections and testing results and event reports. Based on these reports further analyses and remedial measures are demanded. Appropriateness and implementation of these measures are followed up by the authority.

In case the necessary corrective actions comprise backfitting, modification of plant equipment or related operation procedures the licensee applies for these modifications to be reviewed and approved by the regulatory authority.

The regulatory oversight described above is under the responsibility of the competent authority at the individual federal state (Land) level and performed accordingly. In addition the federal regulatory body (BMU) is involved in case of major events and events of relevance for other NPPs. In such cases, also the Reactor Safety Commission (advisory committee of BMU) and the GRS (expert organisation of BMU) are involved for further evaluation and safety review.

Hungary

We do not have specific regulatory oversight of CAP.

Japan

Answers: In Japan, nuclear safety inspection exists, which inspects the observance situation of the safety programs by licensees based on the Law for the Regulations of Nuclear Source Material, Nuclear Fuel Material and Reactors (hereafter called to as the “Law”). The CAP is an activity of licensees that is required by those safety programs and is subjected to the confirmation by the nuclear safety inspection. Also, nuclear safety inspectors stationed in a power station check the CAP as well as the safety preservation activities performed daily by the licensee. In addition, nuclear safety inspectors check nonconformity management and corrective action related to specific electric structures at the periodical inspection and periodic safety management review.

(1) Nuclear Safety inspection

In Japan, electric utilities shall submit an application for approval of their “safety programs” to the regulatory body and shall be approved, before commissioning of a nuclear power station (before nuclear fuel is carried in a power station).

The “safety programs” are laws that provide the necessary measures for safety preservation required of licensees to maintain the reactor facilities and operate the reactors, etc. The Ministerial Order requires of licensees to describe items related to compliance with legislation, nourishing of safety culture, quality assurance, operations management, maintenance management, radiation management, etc. Licensees and their employees are required by the Laws to comply with the safety programs.

According to a provision of the Ministerial Order, electric utilities are obliged to store the records of periodical testing, etc. conducted during operation and to report an accident or trouble to regulatory body immediately when it occurs.

On the other hand, nuclear safety inspectors stationed in all of nuclear power stations perform daily patrol and inspection work in their responsible station. They perform periodic inspections four times a year and check the operations important to safety such as the start-up and shutdown of the plant to confirm the observance situation of the safety programs by electric utilities. Inspectors check the

licensee's CAP (nonconformity management, corrective action, an analysis of primary cause, etc.) through the above-mentioned activities.

Nuclear safety inspectors report the results of nuclear safety inspection to Nuclear and Industrial Safety Agency (NISA).

(2) Periodic inspection

Licensees inspect the equipment (specific electric structure) to which safety-related technical standards is applied and confirms conformity to the technical standards. (This is called the periodic licensee's inspection.)

NISA inspectors or Japan Nuclear Energy Safety Organization (JNES) inspectors witness the periodic licensee's inspection of the equipment, particularly the equipment of high importance, or confirms records. (This is called the periodic inspection.)

When a nonconformity event is occurred in the facility subject to the periodic inspection, NISA or JNES inspectors check that if a countermeasure is taken as specified in the rules.

NISA and JNES inspectors report the results of their periodic inspection to the headquarters of NISA.

(3) Periodic safety management review

JNES reviewers review the implementation system of the periodical utility inspection performed by licensees aiming at the equipment (specific electric structure) to which the safety related technical standards are applied.

JNES reviewers check nonconformity action, corrective action and preventive action related to the specific electric structure. NISA headquarters checks a report on the periodic safety management review submitted by JNES reviewers and assesses the periodic licensee's inspection.

Korea

- *At present, since the application of CAP in Korea is in the launching stage, the CAP is operated voluntarily and not under the regulatory oversight.*

Mexico

Yes, through base line inspections, resident inspector inspections (weekly, semiannually. and annually) and biennially inspections.

Netherlands

See Table 1 (for Question 2)

Spain

Yes:

- *Resident Inspectors carry out a follow-up and perform an annual inspection reviewing a sample of NC and repetitive problems.*
- *All the procedures of inspection for specialists and other inspectors of head quarters provide instructions in order to track the CAP.*
- *The inspectors of the quality assurance branch lead a biennial inspection, with the contribution of resident inspectors, to assess the efficacy of the CAP.*

Sweden

Not Applicable

United Kingdom

Through routine inspection of the closeout processes related to licence compliance – e.g. LCs 7, 17, 28

A review of the CAP will be a key component of the annual review of safety meeting between the site senior management and the NII

Performance of the licensee on managing its CAP is a component of safety performance indicators reported routinely to the regulator

United States

NRC Response: The Nuclear Regulatory Commission has regulatory oversight of licensees' corrective action programs. The NRC uses inspection procedure (IP) 71152, "Identification and Resolution of Problems," to inspect these programs. In addition, other NRC inspection procedures require inspectors to verify licensee corrective actions for subjects covered by the procedures.

Inspector Training

Question 4

Do inspectors receive specific training to qualify them to assess the CAP? Briefly describe.

Belgium

No (mainly on-the-job training).

Czech Republic

Training for inspectors depends on their specialization and program of IAEA. As an example I could insert IAEA training course in the realm of Investigation of events and operational event feedback in NPP Temelin site in 2001

Finland

Inspection team leaders have ISO-9001 specified lead auditor training. Inspectors inspecting this area are specialist on management systems.

Germany

*No special training of the inspectors
Team inspections are performed together with experts if necessary.*

Hungary

We do not have specific training to assess the CAP

Japan

Answers: Qualification requirements (academic background, on-the-job experience, and completion of education and training) for nuclear safety inspectors, NISA inspectors, JNES inspectors, and JNES reviewers are specified. Persons who satisfy these requirements are qualified as nuclear safety inspectors.

Two types of courses (80 hours in total) are implemented: one is the training equivalent to that for junior reviewers in ISO 9001 (quality assurance) (approximately 60 hours) and the other is applied training of quality assurance.

- *An example of qualification requirements (in case of JNES inspectors)*
 - (1) Academic background: Graduation from the science or engineering faculty of senior college*
 - (2) On-the-job experience: Two years or more of administrative safety preservation work or three years or more of safety preservation work*
 - (3) Education and training: Completion of education and training specified by the Minister of Economy, Trade and Industry*
- *An Example of education and training*

Nuclear regulation, nuclear equipment, outline of inspection, radiation education, OJT at a nuclear power site, ISO 9001 training and applied training of quality assurance (human error, primary cause analysis, etc.)

Korea

No

Mexico

Yes, through base line inspections, resident inspector inspections (weekly, semiannually, and annually) and biennially inspections.

Netherlands

No specific training is received to assess the programmes.

All of the inspectors which carry out the inspections on-site have a technical background and have received a basic training in auditing techniques and the ins and outs of the site such as the organisation, quality system, safety report etc,

Regarding to the inspection of the programmes, they are focussing on the items mentioned in the short and medium cycle of table 1.

The assessment of programme nr. 7, incident investigation and of the programmes of the yearly and longer cycle is mainly done by a team of specialists at our office. In most cases the inspector is a member of the assessment team.

The inspector checks the follow up of the actions derived from these programmes.

Spain

There is no special or specific training for the inspections to the CAP.

Sweden

Not Applicable

United Kingdom

Not directly addressed at present, but general guidance is provided against relevant license conditions that link to corrective action system. However, the training course is currently under review and this issue is likely to receive direct attention.

United States

NRC Response: The NRC's inspector qualification program, which is described in Inspection Manual Chapter (IMC) 1245, provides training activities related to assessing corrective action programs.

Pre-Inspection Preparations

Question 5

Where do you prepare for the inspection (in the regulator's office, at the site or both places) and how much time is devoted to preparation?

Belgium

In the regulator's office.

The time devoted for preparation depends on the topic and can reach a couple of days for evaluation of a whole CAP (for instance for an OSART).

Canada

A program (program content) preparation can take up to 45 days preparation, at headquarters mostly, while a program performance inspection can take 2 to 10 days or less if the guide is prepared.

Czech Republic

We prepare for these inspections entirely in our office, partly site inspectorate; partly Prague headquarters. Time for preparation is 15-25 hours (average for each inspection).

Finland

Preparation work for inspections is usually done in the head office and at the site office. In some cases Licensees are requested to submit relevant documents to STUK or inspectors familiarize themselves to the topic at the site before the inspection.

2-3 days is average time devoted to the preparation. Team leader usually spends more time.

Germany

Preparation according to the regulatory inspection programme is performed basically in the regulator's office (review of reports, follow up of implementation activities). The effort typically is one day preparation time for a one day inspection.

Hungary

Mainly in the regulator's office.

Usually the preparatory time double than the duration of inspection

Japan

*Answers: They prepare for inspection in both their office and on site.
The time required for preparation is not specified.*

Korea

- *Inspection, at present, for the CAP is not implemented.*

Mexico

Base line and biennially inspections are prepared in the regulator's office and the resident inspections are prepared at the site, the time devoted for the first one is two weeks approximately and for the other one week.

Netherlands

The preparation to carry out a check of each programme is done at the regulator's office. The time devoted to preparation depends on the programme that is inspected. Hardly any time is involved to prepare a check of a short cycle and medium cycle programme (except nr. 7).

The preparation of an inspection of a programme of the yearly cycle (and nr. 7) costs roughly a day; the preparation to perform an inspection of the longer cycle programmes costs a week.

The preparation of an inspection of the corrective actions coming from the 2- and 10-yearly evaluation reports takes a longer period.

Spain

The inspections are prepared in the regulators or resident inspector offices. It is difficult to assign numbers since it depends on the complexity of the inspection but very roughly it could be of 40 hours in the office and two or three more hours in the site.

Sweden

Not Applicable

United Kingdom

Where - Both in the office and on site. How much time – this will vary depending on the nature and subject of the intervention. Also, the specific amount of time allocated against CAP is difficult to segregate from the general preparatory time. Also, preparatory time for a targeted inspection (e.g. QA inspection) will be longer than a routine intervention.

United States

NRC Response: NRC inspectors prepare for the biennial PI&R team inspection at both the regulator's office and the site. The team leader may go to the site to obtain preparation material to provide to the team members; however, this material is usually obtained electronically. Inspectors typically spend one to two weeks preparing for the team inspections.

Question 6

What types of information is typically requested of the licensee in advance for review? How are specific issues selected for review (if identified by the regulator what criteria are used? If provided by the licensee/power plant how are they selected?)?

Belgium

Main results of the licensee's self-assessment, conclusions of external audits, incident reports, ...

Issues are selected for review by regulator based on experience (mainly the one of the resident inspectors), potential importance to safety or radiation protection and based also on the potential to highlight process deficiencies.

Canada

*Confirmation of document revision dates; QA process document; sample products or outputs of the process (samples of events treatment, analysis, decision points, change control)
Specific topics or issues are chosen on the basis of perceived recurrence, systematic weaknesses.*

Czech Republic

The main types of information are managing documentation from operator site and internal documentation, reports from their audits, external and internal. In the case of our last inspection, the selected issues were mainly from the previous inspection and partly from other inspections.

Finland

Most of the management manuals and guides are submitted to STUK regularly so typically STUK requests a list of open points, MoMs, indicators, protocols etc.. In general, documents which can be used in assessing the adequacy, functioning and effectiveness of the CAP process.

Germany

*Technical monthly and annual report
Annual report on human and organisational factors review
Annual report on safety management
Reports on reportable events
Reports on results of event analyses
Notification or applications of planned modifications
Annual report on activities related to event analyses and operational experience feedback.*

Hungary

*In the quarterly report shell introduce
the deadline
the responsible person/organization
status of CA
the summary of progress or the result of CAs
the explanation of modification if were any.*

Japan

Answers: Inspectors require of licensees to submit a nonconformity report on all of nonconformity events every time nonconformity occurs (or on the following business day). Nuclear safety inspectors timely attend the CAP meeting held by licensees and confirm their activities to obtain information.

From the daily activities of nuclear safety inspectors as mentioned above, the weakness of the licensee's CAP or important-to-safety nonconformity events are selected and confirmed by nuclear safety inspection.

Korea

- *Inspection, at present, for the CAP is not implemented.*

Mexico

The information typically requested to the licensee are the related procedures, internal inspections results, operational events, minor incidents, external experience, maintenance rule, and indicators programmes.

The regulator selects a sample of risk significant issues that have been processed through the CAP and which have been identified through its inspections or operational events.

Netherlands

In advance, information is requested of the following programmes:

- *7 (incident investigations),*
- *12 (In-service inspection),*
- *13 (doses report outage period),*
- *15 (report over occurred incidents),*
- *16 (report on effectiveness of the organisation)*
- *19 (2-yearly evaluation report) and*
- *21 (10 yearly evaluation report)*

The selection for review of the specific issues is according the number of + 's (2 or higher); see table 1.

The R.B. also receives a monthly report where information about maintenance (nrs. 1 and 2), testing (nr. 5) and incidents (nr. 6) can be gained.

Spain

In general the inspectors request the latest procedures concerning the CAP, self-assessments, trends, processing of incidents, etc.

In a more specific way, for the biennial inspection:

- *All the mayor and minor incidents reported weekly to the head quarters by the resident inspectors during the past two years.*
- *All event reports.*
- *All degraded conditions.*
- *Evaluation of operating experience reports.*
- *Assessment of applicability of new standards.*

- *Monthly reports of operation.*
- *Reports of preceding CAP inspections.*

Sweden

Not Applicable

United Kingdom

For a routine inspection, licensee's arrangements for complying with relevant licence conditions, event reports of a range of types may be requested in advance along with trend data.

For a QA targeted inspection QA reports, programmes and corrective action lists data will be obtained.

The annual review meeting will be supported by a briefing pack produced by the licensee which will include summary information from the site's CAP

United States

NRC Response: The NRC will request to review: licensee administrative procedures that control the identification, evaluation, and resolution of problems; list of corrective action documents issued since the last inspection (work orders, work requests, temporary modifications, calibration failures, condition/problem identification reports, operability evaluations and determinations); corrective action program assessments; program performance information; trend reports; safety culture assessments; procedures and documentation regarding licensee efforts to identify, resolve, and prevent performance problems through performance monitoring, root cause analysis, cause determination, and corrective actions; and NRC inspection reports.

Samples are chosen using risk insights and generally cover the NRC Reactor Oversight Process (ROP) cornerstones of safety – reactor safety (initiating events, mitigating systems, barrier integrity, emergency preparedness), radiation safety (public and occupational radiation), and safeguards (security/physical protection). The samples include licensee-identified issues, NRC-identified issues (including past violations), operating experience, safety culture issues, and issues identified through alternative avenues such as employee concerns programs.

Areas Reviewed during CAP Inspections

Question 7

What areas are evaluated during inspections (e.g., engineering, operations, health physics, security, maintenance, chemistry, etc.)?

Belgium

All areas that could have a potential importance on safety or radiation protection can be covered, whatever the licensee's organization. Emphasis should be given to the importance of evaluating interfaces between areas (engineering, operations, ...) as a lot of (important) problems occur at the interfaces.

Canada

No restrictions as to areas where CAP applies.

Czech Republic

Mainly Q-A, management system, operation and engineering, but CAP covers all areas

Finland

STUK emphasis is on the CAP process in general, specific areas and samples might be selected as an example to verify the functioning of the process.

Germany

The routine regulatory inspection programme implies CAP activities as well. According to the inspection programme the following technical areas are covered:

- Containment*
- Emergency cooling systems*
- Emergency power supply*
- Ventilation systems*
- Control of reactor core*
- Control of safety system*
- Performance of component handling*
- Fire protection*
- Water chemistry of cooling circuits*
- Radiation protection*
- Radiological control of the environment*
- Plant security*
- Human factors*
- Safety management system*

Regulatory inspection activities are performed according to a structured plan. This plan offers appropriate guidance rather than prescribing explicit checklists.

In the course of these inspections it is checked whether unresolved problems or measures not yet implemented still exist. The status of implementation for larger projects is checked.

Hungary

The target areas depend on the corrective actions. Usually the inspector chooses 2-3 safety significant CA for detailed review. The most frequented areas are operation, maintenance and engineering.

Japan

Answers: (1) Nuclear safety inspection

Safety preservation activities are evaluated including operation management, maintenance management, fuel management, disaster countermeasures management, waste management, etc. provided in the safety preservation rules.

(2) Periodic inspection and periodic safety management review

Part of maintenance management is evaluated.

Korea

- *Inspection, at present, for the CAP is not implemented.*

Mexico

All the areas related with the CAP (engineering, operation, health physics, security, maintenance, chemistry, etc.)

Netherlands

At the routine inspections on-site the programmes 1, 2, 5, 6, 7, 8, 9, 11, 14 and 20 are reviewed/inspected.

Programmes 12, 13 and 15 are reviewed each year.

At the 2 yearly and 10-yearly evaluations (nrs. 19 and 21) the following issues are evaluated:

- *Management and Organisation*
- *Quality Insurance and independent control*
- *Personnel and training*
- *Operations*
- *Maintenance*
- *Procurement and logistics*
- *Configuration control*
- *Fuel management*
- *Chemistry*
- *Radioactive waste treatment*
- *Radiological health physics and Emissions*
- *Emergency preparedness*
- *Fire protection*

A special branch of our organisation evaluates the issue "Security;" the Labour Inspectorate inspects "Occupational Health."

NB.

The 2-yearly evaluation focuses on the aspects of the organisation of the workflows (communication), administration and procedures. As reference the license (including the IAEA-codes and guides for operation) is used.

The 10-yearly evaluation focuses also on possible technical improvements and can lead to a renewal of the license.

Spain

Main areas are reviewed: Maintenance, Operation, Radiological Protection, Quality assurance, Fire programs, Spare policy, Training, etc.

Sweden

Not Applicable

United Kingdom

All of these areas will be covered on a sampling and cyclic pattern to ensure full coverage within a defined time period. Intervention priorities will be informed by events and OEF at the site and elsewhere.

United States

NRC Response: The biennial PI&R inspections and routine reviews will typically cover quality assurance, employee concerns program, safety conscious work environment, engineering, maintenance rule (10 CFR 50.65), operating experience, operations, security, emergency preparedness, maintenance, radiation protection, chemistry, audits, and self-assessments. Other areas such as fire protection, health physics, and modifications will be reviewed during implementation of other inspection procedures.

Question 8

Are inspections reviewing the process/programme, performance/results, or both?

Belgium

Regulator's inspections cover both (but not necessarily at the same time / during the same inspection).

Canada

We have guides for performance of CAP (call them type 2 inspections) as well as develop guides CAP program process (called type 1 inspections).

Czech Republic

Mainly process and performance

Finland

Both are used. The process and programmes are reviewed to assure they fulfil the requirements in document level but results and performance (examples) are used to verify that the CAP-process is functioning in practice. The effectiveness of the process is evaluated through indicators.

Germany

Basically, the resulting implementation measures, in particular remedial actions and provisions to avoid recurrences are inspected.

Inspections in the areas of HOF, safety management, operation management, and event analysis also cover the related processes.

During plant walk down inspections, also the implemented corrections of plant systems and components and their correct function are inspected.

Hungary

The comprehensive inspection mainly focuses on the process, the target inspector orients to results and performance of CAP.

Japan

Answers: Nuclear safety inspection is basically implemented by a process type of inspection. It is mainly checked if the QMS functions as a real activity and the results are evaluated in regard to the purpose of the activity. In the course of those checking activities, the processes are also checked.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

They are reviewing both.

Netherlands

The routine inspections on-site (see question 7) are mainly performance/results oriented.

At the other inspections both the process/programme and the performance/results are reviewed, especially during the audits of the Regulatory Body (programme 18).

Spain

Both process and results.

Sweden

Not Applicable

United Kingdom

Both

United States

NRC Response: The NRC looks at both; however, the focus will depend on which inspection is being performed. The biennial PI&R will focus more on licensee performance and results. The routine reviews, typically performed by resident inspectors, will look at performance in addition to how the program is implemented on a daily basis.

Frequency and Resource Expenditure of Corrective Action Programme Inspections

Question 9

How often and when do you inspect licensee CAPs (e.g., routine resident inspector inspections, team inspections, inspections following operating events)?

Belgium

A so-called "thematic inspection" is planned about each year to examine the processes related to Experience Feedback (including CAPs).

"Specific inspections" are done to follow specific important CAPs.

Routine resident inspector inspections are used to follow other CAPs.

All are conducted by resident inspectors, with the help if necessary by regulator's experts in this field.

Canada

3 per station, for team inspections, once per year roughly.

Czech Republic

Routine resident inspector inspections regularly, team planned inspection one per two years, unplanned – it depends on current operational status, this year three inspections

Finland

The CAP process is inspected by using Team inspections (4-6 inspectors) which are normally done annually.

Resident inspector's daily work is more focused on technical issues. They participate to the annual team inspections also.

STUK performs event based inspection rarely. Licensees are obligated to inform STUK of the events and implement the OEF -process promptly. Usually resident inspectors are discussing with the licensees representatives during and after events and they are sending additional information to STUK.

The licensees shall make an event description and assessment before STUK. Otherwise the responsibilities might be confused.

Germany

The regulatory inspection programmes in Germany are made up by a large number of single inspections performed by small teams or individual experts of different technical expertise areas. Explicit or dedicated CAP-inspections are not performed. Nevertheless, CAP is an important element of all inspections.

Inspections are performed in most cases oriented to the resulting performance properties of systems and components and are supplemented by process oriented inspections. Therefore, a large number of regulatory inspections is performed, e.g., by reviewing approximately 1000 in-service inspections per year.

There is no resident inspector working at the NPP sites.

Hungary

Comprehensive inspection (team inspection) performed in every 3 years. The CAP is a part of operational experiences feedback area.

1-2 target inspections

Japan

Answers: Nuclear safety inspectors stationed in a power station confirm the licensee's daily CAP, and carry out four periodical safety preservation inspections a year. However, inspection focusing on only the CAP is implemented once a year. For example, if they choose maintenance management as an inspection item, they usually check the CAP mainly in view of how it functions in the maintenance process. In this case, nuclear safety inspectors check if appropriate corrective action has been taken against specific nonconformity events occurred in maintenance management based on evidence. Nonconformity events to cover are important ones regardless of whether they are occurred during operation or shutdown. They also check the situation of corrective action against nonconformity during operation in the preceding cycle before the start-up of operation after periodical inspection through safety preservation inspection.

A team consisting of two or more nuclear safety inspectors implements nuclear safety inspection.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

Our resident inspectors review weekly licensee CAP by viewing computerized corrective action programme entries. Semiannually and annually, they review trends and follow the two or three most important to safety findings. During routine inspections the inspectors review a selection of findings related with the inspection subject, and during the biannually inspections the inspectors review a sample of most important safety findings, trends, the corrective action programme, the independent evaluations and self assessment evaluations.

Netherlands

The routine inspections (see question 7) are carried out once a week.

The audits by the RB are carried out two/three times a year.

For the other inspections see table 1.

Spain

- Routine resident inspector inspections quarterly as well as an annual inspection.*
- Verifications of the CAP are carried out in the systematic inspections planned by the CSN.*
- An specific biennial inspection*

Sweden

Not Applicable.

United Kingdom

Routine LC7 compliance inspection and other relevant and other relevant interventions about 2 or 3 times annually. A formal targeted team inspection will be carried out on QA once per year plus other interventions in response to events.

United States

NRC Response: The NRC has routine resident inspector inspections that will look at all of the CAP entries on a daily basis, semi-annual trend reviews, annual follow-up of selected issues, and biennial team inspections. The NRC has other inspection procedures (supplemental and special inspections) for following up on significant operating events, findings, and performance indicators.

Question 10

What inspection effort is used (inspector hours per plant) for CAP inspections (if more than one type of inspection is performed for this purpose at a licensee, discuss the resources for each type of inspection)?

Belgium

A thematic inspection requires about 4 to 5 man-days (preparation, realization and writing) for a plant. The inspection effort is difficult to calculate for routine and specific inspections (strongly depends on the topic).

Canada

Rough hours are as follows:

<i>type 2 (performance inspections) on cap</i>	<i>60 hours per inspection including report</i>
<i>type 1 (cap program or process content)</i>	<i>250 hrs per inspection (annual for now))</i>
<i>licensee events/database monitoring/</i>	<i>200 hrs per year</i>
<i>control room logs</i>	<i>500 hrs per year per control room</i>
<i>events inspection</i>	<i>variable, 2 person team inspection for a week, and add document</i>
<i>review, for a year</i>	

Czech Republic

Team inspection – 6, routine in accordance with necessity to discuss events with headquarter specialist, unplanned reactive inspection usually 2 - 3 inspectors.

Routine inspections on the average 550-600 hours per plant, “top” team inspection roughly 600 hours and unplanned inspections roughly 60 hours.

Finland

Periodic inspections are usually made annually and average number of inspectors in the team is around four. Inspections take normally one or two days at the site and preparation takes normally 2 days per inspector. Average working days used to one inspection is around 15-20 days totally.

Event inspections depend on the significance of event and they might take substantially more resources.

Germany

For the result oriented inspections it is not possible to identify the fraction used for CAP inspections (see questions 9).

For process oriented inspections the total effort can be estimated:

- For event reporting and related inspections approx. 40 inspector hours per plant and year*
- For event analyses and operations experience feedback approx. 40 inspector hours per plant and year,*
- For HOF analyses and safety management system inspections approx. 80 - 200 inspector hours per plant and year*

Japan

Answers: Nuclear safety inspection is implemented at each power station. It is implemented by a team consisting of two or more nuclear safety inspectors. One periodical nuclear safety inspection is carried out for two weeks as a rule. Multiple inspection items are checked during this period. The time required for inspection differs depending on nonconformity events to cover even when the CAP is inspected. Therefore, time rules are not defined.

Korea

- *Inspection, at present, for the CAP is not implemented.*

Mexico

120 inspector hours per plant is used for CAP inspections

Netherlands

*For routine inspections: 20 hours (inclusive preparation and reporting)
For RB-audits (nr 16): 120 hours (inclusive preparation and reporting)
Incident investigation: 100 hours per (medium) incident
2-yearly evaluation: 200 hours (in 2 years)
10-yearly evaluation: 1000 – 1500 hours (in 10 years)*

Spain

Routine inspections of resident inspectors: 30 minutes daily, as an average.

Annual inspection performed by resident inspectors: 40 hours.

Biennial inspection: 150 to 200 hours.

Verifications performed during other planned inspections: around 10 to 15 % of the total time devoted to the inspection.

Sweden

Not Applicable.

United Kingdom

Approximately five inspector days on routine activities plus about four inspector days on QA interventions per year. Not all of this time will be allocated to CAP attention.

United States

NRC Response: The daily review of CAP documents will take between 30 to 50 minutes per day, which equates to an annual effort of 125 to 208 hours per year (the time depends on how many reactor units are at a site). The semi-annual trend review is estimated to take an average of 16 to 24 hours per year. The annual follow-up of selected issues is expected to take between 56 to 80 hours per year, depending on the number of reactor units at a site. The biennial inspection is expected to take an average of 212 to 288 hours of inspection effort.

Evaluation of the CAP Effectiveness

Question 11

How do you assess whether the licensee has appropriately prioritized items in its CAP (based on safety significance)?

Belgium

Engineering judgement / experience of regulator. If needed, regulator can also have help from PSA studies

Canada

CNSC compares assigned priority (or changing priority) to perceived importance with respect to events occurrence or potential consequences and questions licensees.

Regular action meetings include some of these reviews. The self-reporting system also includes action plans (linked to occurrences) which inspectors verify for accuracy.

Czech Republic

The adequacy is mainly assessed and discussed during routine inspections aimed to operational experience feedback. This is of course item for regular summits between both sites and it could be assessed by unplanned special team inspection.

Finland

In relation to events, immediate corrective actions are made as soon as possible and long term corrective actions are presented in the event reports. The Licensee prioritizes the needed corrective actions based on safety significance (safety classification, defence in depth, common cause failure, OLC, PRA, etc.), recurrence and operational importance.

In the Licensee's internal audit system, the findings are categorised as non-conformances and recommendations. The categorisation is based on general guidance. The Licensee's internal audit system is one topic of the of STUK's periodic inspections.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

Well, Licensee prioritizes all corrective actions according to its procedures. The result of prioritization is not a part of investigation report.

Regulator also prioritizes corrective action according to our procedure based on safety significance related to reportable events.

Japan

Answers: Inspectors check to see if the classification rules of nonconformity importance defined by licensees are appropriate based on the importance of equipment and if the prioritization is based on these rules.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

By verifying that the licensee has appropriately classified the item in compliance with its procedure and/or regulatory requirements, as stated in question 2.

Netherlands

The prioritisation of hardware items (components, equipment and constructions) is based on its occurrences in the Operational License Conditions (OLC) or in the operational technical specifications (BTS). When an item is not available the OLC or BTS describes the allowed time to correct this situation.

The “soft items” (improving safety culture, upgrading staffing) are mainly determined by the results of the 2- and 10-yearly evaluation.

Also a yearly meeting is arranged where the effectiveness of the licensees’ organisation is discussed (16). At these discussions also the Human Performance and Safety Culture (HP&SC) aspects are assessed.

Spain

The inspector’s oversight the correct application of the documents that establish the application of criteria for the adequate categorization of problems based on safety significance and for the type of action and time for its resolution.

The activities of follow-up of the CAP performed by the Licensees are also verified during the inspections.

Finally it is also verified that all the problems over a threshold are introduced in the CAP.

Sweden

Not Applicable

United Kingdom

By comparison with one’s own and the organization’s judgement and by benchmarking against experience and knowledge of other licensees’ processes always bearing in mind the safety significance.

United States

NRC Response: Each plant submitted a description of what it considered to be conditions adverse to quality and significant conditions adverse to quality (in accordance with 10 CFR 50, Appendix B, Criterion XVI) during its licensing phase. The licensee’s approved CAP program defines the levels of significance that can be assigned to issues and provides examples for each level of significance. NRC

inspectors will compare licensees' significance assignment to the program procedures and use risk insights for determining the appropriate significance level.

The NRC reviews the procedures describing the licensee's CAP. The NRC evaluates the methods for assigning and tracking issues to ensure that issues are screened for operability and reportability, prioritized for evaluation and resolution in a timely manner commensurate with their safety significance, and tracked to identify adverse trends and repetitive issues. In addition, the NRC interviews plant staff and management to determine their understanding of and involvement with the CAP.

The NRC reviews issues selected across the seven cornerstones of safety in the NRC's Reactor Oversight Process to determine if site personnel properly identify, characterize, and enter problems into the CAP for evaluation and resolution. The NRC selects items from the maintenance, operations, engineering, emergency preparedness, physical security, radiation safety, and oversight programs to ensure that the licensee appropriately addressed problems identified in each functional area. The NRC selects a risk-informed sample of issues that are issued since the previous NRC PI&R inspection. The NRC considers risk insights from the NRC's and the station's risk analyses to focus the sample selection and plant tours on risk-significant systems and components.

The NRC selects items from various processes used at the station to verify that they are appropriately considered for entry into the CAP. The NRC may review a sample of operability determinations, engineering system health reports, and completed surveillance tests. The NRC also reviews work orders for selected components to determine if station personnel enter issues identified during the performance of preventive maintenance into the CAP.

The NRC reviews issues to assess whether the licensee adequately evaluates and prioritizes identified problems. The issues reviewed would encompass the full range of evaluations, including root cause analyses, apparent cause evaluations, and common cause analyses. The review would include the appropriateness of the assigned significance, the scope and depth of the causal analysis, and the timeliness of resolution. For significant conditions adverse to quality, the NRC reviews the licensee's corrective actions to preclude recurrence. The NRC observes meetings in which station management reviews new issues for prioritization and assignment and evaluates root cause evaluations and associated corrective action assignments. The NRC also reviews equipment operability determinations, reportability assessments, and extent-of-condition reviews for selected problems.

Question 12

How do you assess whether the licensee is effectively trending and using information within the CAP to prevent recurrence of similar problems?

Belgium

This assessment is done through thematic inspections (see question 9) and more specifically by assessing the licensee's procedures related to Operating Experience. The Licensee also develops performance indicators in this area. He also uses WANO codification, which makes it easier for trending purposes. These performance indicators and event reports are systematically made available to the regulator.

Canada

Search capabilities in the licensee database, which is available to our inspectors.

Czech Republic

Main criterion for our assessment is no recurrences (definition from legislation) and next one is fulfillment of terms from operator's operational experience feedback committee. This is subject of discussions during CAP inspections.

Finland

STUK's oversight includes that the Licensee's failure statistics are used as input for PRA and ageing management programme.

The licensee shall follow the failure statistics and make appropriate analyses to identify potential weaknesses and changes in SSCs. The results of these analyses shall be compared against component-specific maintenance and inspection programmes, operational environment and age recommendations, procedures and the efficiency of corrective actions taken due to failures. On the basis of the analyses, changes in the operation and maintenance of SCCs shall be designed to ensure reliability. The failure register shall also be utilised in the updating of the probabilistic safety assessment (PSA). Licensees are requested to report annually results of the ageing management programme and the modifications needed for the programme itself. Ageing management is also one topic in the periodic inspection programme.

In case of operational events, the Licensee shall make an assessment of the recurrence of the event or the causes of the event. This is based on their event databases and expert judgement. STUK reviews the event reports and this assessment.

STUK oversees Licensees'

- internal audits*
- self assessment and management system review and*
- independent management system reviews*

by reviewing the procedures and reports and making periodic inspections.

STUK assesses the external audit programmes and the conduct of the audits by participating in the audits as an observer.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

We have some elements but do not have a strong method to evaluate effectiveness of CAP. Need some improvement on this area when the new regulation will come into the force.

Recently, we evaluated some safety performance indicators (number of recurrent events, delay and non-completion of corrective actions etc) and reviewed Licensee's report on self assessment annually mainly related to reportable events. We ask the Licensee to fix problems if we find any or identify causes if the indicator indicates problems. The progress is followed by Licensee reports and target inspections.

Japan

Answers: Inspectors confirm how licensees make good use of the results of a data analysis, that is one of their quality assurance activities, for remedial activities. They also evaluate whether or not information was effectively used depending on the degree of recurrence of similar events. However, this evaluation is difficult because the effect is different depending on how similar events are defined.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

By verifying that the trending are according with the behavior of the plant and reviewing the evaluation in which recurrence has detected.

Netherlands

By checking the monthly reports and assessing the evaluation reports (19 and 21), outage report (14) and investigation of incidents /reporting (7 and 15) the trending is assessed by the RB.

The use of the relevant information by the licensee is checked by inspecting their "work maps" (containing all kind of relevant information to perform a (repair) job, such as pre-job meeting) and following their brush-up courses before every outage period.

Spain

It is requested to the Licensee to assess the trends of problems reported to the CAP, at least once per year. The inspectors also reviewed whether repetitive problems are identified and are upgraded as it is required.

Sweden

Not Applicable

United Kingdom

Through LC7 sample inspections by both “resident” inspectors and other inspectors as part of targeted inspections. Also covered through the annual review of safety process

United States

NRC Response: NRC inspectors review the trending functions and input of the licensee’s CAP software programs and independently follow-up on repeat issues during the routine, semi-annual trend, and biennial problem identification and resolution (PI&R) reviews. The NRC also looks at licensee corrective actions in response to root cause analyses to ensure that the corrective actions prevent recurrence. The NRC also documents qualitative assessments of licensees’ CAPs in inspection reports. The NRC reviews corrective actions associated with selected issues to determine whether the actions address the identified causes of the problems. The NRC looks for repetitive problems to determine whether previous corrective actions were effective. The NRC also reviews licensee staff’s timeliness in implementing corrective actions and their effectiveness in precluding recurrence for significant conditions adverse to quality. The NRC reviews corrective actions associated with selected non-cited violations (NCVs) and findings to determine whether the licensee staff properly evaluated and resolved these issues.

Question 13

How do you assess the effectiveness of licensees' CAP (e.g., are problem recurrences minimized)?

Belgium

See answer 12.

Canada

CNSC does the reverse; and verify if problems had been identified in the past.

Czech Republic

Main criterion for our assessment is no recurrences (definition from legislation) and next one is fulfillment of terms from operator's operational experience feedback committee. This is subject of discussions during CAP inspections.

Finland

STUK requires the Licensees to assess the effectiveness its CAP-processes and report periodically of the assessment results to STUK.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 cannot be given as requested.

Hungary

See no. 12.

Japan

Answers: The CAP aims at the prevention of recurrence. For this purpose, it is needed to identify the primary cause of a nonconformity event. Inspectors evaluate the effectiveness by checking that the countermeasures against the event based on this result are implemented. They also evaluate the effectiveness of the CAP depending on the degree of recurrence of similar events.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

By verifying the following:

- a) The successful closure of each finding*
- b) The corrective actions for each finding have effectively resolved the causal factors involved in the finding and will prevent recurrence of the same or similar findings.*
- c) The corrective actions were not implemented in a timely manner.*
- d) Comparing CNSNS results against licensee's own assessment of performance in problem identification and resolution area.*

Netherlands

In the Netherlands there is no systematic approach to assess the effectiveness of the licensees' CAP. Occasionally the various programmes are discussed/evaluated during RB-audits (nr 17), the 2-yearly evaluation process (19) or during the licensees' presentation of the results from the IAEA/WANO missions (20).

Spain

The efficacy of the CAP is evaluated by assessing the problems reported by the Licensee, their capacity to resolve those problems and the efficacy and time of implementation of adequate corrective actions.

Sweden

Not Applicable

United Kingdom

Through consideration of repeat events, overview of the licensee's process, consideration of the licensee's openness to change and the evidence of implemented change requests aimed at correcting deficiencies or improving safety.

United States

NRC Response: The NRC will assess the effectiveness of the licensee's ability to understand issues and implement timely interim and long-term corrective actions to prevent recurrence. Repeated occurrences of significant conditions adverse to quality would warrant violations. The NRC also documents qualitative assessments of licensees' CAPs in inspection reports. The NRC reviews corrective actions associated with selected issues to determine whether the actions address the identified causes of the problems. The NRC looks for repetitive problems to determine whether previous corrective actions were effective. The NRC also reviews licensee staff's timeliness in implementing corrective actions and their effectiveness in precluding recurrence for significant conditions adverse to quality. The NRC reviews corrective actions associated with selected NCVs and findings to determine whether the licensee staff properly evaluated and resolved these issues. The NRC also selects a sample of operating experience (OE) issues to confirm that the licensee evaluates the OE information for applicability and has taken appropriate actions, when warranted. OE documents are reviewed to ensure that underlying problems associated with the issues are appropriately considered for resolution via the CAP.

Evaluation of the Licensee use of the CAP

Question 14

How do you evaluate licensee self assessments (SA) and independent assessments (IA) of its CAP?

Belgium

Experience of regulator's inspectors is mainly used.

Canada

SA and IA are programs that are inspected at baseline frequency.

Czech Republic

Mainly by the inspection aimed to safety culture, secondarily as an assessment of the "soft indicators" during regular summits between regulatory and operator sites

Finland

Licensees have to perform self assessments and independent assessments of its management system processes periodically. The results of these assessments are one of the topic of STUK's periodic inspections.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

See no. 12.

Japan

Answers: The CAP is an activity aiming at the prevention of recurrence and inspectors evaluate whether or not licensees do a self-evaluation of their own CAP from this point of view.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

The licensee audits and self-assessment evaluations are reviewed during the biennially inspections.

Netherlands

During the discussions about the effectiveness of the licensees' CAP (Question 13), this issue is also evaluated.

Furthermore by attending various international working groups (WGIP, WGOE and SEGHOFF) and attending presentations held by the NPP during plant visits of these working groups the effort of the Dutch NPP is "measured."

Spain

By reviewing periodic CAP reports of the licensee, QA audits, trend analysis, and evolution of CAP indicators.

Sweden

Not Applicable

United Kingdom

Through a combination of the annual review of safety process and the safety performance indicators

United States

NRC Response: The NRC will independently perform its own assessment of the CAP and compare its assessment to the licensee's assessments at the end of the inspection. The NRC will also follow-up on the licensee's corrective actions in response to the assessment results. Inspectors will review a sample of corrective action and assessment audits, including the most recent audit of the CAP, CAP trend reports, Quality Assurance (QA) audits, departmental self-assessments, and assessments conducted by independent organizations. These reviews are performed to determine if problems identified through these assessments are entered into the CAP and whether corrective actions are initiated to address identified deficiencies. The effectiveness of the audits and assessments are evaluated by comparing audit and assessment results against self-revealing and NRC-identified findings and observations made during the inspection.

Question 15

How do you evaluate whether the licensee's staff is willing to use the CAP?

Belgium

No specific method is developed. This topic can be covered by inspections.

Canada

Ongoing on-site verification that small events are inserted on the CAP database by staff.

Czech Republic

Mainly by interviews during "top" inspection aimed to safety culture, communication

Finland

STUK considers that there are not such observations which would indicate that Licensee uses its CAP-processes with reluctance.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

This is out of scope in our evaluation practice.

Japan

Answers: Since the CAP aims at the prevention of recurrence, inspectors evaluate by checking whether or not licensee's employees have been able to identify the primary cause of a nonconformity event and proper countermeasures have been implemented against the event based on its cause.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

By conducting interviews with or observing other activities involving licensee personnel during the inspection

Netherlands

The implementation of Recommendations, Suggestions derived from missions (nr. 19), 2- and 10 yearly evaluations (19 and 21) and reports (nrs. 14 and 15) and action points derived from RB-inspections and audits are frequently inspected by the Regulatory Body.

Spain

Usually through interviews with the staff of the licensee.

Verifying whether the organization is using the CAP for the management of corrective actions used to correct deficiencies, for the proposals of improvement and for the commitment with the regulator.

Verifying that CAP issues are included in the routine meetings of the plant.

Sweden

Not Applicable

United Kingdom

Evaluation will include consideration of the number of recorded events, the level of actions identified and progressed and benchmarking these against similar sites and plants. In general, the licensee's have mature processes and any drift away from this status is likely to be identified through normal interactions with site staff at all levels

United States

NRC Response: The NRC inspectors will speak with licensee staff individually about their willingness to use the CAP. The NRC also looks at issues identified in the licensee's employee concerns program, which can be used for submitting anonymous concerns. The NRC will also consider the number of allegations it receives for that site. IP 71152 has an appendix that provides guidance for eliciting responses from plant employees about their willingness to use the CAP.

Question 16

How do you evaluate whether the licensee management promotes staff usage of the CAP process?

Belgium

No specific method is developed. This topic can be covered by thematic inspections related to licensee's management (this kind of inspection is performed at least each year for the site director and for each operational department: health physics, operations, maintenance and engineering). A tip is to look at plant's objectives for the year.

Canada

Traditional ways is to publicly thank staff for detecting conditions that have prevented a recurrent or consequential event.

Czech Republic

Mainly by interviews during "top" inspection aimed to safety culture, communication

Finland

The input to management reviews shall include information on status of preventive and corrective actions. Thus, through the results of management reviews the management's attitude to CAP-process may be estimated.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

This is out of scope in our evaluation practice.

Japan

Answers: Inspectors confirm a report on corrective action submitted by business operators with regard to the fact that information on a nonconformity event is shared in the organization and that countermeasures against the event are implemented in each related department in the organization. They also witness the CAP meeting and confirm the situation of activities for evaluation.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

The licensee's management promotes the staff's usage of the CAP process by keeping the CAP simple, involving all personnel, providing easy access for reporting information, etc.

Netherlands

The use of corrective action programmes is a fundamental process of the quality insurance system of the licensee.

By inviting international missions and participating in WANO missions and international working groups the management stimulates its staff to broaden their view in order to improve (CAP-) processes at the NPP.

Spain

Verifying whether the management has implemented actions to encourage the use of the CAP, and the CAP issues are treated in the meetings of the top management.

Verifying that the aims and indicators of the CAP are in the control panel of the Management.

Promoting some kind of economical incentive for the staff for dealing with CAP issues.

Sweden

Not Applicable

United Kingdom

This aspect may be addressed as part of safety culture evaluation activity and is subject to consideration during routine interactions on site. (See also response to 15.)

United States

NRC Response: The NRC will consider the responses to the interviews discussed in the previous answer and the allegations it receives. The NRC also reviews safety culture assessments and allegations, and resident inspectors observe management interactions with their staff. Inspectors will assess the licensee's safety conscious work environment (SCWE) during interviews and discussions with station personnel and review of the licensee's safety culture assessment SCWE-related aspects. Specifically, inspectors will assess whether workers were willing to enter issues into the CAP and raise safety concerns to their management and/or the NRC. Inspectors conduct individual interviews and hold discussions with staff and supervisors regarding use of the CAP, work processes, and other PI&R activities. Inspectors also look at the licensee's Employee Concerns Program (ECP) to determine if employees are aware of the program and using it to raise concerns. Inspectors also review a sample of the ECP files to ensure issues were entered into the CAP.

Examples of Experience from this Oversight Programme

Question 17

Discuss any regulatory benefit you have experienced from the use of this oversight process.

Belgium

One cannot have good performance (and prove it) without a good process. And examining a process gives no guarantee that it will give good results. As for other topics, it is important to examine both sides of the process (i.e. the process and its practical application).

Canada

Canada determined that the existence and proper use of capabilities to detect, report and self correct issues is a key to maintain assurance that the licensee is showing effective processes and maintaining safety.

Czech Republic

Continual improvement of nuclear safety and safety culture, regulatory activities are from my point of view permanent enforcement to operator to improve nuclear safety, but the benefit is very uneasily described

Finland

Effective CAP-processes are prerequisites of maintaining and developing the safety of the plant therefore CAP-processes are often topics of STUK periodic inspections.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 can not be given as requested.

Hungary

The causes of a problem in CAP can help to focus on weak area in Licensee's process.

Japan

Answers: In Japan, quality assurance has been introduced in regulatory requirements since 2003. At the time of introduction, nonconformity was not defined properly and its information sharing in the organization was limited. Its improper activities were pointed out by safety preservation inspections. As a result, at present, all of licensees properly implement nonconformity management including the definition of nonconformity, information sharing in their organizations and the transparency of dealing with nonconformity. The process period is

properly managed and shortened through the surveillance of the nonconformity situation and corrective actions and giving guidance about them.

This results in the proper function of the nonconformity management and corrective action processes.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

We have experienced that the response and corrective actions implementation time by the licensee to inspection findings has reduced.

Netherlands

In 2006, an important change in the organisation of the NPP took place. It was then decided that every year a presentation by the management of the NPP would be held over the effectiveness of the new organisation. During these meetings also the licensees' programme of improving the HP&SC-process is presented/evaluated.

In this way a fruitful exchange of opinions on the "soft issues" is arranged

Spain

It is considered that use of CAP brings some benefits, such as:

- *Increase of transparency in the treatment of problems of nuclear facilities.*
- *Integrates different systems of management as safety, quality, risk, environment, etc.*
- *Integrates the identification, evaluation and resolution of current and potential problems, including proposals for improvement.*
- *Establish criteria for classify problems depending on its safety significance, and priorities actions.*
- *It is possible to consult the PAC for the whole organization, increasing the transparency.*
- *It is a tool for the management to assign resources taking into account the safety significance, and to facilitate the follow-up of problems and status of actions.*
- *It will be a help in the assessment of repetitive problems.*
- *Establish mechanisms for the evaluation of trends.*

Sweden

Not Applicable

United Kingdom

Benefits arising from a robust process for the licensee's identification and implementation of appropriate corrective actions include:

- *The possibility of reduction of regulatory effort on the basis of enhanced self regulation with confidence that the licensee will take appropriate actions in response to events and concerns*
- *Reduction in the need for regulatory investigations and enforcement activities*

- *Information is available to the regulator for development of the site intervention strategies and actions*

Intelligence is provided that is useful in the development of regulatory approaches to other sites and licensees

United States

NRC Response: A fundamental goal of the NRC is to establish confidence that each licensee is detecting and correcting problems in a manner that ensures nuclear safety is a top priority and protects the health and safety of the public. A key premise of the ROP is that weaknesses in licensees' PI&R programs will manifest themselves as performance issues identified during the baseline inspection program or as performance indicators crossing predetermined thresholds. However, several aspects of PI&R are not specifically addressed by the individual cornerstone PIs or baseline inspections but are addressed by completion of IP 71152.

Question 18

Identify any difficulties in implementing this oversight process.

Belgium

We don't have a "recipe"; we rely mainly on the inspector's experience.

For extensive CAP, we also have to face a large amount of information compared to the resources available. Assessing the CAP also requires one to have a good understanding of the licensee's organization (as the CAP usually uses the existing organization or is influenced by existing organization or licensee's habits).

Canada

The current issue is switching from a verification process that focuses on the completeness of the program to performance of the program in a risk-informed environment.

Czech Republic

I can't identify any difficulties

Finland

No Response

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 cannot be given as requested.

Hungary

We don't have requirements on the regulation level related to CAP.

CAP is not a single area but a part of OEF so many elements of the CAP are not significant in our inspection and evaluation processes.

Japan

Answers: It was possible to operate the nonconformity management and corrective action processes by pointing out the problems and giving guidance properly based on the results of general surveillance. However, it is difficult to know whether or not individual corrective action has effect on the prevention of recurrence of nonconformity events from an execution point of view. To do this, it is needed for licensees to identify individual nonconformity events, to find out the essential causes of these events, and to check to see if their countermeasures are effective for the prevention of recurrence. In addition, it must be made sure that similar nonconformity has not

occurred in the safety preservation activities of licensees in order to review the effect of their countermeasures.

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

At the beginning, the different areas of the licensee were reluctant to adopt the CAP, they preferred to continue with their different programmes that they had.

Netherlands

No specific difficulties encountered.

Spain

CAP:

- Requires consumption of resources, especially during first stages.*
- Needs a strong implication of the Top Management.*
- It is necessary, and difficult, to get the contribution of the whole organization and to be used to identify problems and opportunities for improvement.*
- Usually it is visible to find some resistance to implement the level of transparency and communication needed between staff and with the Managers.*
- There is a high level of exigency to fully compliment all the information requires by the CAP.*

Sweden

Not Applicable

United Kingdom

- Inconsistencies in regulatory approach*
- Lack of guidance and training*

Regulatory attention directed at the CAP and supporting processes has the potential to affect the process itself – i.e. inappropriate use of intelligence gained can deter open and honest reporting and analysis of root causes by the licensee

United States

NRC Response: Each licensee has its unique CAP and may have different thresholds for determining the significance of issues. Inspectors encounter the most difficulty when they disagree with the licensee's significance determination since the thresholds are not the same among the plants. The inspections also require some amount of subjective determination when deciding if corrective actions are timely and adequate.

Question 19

Provide examples of safety significant inspection findings related to the licensee CAP (are there any trends in the nature or subject matter of the findings; e.g., inadequate corrective actions to preclude recurrence, untimely corrective action implementation, poor prioritization, non-completion of corrective actions)?

Belgium

Some years ago, untimely corrective action implementation, poor prioritization, ... were some of the signs detected by the regulator for licensee's declining safety culture and insufficient effort on human resources. It is important to notice that bad CAP never occurs separately from other degradation signs. It is therefore important to consider regulator's oversight of CAPs only as one of the items needed to assess the licensee's global performance.

Canada

At least 2 large events in Canadian stations occurred where the root cause identified that a proper review of OPEX in both cases would have reduced the consequences of the events

Czech Republic

All findings are discussed between the inspection team and operator immediately after finalizing of inspection during handover of written record from inspection. Next way is discussion of "top" findings between both top managements (SONS and CEZ) during regular summits

Finland

Inadequate prioritization of items is causing backlogs and misuse of resources and sometime delays in implementation of the corrective action of important issues.

Resources devoted in to different elements of the CAP-processes, especially internal audits. This has led to delays and in some cases poor quality of the internal audits.

Not state of the art computer systems in recording and follow-up of the items are causing sometimes difficulties and delays in implementation of the preventive and corrective actions.

In some cases the analyses of the CAP-results (NCR and CAR) has been inadequate.

Germany

The responses given to questions 1 to 10 show, that the licensee's corrective action activities are integrated into the overall operation and maintenance programme. Consequently, these activities are an important part of the regulatory inspection programme performed by all regulatory authorities at the Land level. No NPP has a dedicated CA-Programme as a singular process. For that reason, answers to Questions 11 – 19 cannot be given as requested.

Hungary

No Answer

Japan

Answers: The following cases have been identified, though they do not have direct effect on reactor safety.

- *Cases where judgment is made deviating from the classification of nonconformity importance defined by a licensee*
- *Cases where similar nonconformity has recurred more than one time, though corrective action was taken*
- *Cases where pending matters are accumulated due to a delay in the corrective action process*

Korea

Inspection, at present, for the CAP is not implemented.

Mexico

As a result of safety significant inspection findings issued during our inspections to the licensee CAP, we have found the following.

- a) *Inadequate corrective actions to preclude recurrence*
- b) *Non implementation of corrective actions*
- c) *Delay in corrective action implementation*

Netherlands

No specific examples of safety significant inspection findings have occurred

Spain

Some of the findings identified during CAP inspections were:

- *Cross cutting finding for significance weaknesses found during the implementation and operation of the CAP in NPPs.*
- *Inadequate classification of problems and, consequently, inadequate application of actions.*
- *Inadequate prioritizations of actions and its associated period of time to solve the problems.*
- *Delays or fail to include some problems.*
- *Incomplete information requested by records of the CAP.*
- *Delays or lack of the root cause analysis.*
- *Delays in the identification of appropriate actions.*
- *Fail to fulfil the periods established for the actions.*
- *Lack of trend assessments.*
- *Failure to identify and deal with repetitive problems.*

Sweden

Not Applicable

United Kingdom

In the Reactor Division, outstanding corrective actions have been the focus of both licensee and regulator attention over the past few years and have been worked downwards. There has been a big effort to achieve this, particularly with the safety related corrective actions. There are many and as such it is difficult to catalogue a sample.

United States

NRC Response: Since 2000, IP 71152 has enabled inspectors to identify at least 15 findings having at least low to moderate safety significance. Of these 15 findings, 8 findings were cited against 10 CFR 50, Appendix B, Criterion XVI (the NRC's regulation for corrective actions). The findings were associated with licensees' failures to treat issues as significant conditions adverse to quality and to evaluate and correct these issues. The inspection reports that describe these issues are listed below and can be found using the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web-site at www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room). The reports can also be found at:

http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts_body.html

Braidwood: 05000456/2002003, 2002007

Brunswick: 05000324/2004008, 2004009

Fort Calhoun Station: 05000285/2007011, 2008006

Indian Point Unit 2: 05000247/2005006, 2005013

Oconee: 05000269, 270, 287/2003012, 2004011

Oconee: 05000269, 270, 287/2001003, 2001009

Point Beach: 05000301/2002003, 2002005, 2002012

Watts Bar: 05000390/2005008, 2004005, 2005007, 2005011