Unclassified **NEA/CNRA/R(2012)6**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **03-Oct-2012**

English text only

NUCLEAR ENERGY AGENCY
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

NEA/CNRA/R(2012)6
Unclassified

Eleventh International Nuclear Regulatory Inspection Workshop on Experience from Inspection of Ageing and Equipment Qualification, Competency of Operators and Licensee's Oversight of Contractors

Workshop Proceedings

Hosted by ENSI, the Swiss Federal Nuclear Safety Inspectorate
Baden, Switzerland
21 – 24 May 2012

The complete version is only available in PDF format.

JT03327631

Complete document available on OLIS in its original format

English text only

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 34 democracies work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Republic of Korea, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Commission takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1 February 1958. Current NEA membership consists of 30 OECD member countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, the Republic of Korea, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Commission also takes part in the work of the Agency.

The mission of the NEA is:

- 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.

Specific areas of competence of the NEA include the safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information.

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.

COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

The Committee on Nuclear Regulatory Activities (CNRA) of the OECD Nuclear Energy Agency (NEA) is an international committee made up primarily of senior nuclear regulators. It was set up in 1989 as a forum for the exchange of information and experience among regulatory organisations.

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 cooperation 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 may also consider 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 main purpose of the workshop was to provide a forum of exchange of information on the regulatory inspection activities. Participants had the opportunity to meet with their counterparts from other countries and organisations to discuss current and future issues on the selected topics. They developed conclusions regarding these issues and hopefully, identified methods to help improve their own inspection programmes.

The NEA Committee on Nuclear Regulatory Activities (CNRA) believes that an essential factor in ensuring the safety of nuclear installations is the continuing exchange and analysis of technical information and data. To facilitate this exchange the Committee has established working groups and groups of experts in specialised topics. The Working Group on Inspection Practices (WGIP) was formed in 1990 with the mandate "… to concentrate on the conduct of inspections and how the effectiveness of inspections could be evaluated… ". The WGIP facilitates the exchange of information and experience related to regulatory safety inspections between CNRA member countries.

These proceedings cover the 11th International Workshop held by WGIP on regulatory inspection activities. This workshop, which is the eleventh in a series, along with many other activities performed by the Working Group, is directed towards this goal. The consensus from participants at previous workshops, noted that the value of meeting with people from other inspection organisations was one of the most important achievements. The focus of this workshop was on experience gained from regulatory inspection activities in three areas:

- Inspection of aging and equipment qualification (full title: Inspection of systems, structures and components (SSCs) affected by aging mechanisms and equipment qualification, including equipment with limited access, such as buried piping).

- Inspection of competency of operators.

- Inspection of licensee's oversight of contractors.

Members of the workshop organising committee wish to acknowledge the excellent planning and arrangements made by the staff of the host organisation, ENSI, the Swiss Federal Nuclear Safety Inspectorate. Special recognition is given to the Swiss CNRA member, Mr. Georg Schwarz, for his leadership and support to the WGIP, and to the Swiss WGIP member, Mr. Hans-Rudolf Fierz, for his essential coordination and efforts for the workshop.

Special acknowledgement is given to the WGIP members who facilitated the topic discussion groups, Julio Crespo, Tim Kobetz, Pierre Barras, Burton Valpy, Jukka Kupila, and Carmen Rodriguez-Mate.

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

The main objectives of the WGIP workshops are to enable inspectors to meet with inspectors from other organisations, to exchange information regarding regulatory inspection practices, to discuss the selected topics, to discuss contemporary inspection issues, and to develop conclusions and commendable practices (if possible) on the selected topics.

As part of the registration, participants were asked to respond to a questionnaire describing practices within their own countries on the workshop topics. The complete compilation of questionnaire responses is contained in the appendix (separate report) to this document.

Approximately forty-five (45) participants from eighteen (18) different countries took part in the workshop. Countries included: Belgium, Canada, Czech Republic, Finland, France, Germany, Hungary, India, Japan, Republic of Korea, Mexico, Poland, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and United States.

Six discussion groups were established for the breakout sessions. Each group consisted of inspectors from different regions and countries to ensure diversity of views for each of the topics. Discussions groups met for three separate sessions on one topic. The exchange between participants was open and active, and the groups formulated conclusions and identified commendable practices.

Evaluation of the workshop results are based on questionnaire responses received from the participants at the closing of the workshop. The evaluation showed that, as in the past workshops, the highest value perceived, was in meeting and exchanging information with inspectors from other organisations. Responses also showed that the format selected was highly favoured and that more workshops of this type are supported in the future.

The results of the evaluation also reflected that participants in exchanging information are provided a unique opportunity to “calibrate” their own inspection methods against those from other countries. While exchanging inspection practices and learning new ideas are part of the main objectives, this opportunity to recognise and understand commonalties and differences is equally important.

Overall discussions between the various participants both in discussion group sessions and throughout the workshop were extensive and meaningful. Ideas and practices regarding regulatory inspection activities were exchanged and it can be foreseen that these ideas will provide improved expertise when being applied in the future.

The workshop conclusions include observations and commendable practices for each topic that were developed by the discussions groups.

2. ORGANISATION AND OVERVIEW OF WORKSHOP

2.1 Planning

Preliminary planning for this workshop, the eleventh in a series, of International Workshops on Regulatory Inspection Activities began following the conclusion of the previous workshop in Amsterdam, the Netherlands, in May 2010. Formal planning started following approval by the CNRA at its annual meeting in December 2010.

Members of the Working Group on Inspection Practices (WGIP) reviewed comments and suggestions made at previous workshops and considered and discussed ways to improve the format of the workshop. The workshop was hosted by the Swiss Federal Nuclear Safety Inspectorate, ENSI in Baden, Switzerland on 21 - 24 May 2012.

In the evaluation at the previous workshop [references: NEA/CNRA/R(2010)5 and (2010)6], participants suggested topics for discussion at a future workshop. The working group considered these topics and also reviewed various proposals on other contemporary topics that were of interest to the countries. Four potential topics were developed and proposed to the CNRA. The committee approved the workshop and chose three topics for the workshop at the December 2010 CNRA meeting. Members of the workshop organising committee further defined the issues to be discussed under each of these topics.

The workshop followed the well-established format which was first utilised in 1992 in Chattanooga and has evolved over the continuing series of workshops. The WGIP workshops consist of three topics. The topic discussions occur in parallel. As such, as part of registration, each participant designates the one topic in which he/she will participate. Many countries elect to send three inspectors, one for each topic, so that the country can benefit from all three topics. In the plenary opening session to 'set the scene', the topic leads give the opening presentation based on their analyses of the questionnaire responses. Next, participants divide into small discussions groups to discuss the topic in detail. In general, there are two discussion groups of 7 – 10 participants for each topic. In the plenary closing session, the leads present the results of the discussions and commendable practices that have been derived, so that all of the workshop participants can benefit from the other topics.

2.2 Announcement and Pre-workshop Activities

The workshop announcement was transmitted in the fall of 2010. As part of the registration form, participants were asked to respond to a questionnaire describing practices within their own countries on the topics for inclusion as pre-workshop information. The responses were used to prepare the opening topic presentation and were used as background material for the group discussions. A compilation of the responses is produced as an appendix to these proceedings.

2.3 Overview of Workshop

Facilitator Training

Prior to the start of the workshop, facilitators attended a training meeting. As the WGIP chair and vice-chair, Steve Lewis and Julio Crespo led the training. Mr. Lewis reviewed the general objectives of the workshop and outlined the various characteristics required of a good facilitator and recorder. He noted the importance of their role in guiding the group, opening discussion, continually monitoring that all of the group members participate in the discussion, and various methods to manage an effective discussion. Mr. Crespo reviewed techniques to promote active participation. He also discussed various alternatives for the two discussion groups for each topic to interact during the workshop, such that each group has the opportunity to follow independent discussion paths but also benefit for some interaction with the other group. Next, the two facilitators for each topic met to review the various issues transmitted via the questionnaires and to outline major points to be covered in the discussion sessions.

Meet-and-Greet Session

The evening before the workshop, a reception was hosted by ENSI to allow participants to meet each other in an informal setting. The discussion groups are posted to allow group leads and participants to introduce themselves. This informal session allows the workshop to begin in a more productive manner given that initial introductions have been completed.

Opening Session

Mr. Georg Schwarz, Deputy Director General of the Swiss Federal Nuclear Safety Inspectorate, ENSI, welcomed participants to the Switzerland. He gave recent examples from Switzerland to demonstrate the timeliness and importance of the workshop topics and encouraged the participants to actively participate.

Mr. Steve Lewis, Chairman of WGIP, welcomed the participant and noted the importance and relevance of this type of workshop and the excellent opportunity it presented to both inspectors from OECD Member countries and non-member countries to meet and exchange information on important issues.

Ms. Diane Jackson, NEA Deputy head of Nuclear Safety division and WGIP technical secretariat, provided a welcome on behalf of the Nuclear Energy Agency. She provided the context of the senior regulators that server on the CNRA and expressed their support and expectations for the workshop. Additionally, she noted that a major benefit for the countries is for the participants to apply the information to the inspection programme when they return to their regulatory organisation.

The leads reviewed the questionnaire responses and created opening presentations. The opening presentation summarized the responses and auggested additional questions for the discussion groups. The presentations are summarized in the topic chapters. The topics and presenters were as follows:

1. Mr Julio Crespo, CSN, Spain on the Inspection of systems, structures and components (SSCs) affected by aging mechanisms and equipment qualification, including equipment with limited access, such as buried piping (short title: Inspection of aging and equipment qualification).

2. Mr Tim Kobetz, NRC, United States on the Inspection of competency of operators.

3. Mr Pierre Barras, Bel-V, Belgium, on the Inspection of licensee's oversight of contractors.

Group Discussion Sessions

Participants were divided into six discussion groups, based on their preference given at registration, to discuss topics. Three (3) half-day sessions were held. A facilitator and recorder worked with each group to stimulate and encourage discussions. For each topic, there were two discussion groups. The group leads coordinated time for the participants to interact as well as time to have sufficient time for good discussion.

Presentations by host country representatives

Two licensee representatives presented information on the recent regulatory issues in Switzerland at each of their plants.

Kernkraftwerk Leibstadt (KKL)

The representative of KKL made a presentation on the Competency of Operators. This presentation included an overview of KKL's operating nuclear power plants and its organisation, including the staffing of the six (6) shift teams for each unit. Directly addressing what the competency of operators means, six (6) key areas were identified where operators need to have competency.

1. Nuclear Basics including an understanding of reactor physics, thermo hydraulics, health physics and chemistry.

2. Technical Knowledge of mechanical, electrical, and instrumentation and control components and systems.

4. Plant Performance during normal operations, anticipated operational occurrences, design basis accidents and severe accidents.

5. Phenomenology of accident progression and other events.

6. Operating Procedures for normal operations and emergency procedures.

7. Human Performance Tools to minimize the impact of human errors on safe operation including 3-way communications, peer checking, STAR (Stop, Think, Act, Review), and pre-job briefings.

Developing and maintaining operator competence was also discussed by KKL. Methods described included classroom sessions, self study, simulator training, computer based training methods, on-the-job training, and participation in emergency exercises and drills. Examples were provided showing the basic training provided to preparing engineers for license exams and the annual retraining that operators have in the key areas of competency.

In closing KKL noted that competency of operators requires knowledge and skills in a wide range of topics. Further, assessment of individual operator and team competence requires a good knowledge of plant design and procedures. It was also stressed that improvement is only possible by sharing experiences between nuclear power plant operators as well as with the regulator.

AXPO Kern Energie

Information was shared on a recent reactor coolant pump seal failure at NPP Beznau in Switzerland. NPP Beznau started commercial operation in 1969 and the original reactor coolant pump seal operated successfully until 2011 when it was replaced (more than 40 years). Details were discussed about the

specific design of the reactor coolant pump and how the pump failed. The root cause of the failure was determined to be deficiencies in the drawings that created all of the problems that led to the failure. Mistakes were made when adopting the original drawings by the licensee for the support ring replacement in 2011. Geometric differences of the parts created the support ring to be displaced and defects to the O-ring that eventually lead to the failure of the reactor coolant pump seal. These small deficiencies resulted in a 23 day shutdown and about 3 man-years of unplanned work to repair the reactor coolant pump seal and restart the unit.

In the conclusions of this presentation it was noted that the problem stemmed from a drawing problem, and was not an ageing issue.

Closing Presentation of Topics

A closing presentation on each of the workshop topics was made by the facilitators. Each presentation was followed by general questions and comments from the floor. Each of the groups developed a set of commendable inspection practices based on their discussions.

Remark on "commendable practices": Commendable practices are extracts from the topics, which were discussed by the workshop participants and were thought to be reference for Member countries. These are neither international standards nor guidelines. Each country should determine inspection practices, considering its own historical, social and cultural backgrounds and the commendable practices can be useful reference when each country improves its inspection practices.

Closing Remarks

Mr. Lewis remarked on the success of the discussions. Mr. Lewis noted, as typical for the inspection practices workshops, that there had been open and frank exchange during the group discussion sessions. He also noted that many of participants took advantage of the scheduled informal sessions to further bilateral exchange. Discussions on the workshop topics have shown that:

1. These workshops for inspectors continue to provide a unique environment in which inspectors can exchange information on current issues to gain insights and to also validate their own processes.

2. The topics were well developed and the participants were well prepared and made important contributions.

3. The development of both commendable inspection practices and the development of new challenges to be faced were successful and participants and their national organisations would hopefully benefit from the insights gained.

In closing the work, Mr. Lewis thanked the ENSI staff in particular the efforts of a few individuals who made major contributions. Mr. Hans-Rudolf Fierz who co-ordinated the organisation efforts, the programme and ensured the success by their diligence to all the many details involved. Mr. Lewis also thanked Ms. Diane Jackson (OECD/NEA secretariat) for her service to the Working Group on Inspection Practices, which included support from NEA, all organisational aspects for the groups programme of work and for the group meetings and workshops.

In concluding, Mr. Lewis thanked all the workshop participants, facilitators and recorders remarking that without their contributions, hard work, dedication and commitment the workshop would not have been a success.

Technical Excursion

As an additional offer to the participants, a technical excursion tour was made to the Swiss radioactive waste repository. Staff members of the facility operation organisation provided an introduction and a guided tour of the facility.

Reception and Dinner

A reception and dinner was held mid-way during the workshop. Participants are given the opportunity to socialise and exchange information in an informal setting. This dinner is an excellent means to facilitate participants to meet other workshop participants that are outside of their discussion group and encourages bilateral exchanges. Mr. Georg Schwarz, Deputy Director General of the Swiss Federal Nuclear Safety Inspectorate (ENSI) welcomed participants to the dinner and provided some history of the guild house restaurant.

3. TOPIC 1: INSPECTION OF AGING AND EQUIPMENT QUALIFICATION

3.1 Topic Introduction

As nuclear facilities age, the continued effectiveness of systems, structures and components (SSCs) affected by aging mechanisms and equipmentqualification must be verified. Of note, based on recent operating experience, these SSCs include equipment with limited access, such as buried piping. This workshop topic is not a new issue, in Regulatory Aspects of Life Extension and Upgrading of NPPs - CNRA Special Issue's Meeting 2000 Report [NEA/CNRA/R(2001)1 and (2001)2] and in 1999 the WGIP addressed the issue in the topic of Regulatory Inspection Activities related to Older Operating NPPs, NEA/CNRA/R(99)2. However, much has been learnt since then, more plants have sought the regulatory approval for extended operation and additional science and operating experience have been identified. The CNRA Senior Task Group on long-term operation has also recently completed a look at the regulatory perspective of long term operation. The focus of this workshop topic is to identify commendable inspection practices for gaining confidence on verifying the licensee's ability to maintain the effectiveness of aging SSCs.

3.2 Discussion Group Members

Inspection of aging and equipment qualification								
*** WGIP members**								
Group 1					**Group 2**			
Mr.	**Julio**	**Crespo ***	**Spain**		Ms.	Carmen	Rodriguez Mate	France
Mr.	Reginald	Hadden	UK		**Mr.**	**Mikulas**	**Bencat ***	**Slovakia**
Mr.	Arvind Paul (A.P.)	Garg	India		**Mr.**	**Luis Miguel**	**Gutierrez ***	**Mexico**
Mr.	Alain	Geens	Belgium		Mr.	Tage	Eriksson	Sweden
Mr.	Petri	Vuorio	Finland		Mr.	Masakuni	Koyama	Japan
Dr.	Sweng-Woong	Woo	Korea		Dr.	Johannes	Hammer	Switzerland

3.3 Pre-workshop Questionnaire

For preparation of the workshop, participants were invited to supply their national inspection approaches used according to the following questionnaire:

1. Did/Does the licensee qualify during construction active or passive components to be able to cope with an important event? YES NO

   1.1. Which kind of requirements e.g. ASTM/ASME standards, codes?
   To what extent?

   - Seismic YES NO
   - Environmental YES NO

   1.2. What method was used?

   - Test YES NO
   - Analysis YES NO
   - Code/calculation YES NO

   1.3. Did the RB assess and inspect the process?

   1.4. Was there any RB approval required?

2. How have the requirements evolved during the past years?

   2.1. Have they changed to more or less severe?

   2.2. Has the scope (list of the (SSCs) been modified? If the answer is yes – please explain the main reasons.

   2.3. Does your RB inspect the process to ensure that new requirements are implemented? If the answer is yes – briefly describe how.

   2.4. Does your RB inspect the process to ensure that if equipment is modified its qualification is also adequately modified? If the answer is yes – briefly describe how.

3. Has your RB required the licensee to implement specific ageing program to check whether the SSCs (passive and active) behaviour is in accordance with expectations.

4. Has your licensee or RB identified problems related to obsolescence, unavailability, etc. of qualified SSCs?

5. Does your licensee use new qualified materials, equipment? If the answer is yes – briefly describe how the RB is involved in this process?

6. How does your RB manage the lack of conformity (non-conformances) when it is discovered? Can your RB stop the operation of the plant or allow justifications to keep the plant operating for a time with supplementary activities. Please provide any example.

7. Is the licensee's upgrading non qualified SSCs? If the answer is yes, please describe the process.

8. How has operating experience been applied concerning qualified SSCs?

9. Has your RB assessed how to inspect SSCs with limited access?

3.4 Topic 1 Opening Presentation

To provide the groups with a common basis for discussing Topic 1, Experience from Inspection of ageing and equipment qualification, Mr. Julio Crespo, made a presentation summarizing the responses to the pre-workshop questionnaire. He reminded the participants of the focus on identifying commendable inspection practices to verify the licensee's ability to maintain the effectiveness of ageing structures, systems, and components.

The responses to the first set of questions were that most of the licensees qualify active and passive components to be able to cope with events using established seismic and environmental qualification standards (i.e., ASTM, IEEE, or other requirements). Further, methods used to demonstrate the capabilities of SSCs include tests, analyses, and code calculations, or some combination of these methods. Most of the regulatory bodies inspect these processes, directly using sampling methods or by the use of a third party organisation.

In response to the second set of questions regarding the evolution of ageing management requirements, it was noted that modifications to the requirements have been made to address more severe conditions, especially for seismic requirements. Significant changes were not required to the scope of qualified SSCs. Periodic safety reviews (PSRs) contributed to many of the changes in requirements as some of the SSCs were found to have inadequate qualifications. Regulatory bodies routinely inspect the licensee's processes to ensure new requirements were met and effectively implemented.

Overwhelmingly, the responses to the pre-workshop questionnaire showed that the RBs require licensees to implement specific ageing management programmes. This is also the case for reported problems with obsolescence and unavailability of qualified SSCs. In some cases, it has gotten more difficult to find vendors that are able to fully meet all of the requirements for safety related SSCs. This has resulted in many licensees upgrading their SSCs using dedication processes on components designated for commercial use. This creates the potential for deviations from requirements, or non-conformances, to be introduced into the SSCs. To address this RBs require justification for the disposition of non-conformances using a formal process that includes an analysis of the impact on safety, and as necessary supplemental controls to assure safe operation of nuclear facilities. Operating experience has been used by licensees to evaluate problems and transfer knowledge between nuclear facilities. Also, inspection of SSCs with limited access are being included in periodic inspections, within the scope of periodic safety reviews, inservice inspections, specific monitoring programmes, and the use of new non-destructive examination methods.

3.5 Group Discussion Summary

Group 1 participants started the discussions looking for an acceptable definition of Aging Management. All participants agreed that the IAEA had recognised that licensees have identified a need to manage ageing processes of SSCs. Subsequently, IAEA issued a requirement for licensees to establish an Ageing Management process, this requirement has been incorporated into IAEA Safety Guide No. NS-G-2.12, "Ageing Management for Nuclear Power Plants[1]". Additional information for older plant assessment for long term operation was included in the IAEA Safety Series Report (SRS) No. 57, "Safe Long Term Operation of Nuclear Power Plants[2]".

These guides were considered by all participants as a good starting point, although it was recognized that not all licensees had implemented arrangements to address the IAEA requirements, therefore regulatory bodies should be encouraged to check whether their licensees have an adequate aging management process in place reflecting the mentioned IAEA guidance.

[1] http://www-pub.iaea.org/MTCD/publications/PDF/pub1373_web.pdf

[2] http://www-pub.iaea.org/MTCD/publications/PDF/Pub1340_web.pdf

Initially Group 2 started discussions about the main aspects of ageing and those most relevant considering the qualification of SSCs. After the first work session both groups decided to concentrate their efforts on answering the questions introduced during the opening session and using NS-G-2.12 as a reference document.

3.6 Topic 1 Conclusions and Closing Presentation

The following conclusions emerged from discussions during the workshop (Note - These conclusions and the accompanying commendable practices are based on workshop discussions and do not reflect a consensus NEA opinion. Nevertheless, they can be utilised as a general benchmark for basic comparisons of those issues which inspectors from participating countries share). Although different approaches were discussed both groups focused their attention on trying to establish how to improve the inspection of the licensee ageing management processes. The output was the following commendable practices:

1. It is important that RBs inspect the licensee's Ageing Management Programme to ensure:
    a. The licensee's programme is fully implemented, including consideration of the safety significance of SSCs in order to grade the importance, and that it is functioning.
    b. This should include a physical inspection together with review of documentation.
2. The RB should confirm by inspection that the licensees act proactively by the implementation of the Plan Do Check Act (PDCA) review process that aligns with IAEA Guidance for the systematic approach to managing ageing of a structure or component.
    a. Plan : Planning, Design and Qualification
    b. Do : Operation under planned conditions
    c. Check : Plant Monitoring and Inspection, Aging Detection including any deviation of environmental conditions
    d. Act : Reconsider Qualification and how to manage the impact of aging changes
3. RBs should ensure by inspection that licensees carry out inspections, tests and any other reasonable activities, which should include the use of operating experience (OPEX) data. This approach should lead to a determination of the aged condition of components by providing a prediction of its remaining life.
4. RBs should confirm by inspection that licensees and vendors ensure that the Equipment Qualification (EQ) process contains reasonable measures for identifying and minimizing uncertainties included in the process for determining component's life.
5. RBs should confirm by inspection that:
    a. Licensees keep and maintain a record of all non-conformances related to EQ.
    b. Licensees have a system in place for assessing the impact on safety of EQ related non-conformances.
    c. Licensees have a system in place for assessing the accumulated effect on safety of all EQ related non-conformances.

6. It is important that the RB:

   a. Is kept informed of all research related to ageing and its mitigation.

   b. Ensures by inspection that the licensees have research programs related to aging.

7. SRS No. 57 (SALTO report) identifies that the control of chemistry is an important factor in mitigating ageing effects. The Groups observed that not all licensees are paying adequate attention to these aspects. The RBs should ensure by inspection that licensees have in place adequate chemistry programmes.

8. The Group observed that a large number of licensees have SSCs that are difficult to access for inspection and maintenance activities. To address this problem some licensees have identified and developed a list of SSCs that are difficult to access. They have implemented arrangements to ensure that safety is maintained through inspections, maintenance or other technical justification approaches. The RBs should confirm through inspection that licensees are considering the impact on safety of SSCs with limited access.

9. An observation of this working group is that RBs, licensees and vendors may have a lack of knowledge and competence of the ageing mechanisms of the SSCs important to safety. Therefore the development and implementation of a knowledge management system for ageing should be considered by all relevant parties.

4. TOPIC 2: INSPECTION OF COMPETENCY OF OPERATORS

4.1 Topic Introduction

The competency of the licensee's operators to perform required tasks and understand the status of the plant during various plant operations is vital to the safe operation of a nuclear facility. The focus of this workshop topic is to identify commendable inspection practices for gaining confidence on operator performance during plant operations. The operations include normal, outage, and off normal conditions. Most regulatory bodies have requirements for training and licensing control room operators. However, experience continues to show that poor operator performance may challenge safe plant operations. Therefore, it is important to have a strong inspection process that identifies problems in this area early. This topic was chosen in spring 2010, however the reliance of the actions and knowledge of the operators during the Fukushima accident demonstrates that vigilance in the area is essential.

4.2 Discussion Group Members

Inspection of competency of operators							
*** WGIP members**							
Group 1				**Group 2**			
Mr.	**Timothy**	**Kobetz ***	**USA**	**Mr.**	**Jukka**	**Kupila ***	**Finland**
Mr.	**Per-Olof**	**HAGG ***	**Sweden**	**Mr.**	**Gyula**	**Fichtinger ***	**Hungary**
Mr.	**Yoshihiro**	**Yamamoto ***	**Japan**	**Dr.**	**Matthias**	**Schneider ***	**Germany**
Ms.	Jolana	Korinkova	Czech Republic	Mr.	Francois	Newbury	Canada
Mr.	Dirk	Asselberghs	Belgium	Ms.	Anais	Nouailles-Mayeur	France
Mr.	Paul	Smith	UK	Mr.	Johan	Enkvist	Sweden
Mr.	Davide	Medugno	Switzerland	Dr.	Swen-Gunnar	Jahn	Switzerland

4.3 Pre-workshop Questionnaire

For preparation of the workshop, participants were invited to supply their national inspection approaches used according to the following questionnaire:

1. Field observations
    a. Does your RB perform field observations and inspections during control room operations?
        i. If not, how does your RB get confidence that the plant is being operated safely?
        ii. If yes, what is included in the inspections?
    b. Describe how your RB assesses human performance in the control room.
        i. Does the operator have guidance for expected behavior of control room operators (other than operating procedures)? If so, describe your RB's inspection activities in this area.
        ii. Do operators have strict requirements for whom and how many people are in the control room at any given time?
        iii. Does your RB evaluate shift turnover?
        iv. Does your RB inspect operational activities outside of the control room (e.g., accompany auxiliary operators on their rounds?
    c. How does your RB inspect the control room operator's performance?
        i. Normal operations.
        ii. Outage operations.
        iii. Unplanned and infrequent events (e.g., plant trips, loss of safety equipment, etc.).
    d. How do inspectors ensure that they do not interfere with or distract operators during normal operation and unplanned and infrequent events?
        i. Does your RB have written guidance for the inspectors?
        ii. Does the operator discuss its expectations with the inspectors?

The following two questions are background questions to assist the Workshop participants in understanding the regulatory and inspection requirements associated with operator licensing.

2. Control room operator initial training and qualification
    a. Does the operator have a programme to train and qualify control room operators? If yes, is the programme approved by the RB?
    b. Briefly describe the operator's initial qualification process.
        i. What types of operational scenarios are included in the training (e.g., are EOPs and SAMGs included, are administrative procedures included)?
        ii. Length of simulator training?
        iii. Length of course work?
        iv. Length of on-the-job training?
        v. Is there a minimum level of education required to become a control room operator?

c. What role does the RB have in the process (e.g., do the inspectors observe portions of the training, who issues the license or authorization to the operator)?

3. Control room operator requalification and refresher training

   a. Does the operator have a programme to maintain and re-qualify control room operators? If yes, is the programme approved by the RB?

   b. What role does the RB have in the requalification process (e.g., do the inspectors observe portions of the training)?

4.4 Topic 2 Opening Presentation

All of the major nuclear accidents (TMI, Chernobyl, and Fukushima) and numerous other incidents show that competent control room operators are a key element in the safety of nuclear power plants. It is universally recognized that control room operators hold a key position for safety during normal plant operations, managing work control, nuclear and industrial safety, the conduct of testing and surveillance, implementing actions to limit disturbances to safe plant operations, in accident management, severe accident management, and emergency preparedness.

Nuclear power plants have been operating around the world since the 1950's. Plant modifications and upgrades are changing the way plants operate. For example, power uprates pose challenges to the design and material condition of the plant. This may pose new challenges for plant operators. The workforce operating the plants is also aging. Some plant operating expertise is being lost through retirements and a new group of operators are beginning to operate the plants. Some operator knowledge is therefore being replaced with less experienced staff. This is not a completely bad thing to have happen. New operators bring a fresh perspective and questioning attitude; however, the loss of experience will begin to identify procedural weaknesses that were compensated for by an experienced workforce.

For these reasons, the WGIP determined that a workshop session on operator competencies was warranted to provide inspectors with a set of commendable inspection practices and inspection techniques to identify a decline in operator performance before it can have an effect on plant operations.

4.5 Group Discussion Summary

This workshop session builds on the work of two recent workshops in this area. During the 10th WGIP Workshop in 2010 there was a session on the inspection of safety culture. This session identified several commendable inspection practices to identify a decline in the safety culture of a nuclear plant's staff. In 2011 the WGOE and WGIP conducted a workshop that focused solely on integrating operating experience into the inspection program. The results of those workshops were reviewed and discussed during the 11th WGIP workshop and contributed to the focus of this session.

The discussions during the workshop identified the several areas to inspect to identify declines in operator competencies, as follows:

1. Routine Inspections – Field Observations.
2. Events and Event Follow-up.
3. Operator Training and Authorization.
4. Training for Inspectors.

These areas were chosen by the workshop participants because they provide the best "early warning" that operators may becoming complacent or do not have sufficient knowledge or experience to effectively perform their duties.

4.6 Topic 2 Conclusions and Closing Presentation

The following conclusions emerged from discussions during the workshop (Note - These conclusions and the accompanying commendable practices are based on workshop discussions and do not reflect a consensus NEA opinion. Nevertheless, they can be utilised as a general benchmark for basic comparisons of those issues which inspectors from participating countries share):

Routine Inspections – Field Observations

Inspectors, whether resident inspectors or regional based inspector, should spend sufficient time out in the plant observing day-to-day activities to gain a perspective on operator competencies. Inspectors should have informal discussions with licensee staff and management to get a sense as to whether management expectations are being understood and met by plant staff.

Commendable Inspection Practices

1. Inspection of operator competencies should include:
   a. Pre-job briefings.
   b. Shift turnovers.
   c. Control room observations.
   d. Plant tours with control room and field operators.
   e. Unannounced inspections.
2. Inspectors should have contact with a wide variety of licensee staff:
   a. Experienced staff.
   b. New staff.
   c. Management.
3. Monitor control room operator performance during emergency drills.
4. Monitor the adequacy of licensee operability determinations.
5. Focus on complex activities:
   a. Outages.
   b. Work control centre activities.
   c. Major modifications.
6. Monitor potential performance indicators:
   a. Temporary Instructions/workarounds.
   b. Control room defects maintenance backlog.
   c. Standing alarms.
   d. Corrective actions.
7. Verify that administrative controls are being followed:
   a. Communication protocols.
   b. Fitness-for-duty.

Inspection Techniques

1. Use informal checklists for walk downs and control room observations.
2. Call on technical and human factors support if needed.
3. Talk to your fellow inspectors.
4. Use available safety culture tools to assess operator actions.
5. Use Regulatory Body senior management site visits to help convey your concerns to the licensee.

Events and Event Follow-up

The key for inspectors when responding to, or following up on, an event is to perform and independent assessment of the operator's performance. Obtain and evaluate information available on how the plant and operators responded to challenges (e.g., operating information on safety injections, scrams, etc.). Do not rely on information provided by the licensee's or operators alone.

Commendable Inspection Practices

1. Review of event reports should include human and organizational factors.
2. Inspectors should independently gather data and assess operator response to plant events.
3. Team inspections should be used as necessary to evaluate operator response to significant events.

Operator Training and Authorization

Regulatory authorities are involved on the training and authorization (licensing) of operators in various ways. Some have very strict oversight and some leave it up to the plant owners. Whatever regulatory approach is used in a country the inspectors should assess whether or not it is being followed.

Commendable Inspection Practices

1. Provide inspection oversight of the licensee's systematic approach to training (including teamwork, leadership, communication, education, etc.).
2. Provide inspection oversight of the authorization and re-authorization process.
3. Verify the competency of the trainers.
    a. Subject area.
    b. Training skills.
4. Assess the scope and adequacy of the simulator scenarios.

Inspection Techniques

1. Review operator authorization and re-authorization failure rates.

Management Systems and Expectations

As mentioned earlier, it is very important that management make its expectations on operator performance clear and that the operators understand and adhere to those expectations. With the loss of experienced operators due to retirements, etc. it is important to verify that the licensees have an effective knowledge management system in place.

Commendable Inspection Practices

1. Evaluate whether management expectations for operator performance are implemented, understood, and effective.
2. Evaluate the effectiveness of the licensee's training programme feedback process.
3. Evaluate whether operators have been properly trained on plant modifications and procedural changes.
4. Verify that simulator has been updated to reflect affected plant modifications and provide training to operators as appropriate.

Inspection Techniques

1. Evaluate the licensee's knowledge management programme including, mentoring and succession planning.
2. Evaluate whether plant modifications have taken into account human factors considerations (e.g., analogue to digital conversions).

Training for Inspectors

The ability of inspectors to evaluate safety culture and human factor issues is very important. In addition, a strong technical knowledge of the facility being inspected is also crucial.

Inspector Knowledge

1. Inspectors should be provided training on how to observe control room observations including the assessment of human factors issues.
2. Inspectors should consider training on the site specific or generic simulator.

5. TOPIC 3: INSPECTION OF LICENSEE'S OVERSIGHT OF CONTRACTORS

5.1 Topic Introduction

A part of the Regulatory Body's activities should be devoted to the inspection of the licensee's oversight of contractors. Some commendable practices in this field were identified during the 8th WGIP Workshop, under the topic of Inspection of Interactions Between the Licensee and its Contractors, which took place in Toronto in 2006 [NEA/CNRA/R(2007)1 and (2007)2]. Changes in the nuclear industry sector, including the availability of nuclear expertise, the expansion of the international supply market and the introduction of new technologies have tended to increase the licensee's use of contracted services. These changes have created new or increased challenges for licensees and regulators related to the retention of nuclear expertise, the effective management of the interfaces between the licensees and contractors, and the oversight of contactor manufacturing quality in the context of greater multinational diversity. Aware of these challenges, the CNRA recently published a regulatory guidance (green) booklet on The Regulator's Role in Assessing the Licensee's Oversight of Vendor and Other Contracted Services [NEA/CNRA/R(2011)4]. This booklet includes a check list of items that should be considered by a Regulatory Body when inspecting this topic. The objective of this workshop for this task is to identify possible new or updated commendable practices related with licensee's oversight of contractors.

5.2 Discussion Group Members

Inspection of licensee oversight of contractors * WGIP members								
Group 1					**Group 2**			
Mr.	**Pierre**	**Barras ***	**Belgium**		**Mr.**	**Burton**	**Valpy ***	**Canada**
Dr.	**Walter**	**Glockle ***	**Germany**		**Mr.**	**Zdenek**	**Tipek ***	**Czech Republic**
Mr.	Richard	Rasmussen	USA		**Mr.**	**Andrzej**	**Glowacki ***	**Poland**
Mr.	Masaaki	WATANABE	Japan		Mr.	David	Walden	UK
Mr.	Paul	Berenguier	France		Ms.	Helene	Belaieff	Sweden
Dr.	Susanne	Schulz	Switzerland		Mr.	Alejandro	De Santos	Spain
Dr.	Roland	Scheidegger	Switzerland		Mr.	Albert	Frischknecht	Switzerland

5.3 Pre-workshop Questionnaire

For preparation of the workshop, participants were invited to supply their national inspection approaches used according to the following questionnaire:

1. What is your regulatory framework for inspecting the licensee's oversight of contractors (short answer)?
2. Does the licensee use independent inspection agency to assist him in oversight of contractors? Does your RB perform an oversight of this use?
3. Does your RB certify contractors who may work in your country? Does the licensee certify contractors?
4. How does your RB inspect the interfaces between licensee and contractors?
   a. As a part of inspections on licensee's (Safety) Management System?
   b. The licensee's processes for selection of contractors (including periodic assessment and follow up of improvements, if needed)?
   c. The licensee's processes for supervising contractors services?
   d. The products and the works performed by contractors?
   e. The retention of contractor's safety related information?
   f. Other?
5. Performance of inspections
   a. What type of inspections does your RB carry out to verify the results of the licensee's oversight of contractors?
   b. Does your RB visit contractors or vendor-manufacturers sites? If not, why not? If yes, what are the main topics you inspect and what are the main benefits you gain?
   c. Does your RB have the authority to inspect the contractors and subcontractors of licensees? If not, does the licensee have provisions in the contract allowing RB access to contractors and subcontractors premises?
   d. Does your RB cooperate with other RB for oversight of foreign contractors (reliance on inspections conducted by other RB's, sharing of inspection findings and lessons learnt)?
   e. Does your RB visit the contractor as an observer of the licensee's inspection or for direct inspection?
   f. If your RB witnesses activities by contractors, does the RB carry this out systematically following any specific trend or other methods?
   g. What areas do you actually inspect (e.g., QA, test results, documentation, subcontractor cascade oversight,)?
   h. How does your RB ensure that the licensee has enough in-house competence to supervise the works/services done by contractors, and that they actually perform that supervision?
   i. Does your RB inspect licensee's safety performance indicators for the oversight of contractor performance?
6. What problems or trends have you seen in the licensee's use of contractors (e.g., quality of documents, quality of work)? Were they informed by safety performance indicators?

7. Does the licensee include their findings on contractor's performance in their corrective actions process? Doe your RB include your inspection findings in your corrective action process?
8. Incidents and events
   a. What trends has your RB noticed in the incidents / events attributed to the use of contractors?
   b. How did your RB respond?
9. What does your RB do to make sure that safety related recommendations by contractors (e.g., maintenance programme, experience feedback, such as boiler replacement) are assessed and implemented by licensee if necessary?
10. Are there any other related topics, which you would like to be discussed during the breakout session?

5.4 Topic 3 Opening Presentation

During the opening presentation for topic 3, insights were shared from the assessment of the responses that were received from 14 countries as outlined below.

1. Regulatory framework for inspecting the licensee's oversight of contractors

   In most of the countries, there is no specific regulatory framework to support the direct inspection of contractors. The inspections are focused on licensees and their ability to correctly oversight contractors. This is similar to the response that was provided during the Toronto Workshop held in 2006.

2. Licensee's use of an independent inspection agency to assist in the oversight of contractors and the Regulatory Body's oversight of this approach

   In some countries, licensee uses independent inspection agencies to assist in the oversight of contractors. When this is the case, it is mostly in specific areas, such as pressure retaining components (for instance in the framework of ASME code compliance). When independent inspection agencies are used, the RB does not always perform direct oversight of these agencies.

3. Certification of contractors

   Except for a specific case related to the certification of pressure vessel manufacturers, none of the RBs in the countries that responded to the survey certify contractors who may work at nuclear facilities. The licensees usually develop and implement a certification process of their contractors. This process is examined by the RB.

4. Interfaces between licensee and contractors

   The interfaces between licensee and contractors are always inspected as a part of inspections of licensee's (Safety) Management System. Specifically:

   a. In almost all the countries that responded to the survey, the licensee's process for selection of contractors is examined by the RB. Furthermore, there is one country where the documents describing the licensee's process are approved by RB.
   b. In almost all countries that responded to the survey, the RB inspects the licensee's processes for supervising contractor services. This can be achieved by checking the performance of work, the supervision by the dedicated plant personnel, etc.

c. The products and services performed by contractors are in most of the countries that responded inspected by the RB, but not necessarily because the work is performed by a contractor, but because the work itself is safety related.

d. In a lot of countries that responded, the RB does not inspect the retention of contractor's safety related information. However, in some of the countries, there is specific regulation making it mandatory for contractors to deliver safety related information.

5. Performance of inspections

a. There is a wide range of practices, going from (only) "high level" inspections to (only) spot checks, in order to verify the results of the licensee's oversight of contractors. In a lot of countries that responded, the RB perform both "process oriented" inspections and "result oriented" inspections (for instance within the scope of routine inspections).

b. Except in one country where the regulations do not allow it, all RBs that responded conduct inspections of contractors or vendor-manufacturer facilities. The extent and content of these inspections however vary. In some countries, these inspections are only done for some specific projects or activities (for instance observation of qualification tests for new equipment). In some countries, the RB performs these inspections by arrangement and in conjunction with the licensee. In this case, it allows the RB to assess the effectiveness of the licensee's oversight of the contractor. In one country, the RB inspections of contractor facilities are an integral part of the inspection programme.

c. Depending on the applicable regulations, the RB may have or not have the authority to directly inspect the facilities of contractors and subcontractors of licensees. When regulation does not allow direct inspection of the contractor facilities, specific arrangements can be made to support oversight by the RB. For instance the contract between the licensee and its contractor can stipulate that the RB may inspect the contractor facilities. In other cases, the RB can take part of a licensee's visit at contractor's premises.

d. For some countries that responded, there is no cooperation with the RBs in other countries for the oversight of foreign contractors (for example there is no reliance on inspections conducted by another RB or for sharing inspection findings and lessons learnt). A lot of countries that responded are however engaged in cooperation and sharing of information through international forums and bi-lateral agreements. Some countries are also engaged in the Vendor Inspection Cooperation Working Group (VICWG) of the Multinational Design Evaluation Programme (MDEP), which is a multinational initiative taken by national safety authorities to develop innovative approaches to leverage the resources and knowledge of the national regulatory authorities who are currently or will be tasked with the review of new reactor power plant designs.

e. In some countries that responded, direct inspections of contractors are performed. In some other countries, the RB visits the contractor as an observer of the licensee's inspection. There are also countries where the RB performs inspections of both the contractor and the ability of licensee to supervise the contractor.

f. In most of the countries that responded, the main selection criteria for the RB inspections of contractors are the safety significance of the equipment or activity and the experience feedback (including radiation protection issues).

g. The areas that are typically inspected cover mainly QA, test results, and documentation. In some countries that responded, more specific topics are also inspected, such as contractor qualification or communication and interfaces between licensee and contractor.

h. In most of the countries that responded, the RB ensures that the licensee has enough in-house competence to supervise the work and services provided by contractors. This is accomplished by performing inspections of the QA or management system and by performing specific inspections (for instance during observation of work performed by contractors and supervised by licensee).

i. In almost all of the countries that responded, the RB does not inspect the licensee's safety performance indicators for the oversight of contractor performance. In addition, it seems that licensees do not apply such generic performance indicators.

6. Problems or trends seen by the RB in the licensee's use of contractors

   Examples of problems detected are differences in culture or language, issues related to the adequate performance of commercial-grade dedication, the lack of knowledge about nuclear requirements, etc. It appears however that the problems tend to be random rather than systematic. Problems are usually identified through events or inspections rather than by use of safety performance indicators.

7. Licensee's evaluation of contractors

   In almost all of the countries that responded licensees have processes to evaluate the contractor's performance. These processes are inspected by the RB. Some licensees have put into place a corrective action process that includes inspection findings coming from the inspections of contractors.

8. Incidents and events

   It appears that no general trend or systematic kind of event can be attributed to the use of contractors. Some of the examples given in the questionnaires are: growing ratio of events caused by human factors related to contractors, issues related to the adequate performance of commercial-grade dedication, and events related to the fact that the licensee does not properly oversee the contractor.

9. Safety related recommendations issued by contractors (e.g., maintenance programme, experience feedback, etc.)

   In almost all of the countries, there is no specific RB inspection activity to make sure that safety related recommendations by contractors are communicated to licensees for their assessment and implementation at licensee facilities.

10. Other related topics to be discussed during the breakout session

    RB activities related to safety culture of contractors and subcontractor personnel.

5.5 Group Discussion Summary

In each sub-group first a small roundtable was held (short presentation of members, in particular the specific interests for the topic), then a discussion of possible issues to discuss more in details, amongst others based on the results summary of the questionnaire. For each issue, the sub-group held an exchange of experience and ideas, then translated them into statements and possible commendable practices. The two sub-groups discussed separately, with regular sharing of results and advices. The group used NEA/CNRA/R(2011)4, "The Nuclear Regulator's Role in Assessing Licensee Oversight of Vendors and Other Contracted Services[3]," as a reference during their discussions.

[3] http://www.oecd-nea.org/nsd/docs/2011/cnra-r2011-4.pdf

Discussions

The questions to be considered were:

1. How should the Regulatory Body (RB) ensure that contractors have a strong safety culture?
2. What is an "intelligent customer"? How should RB verify it?
3. Control of the Supply Chain (Management of sub-contractors, Regulatory controls on licensee oversight of the supply chain, Sub-contractor nuclear awareness).
4. Extent of Contractorisation by Licensee (Should regulators set limits? Licensee core competence).
5. Nuclear QM vs ISO9001 (Relevant codes and standards, Quality of technical/procurement specification and who develops it,…).
6. Additional Requirements for Contractors (Outage heaver load vs normal operations).
7. Training and Qualifications of Regulatory Inspectors.
8. Use of Independent Inspection Agencies (Standards of competence,…).

To ensure meaningful discussions were held on as many of these questions as practical, Sub-group 1 focused on questions 1 and 2, while sub-group 2 focused on questions 3, 4, 5, 6. Questions 7 and 8 were not included within the scope of the discussions during this workshop. Building on these discussions, the group developed consensus statements and commendable practices.

5.6 Topic 3 Conclusions and Closing Presentation

The following statements emerged from discussions during the workshop (Note - These conclusions and the accompanying commendable practices are based on workshop discussions and do not reflect a consensus NEA opinion. Nevertheless, they can be utilised as a general benchmark for basic comparisons of those issues which inspectors from participating countries share):

5.6.1 Statements

1. Licensees must have a management system that clearly defines roles and responsibilities for contractor (and sub-contractor) oversight; including the provision for sufficient oversight resources.
2. The licensee should be an "intelligent customer" when procuring goods and services.
3. Licensees are increasingly outsourcing nuclear safety related work; and therefore must be able to justify the basis for the outsourcing, and the controls that will be applied.
4. The resource burdens on licensees and RBs are far greater during outages, with the potential for a nuclear safety culture clash due to the large number of contractors on site.
5. Contractors should have a positive safety culture.
6. Licensees should communicate their expectations about safety culture (in addition to technical requirements) to their contractors and ensure that the expectations are passed down to all sub-contractors.
7. Licensees should verify that their expectations are met and the contractors have a strong safety culture.

5.6.2 Commendable practices

1. RBs should recognize the potential for the increasing trends in outsourcing of nuclear safety related work, and that many of the licensee activities can be safely outsourced.
   a. RBs should review and/or inspect the justification and basis for outsourcing of nuclear safety related work and confirm that adequate controls are in place.
   b. RBs should confirm that the licensee's core competencies remain adequate.
2. RBs should have a regulatory framework that allows inspection of contractors and subcontractors either directly or through the licensee.
3. RBs should recognize that quality plans are an important means of controlling work and inspect them accordingly.
4. The RB should not develop its own performance indicators related to contractor performance. However, the RB should collect and analyze data relevant to the licensee's oversight of contractors for the long term (i.e., on a yearly basis) based on the following areas:
   a. Allegations and complaints.
   b. Industrial safety issues.
   c. Radiation protection issues.
   d. Significant delays and rework.
   e. Results of RB routine inspections.
   f. Operating experience (including information from other industries).
   g. Information from licensee meetings and licensee reports.
5. Regarding the licensee's communication of expectations, the RB should:
   a. Verify that these expectations are:
      1. Documented.
      2. Clear and unambiguous for the whole chain of contractors.
      3. Verify that these expectations cover at least:
         i. Knowledge of the safety importance of their work.
         ii. Training of contractor personnel in the field of safety culture.
         iii. Visible leadership by the contractor management.
         iv. Use of the corrective action program.
         v. Continuous improvement of processes and documents.
         vi. Transmission of relevant operating experience.
   b. Inspect:
      1. Licensee oversight of the way expectations are met.
      2. The ways in which the licensee's expectations are met in the Contractor's work (onsite and offsite).
6. The RB should conduct meetings with licensees to discuss contractor performance and oversight.

7. The RB should inspect leadership:
   a. Of licensee management by observation and by inspecting:
      i. Communication.
      ii. Contracts.
      iii. Management meetings.
      iv. Resolution of corrective actions.
      v. General feedback meetings.
      vi. Feedback from contractors to the licensee.
      vii. Licensee management observations of contractor work.
   b. Contractor management by observing/inspecting:
      i. Licensee audits.
      ii. Work activities.
      iii. Contractor's management reviews.
8. The RB should verify that the licensee is an "intelligent customer" by inspection of the licensee's pass down of:
   a. Technical requirements.
   b. Regulatory requirements.
   c. Quality assurance requirements.
   d. Safety culture expectations, including safety importance of work.
   e. Training, qualification, and re-qualification requirements.
   f. Qualification for equipment use.
   g. Interfaces (with nuclear power plant, licensee and contractors).
   h. Deviation and non-conformance reporting.
   i. Reporting of operating experience (similar to 10 CFR Part 21 in US).
   j. Access for licensee and RB oversight.
   k. Limits for the use and control of subcontractors.
   l. Performance measures and penalties.
9. The RB should verify the licensee's processes and procedures to develop contracts (this should address the above mentioned items).
10. The RB should inspect the licensee's guidance for determining the scope and limitations for contracting.
11. The RB should inspect the licensee's oversight of contractors work:
    a. Licensee observation of work in progress, particularly for work that cannot be verified by post maintenance testing or inspection.
    b. Licensee management observations.
    c. Licensee awareness of corrective action programme information.

d. Observation of licensee/contractor meetings.

e. Review of licensee and contractor audits and self assessments.

f. Inspect licensee review of contractor accreditations and qualifications.

g. Licensee evaluation of contractors.

h. Licensee evaluation of corrective action programme implementation.

i. Licensee project management.

12. The RB should inspect the licensee's technical capabilities to adequately oversee contracted work activities:

    a. Training of its own personnel.

    b. Participation in trade groups/conferences, so that their knowledge and competence remain up-to-date.

    c. Ability of personnel to discuss technical issues, especially during outages.

13. The regulatory body should understand the relationship between the licensee and contractors to adjust the regulatory body actions and level of engagement:

    a. Has the licensee developed long term relationships with its contractors for safety significant activities?

    b. Is the licensee avoiding monopolistic situations?

    c. Does the licensee take into consideration whether there is a suitable ratio of licensee to contractor employees and the frequency of contractor changes?

14. The regulatory body should inspect the licensee's quality management system applicable to contractor qualification (pre-contract):

    a. Processes.

    b. Application and results

    c. Selection should include and prioritize technical staff input.

6. GENERAL WORKSHOP CONCLUSIONS

The topic chapters include the commendable inspection practices that evolved from the various group discussions.

In addition to the feedback provided on commendable practices within each of the topical area, some general conclusions were made at the workshop (Note - These conclusions are based on workshop discussions and do not reflect a consensus NEA opinion. Nevertheless, they can be utilised as a general benchmark for basic comparisons of those issues which inspectors from participating countries share):

- The commendable practices were too general without real inspection hints.
- More emphasis should be placed on formulating a small number of clear and practicable commendable practices.
- The workshop is a positive environment for sharing insights and was very worthwhile. The structure allows for a lot of time for sharing in formal and informal settings, which is a strong positive.
- Countries could be asked to submit some commendable practices in writing for the benefit of others.

7. WORKSHOP EVALUATION

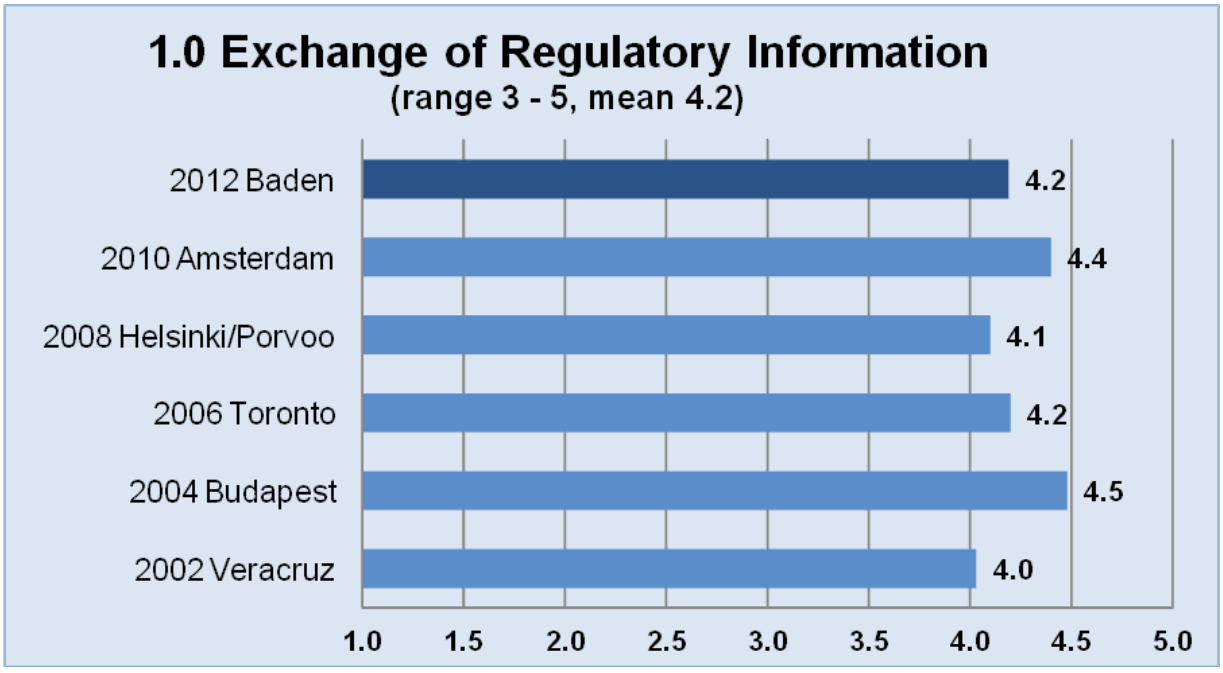
7.1 Evaluation Form Results

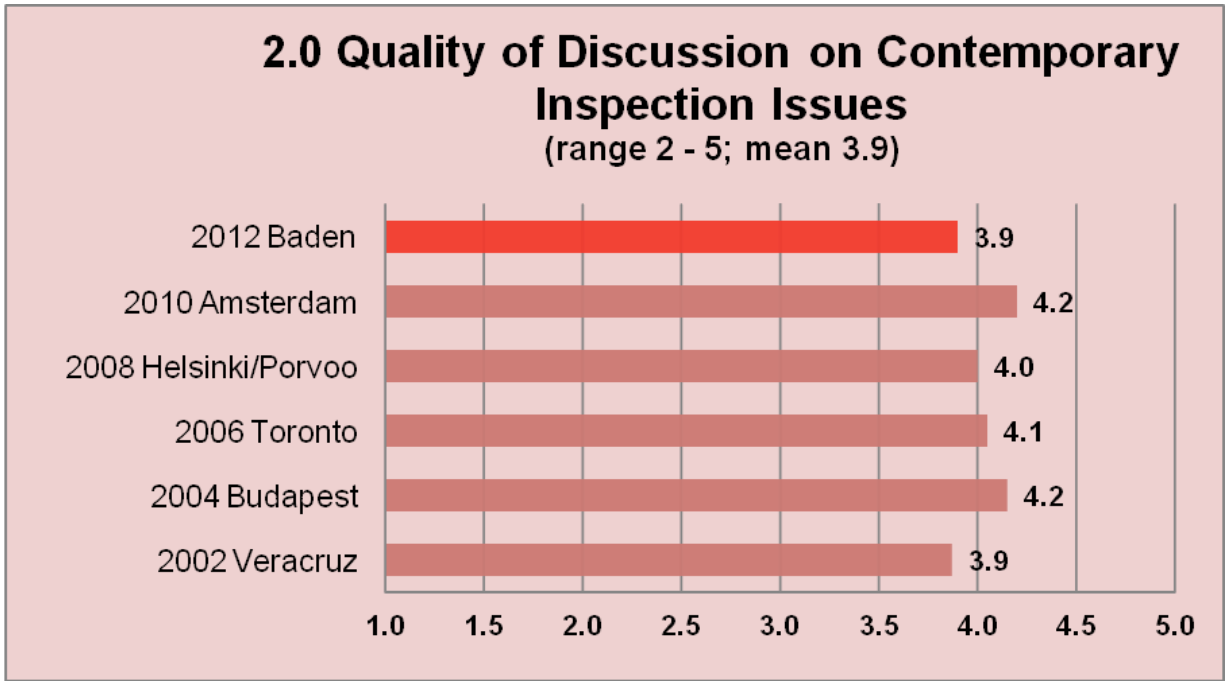
All participants at the workshop were requested to complete an evaluation form. The results of this questionnaire summarised below, are utilised by WGIP in setting up future workshops and to look at key issues for in the programme of work over the next few years. Of the 53 total participants 43 responses were received.

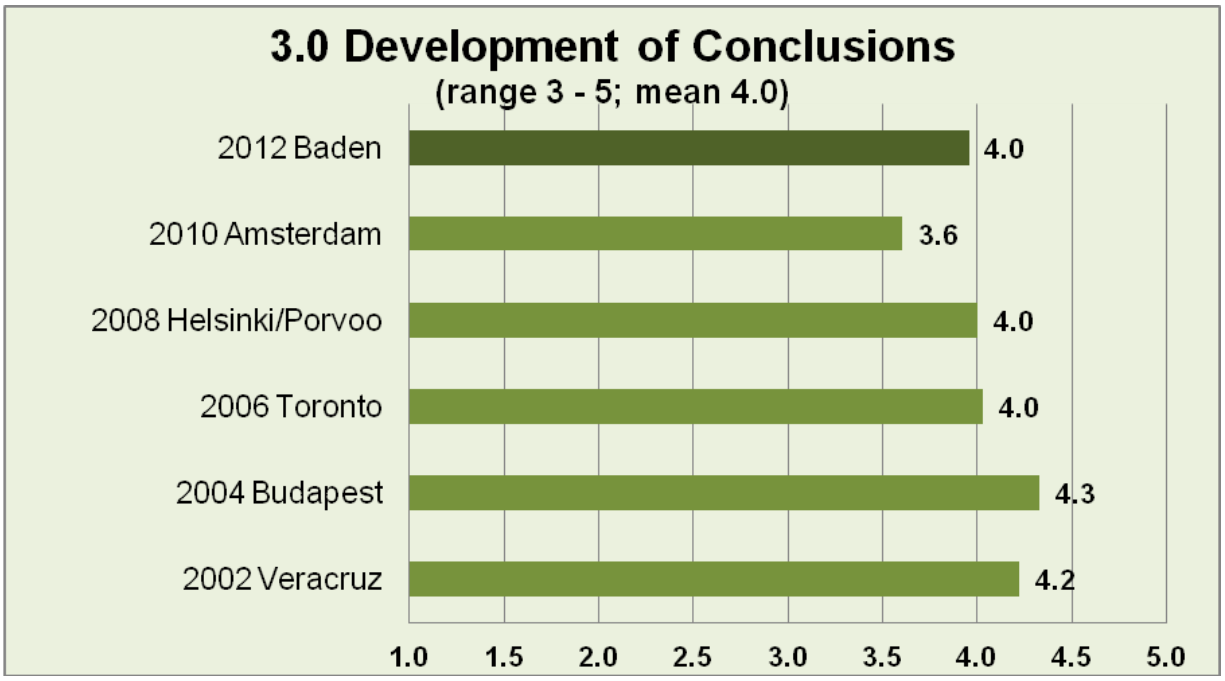
The evaluation form, which was similar to ones issued at previous workshops, asked questions in 4 areas: general - workshop objectives, workshop format, workshop topics and future workshops. Participants were asked to rate the various questions on a scale of 1 to 5 (with 1 being a low (poor) score and 5 being a high (excellent) score. Results are provided in the following charts (which also reflect scores from the previous workshops - for comparison purposes) along with a brief written summary.

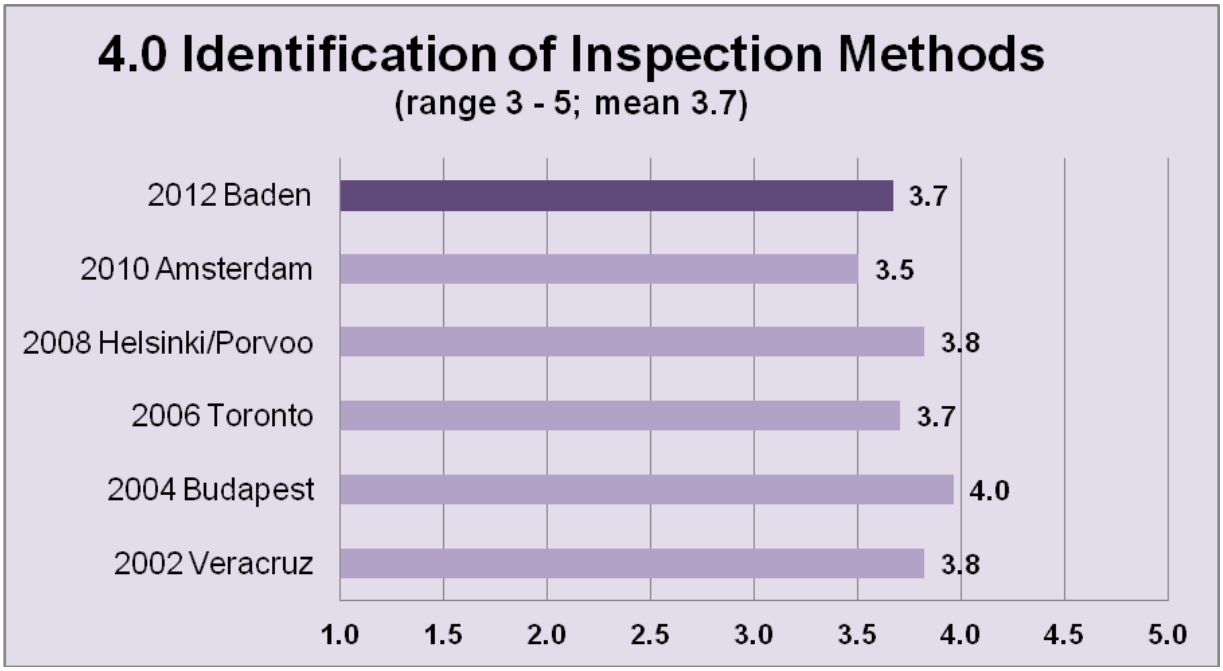
General

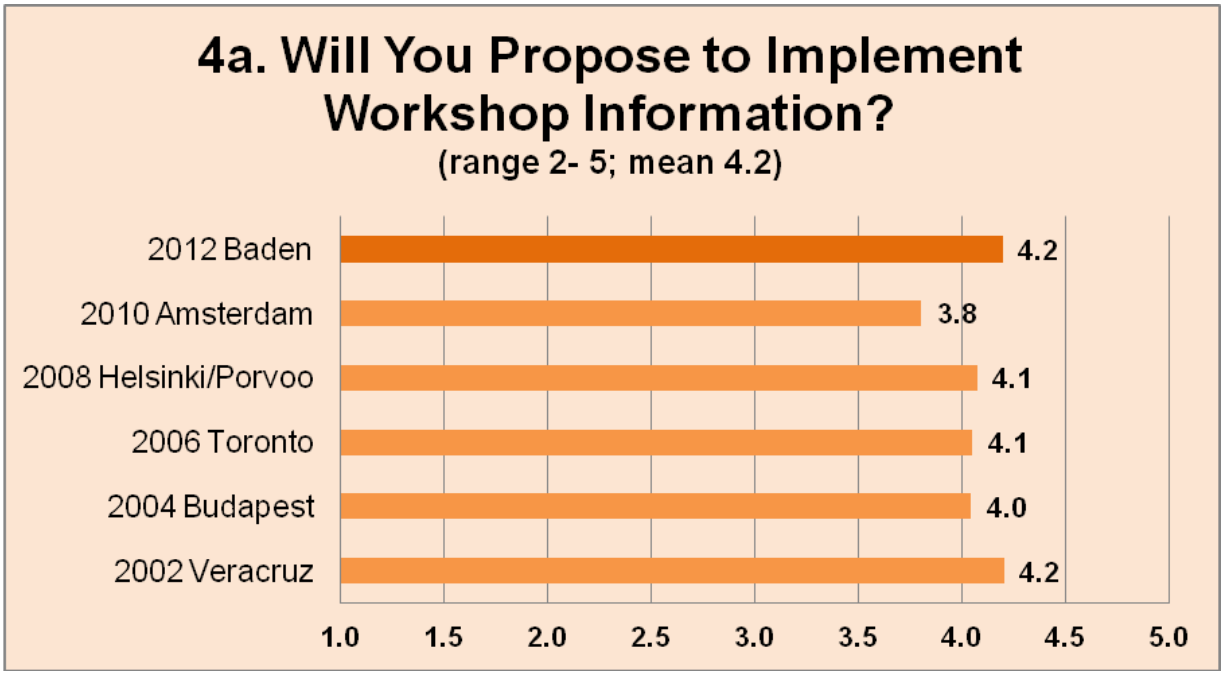
Each of the following charts depicts a specific objective of the workshop and the participant's responses on how well they were met.

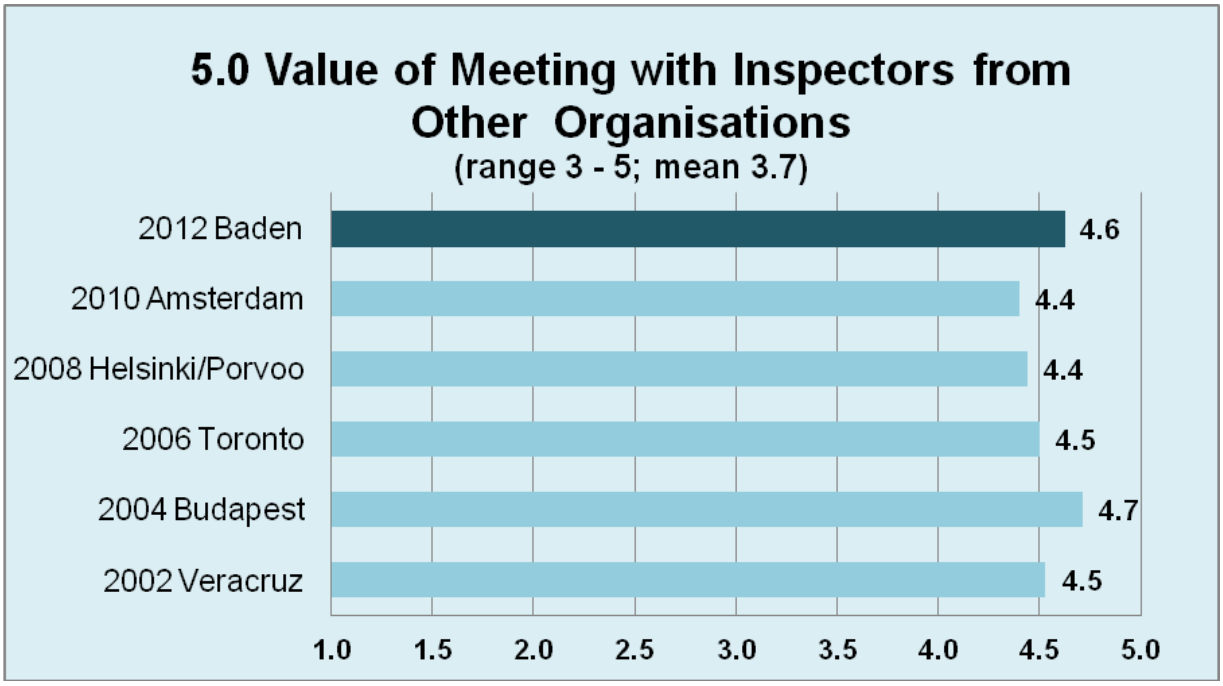



2.0 Quality of Discussion on Contemporary Inspection Issues
(range 2 - 5; mean 3.9)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
3.9
4.2
4.0
4.1
4.2
3.9
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0


3.0 Development of Conclusions
(range 3 - 5; mean 4.0)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.0
3.6
4.0
4.0
4.3
4.2
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0


4.0 Identification of Inspection Methods
(range 3 - 5; mean 3.7)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
3.7
3.5
3.8
3.7
4.0
3.8
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

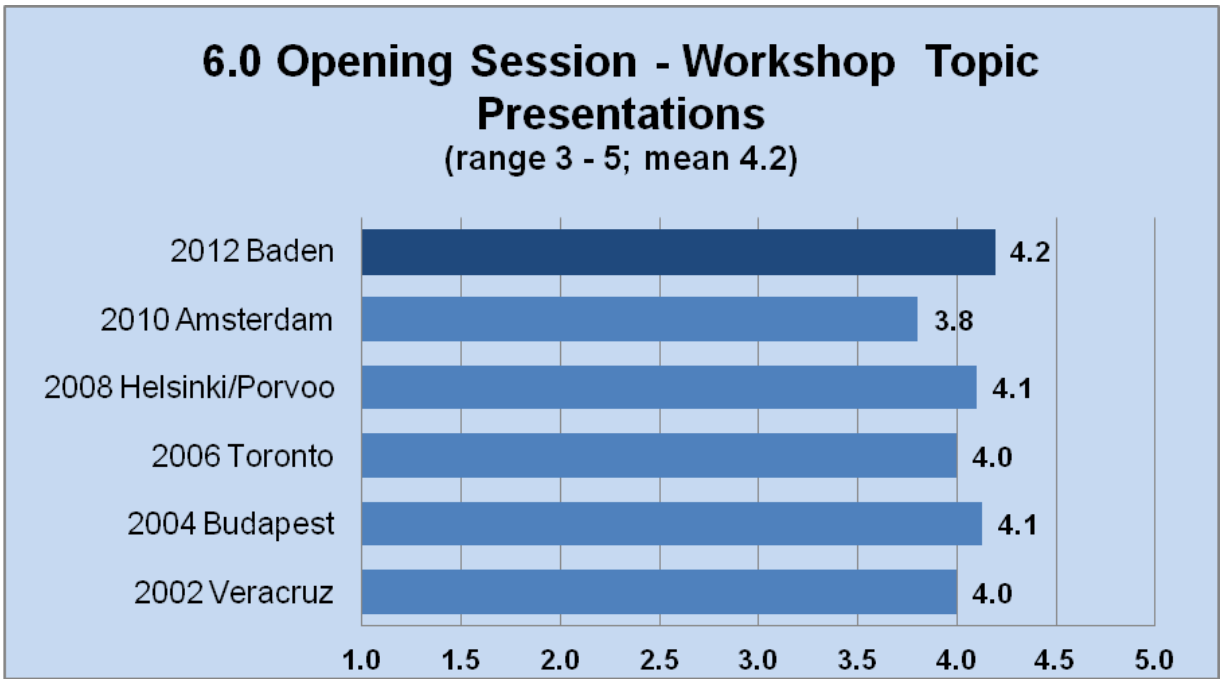

4a. Will You Propose to Implement Workshop Information?
(range 2- 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
3.8
4.1
4.1
4.0
4.2
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

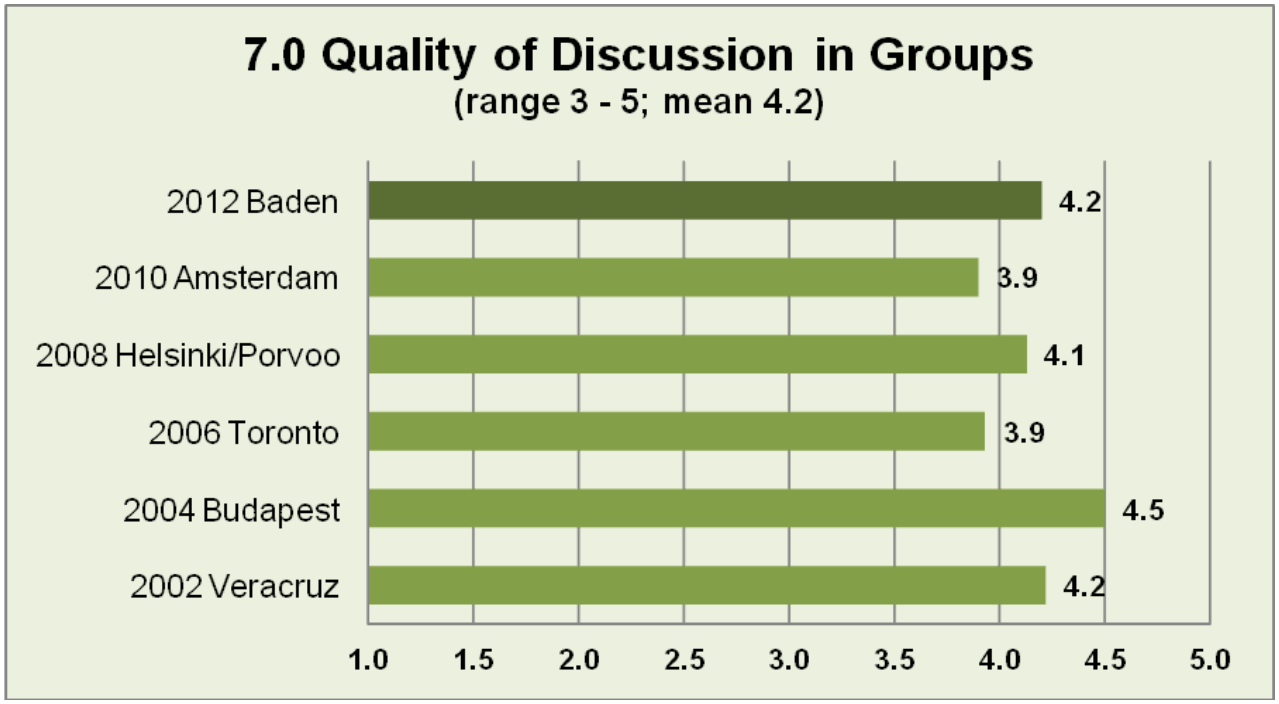


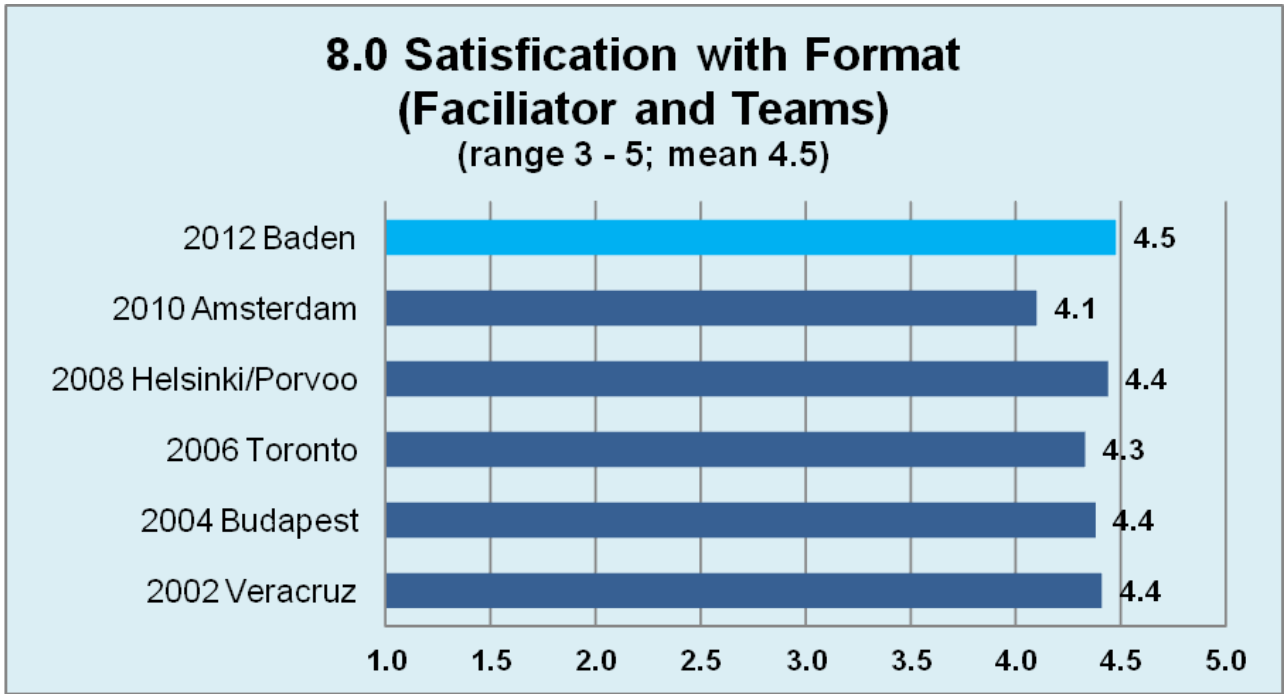
The results are comparable with last three Workshops, which reached the highest history rating in the most of these six specific objectives, when the responses to questions 1, 2, 4, 4a and 5 show that not only do participants find the exchange of information valuable, but were able to identify issues and methods to use in improving their own inspection programmes.

Workshop Format

This part of the questionnaire looked at how effective each of the sessions was. The main objective of this question focuses on the way sessions are conducted. The responses provide key information to WGIP in their preparation and planning for future workshops.



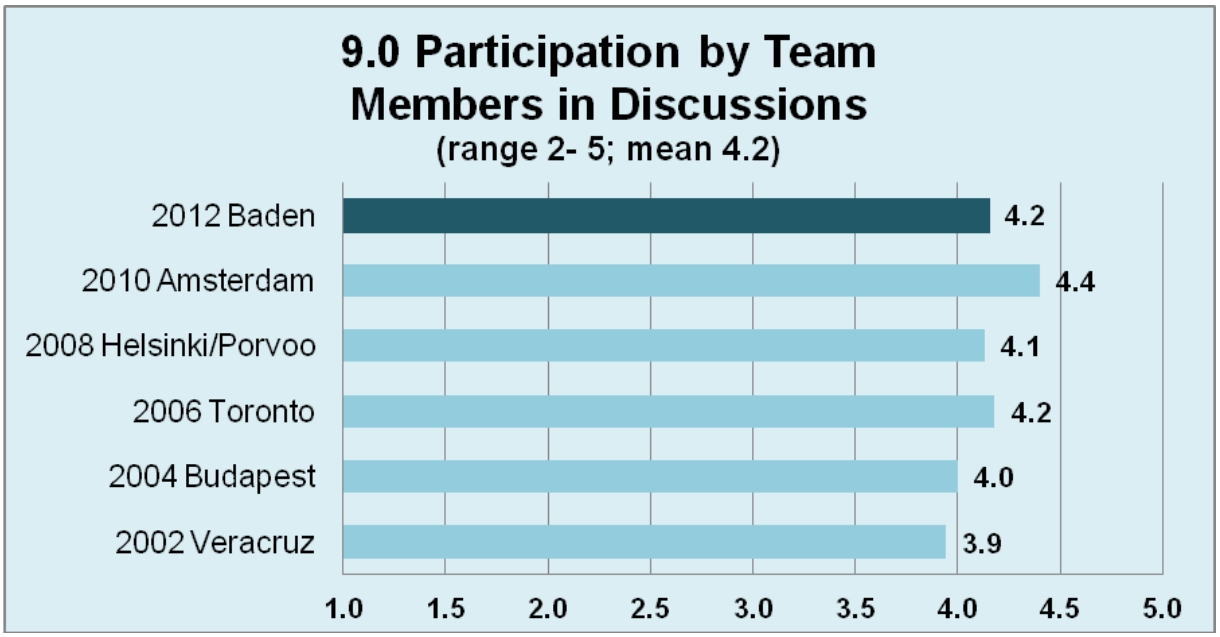


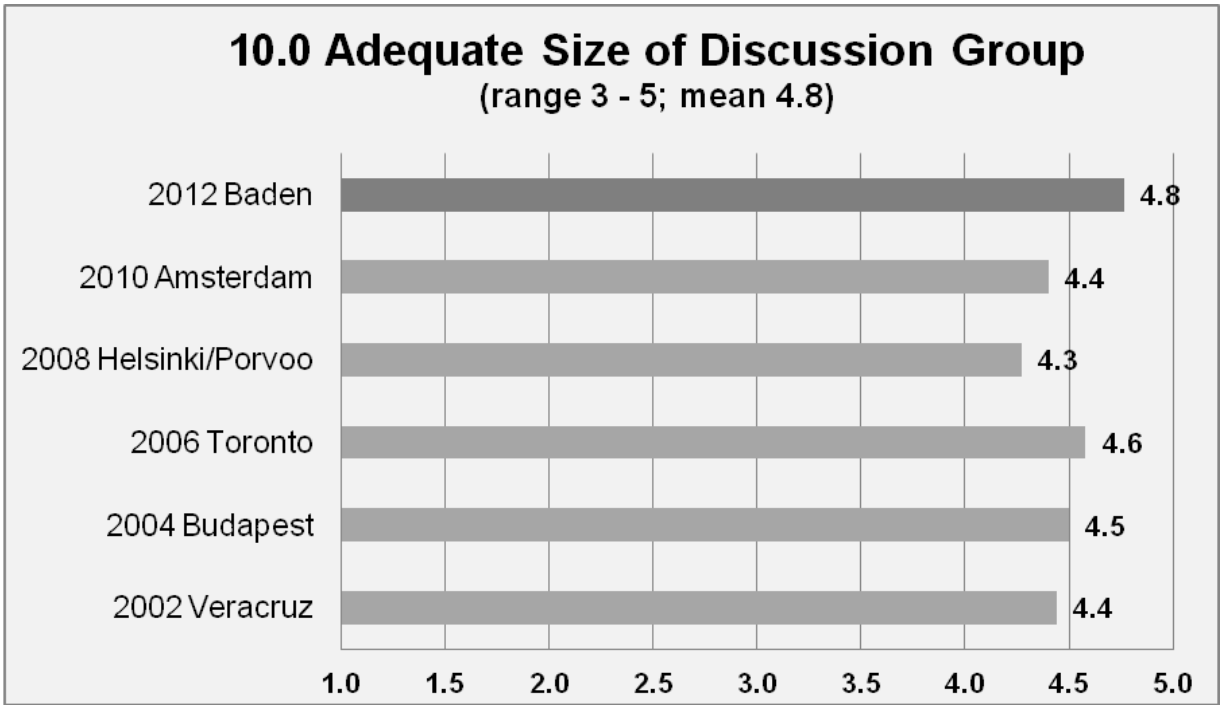


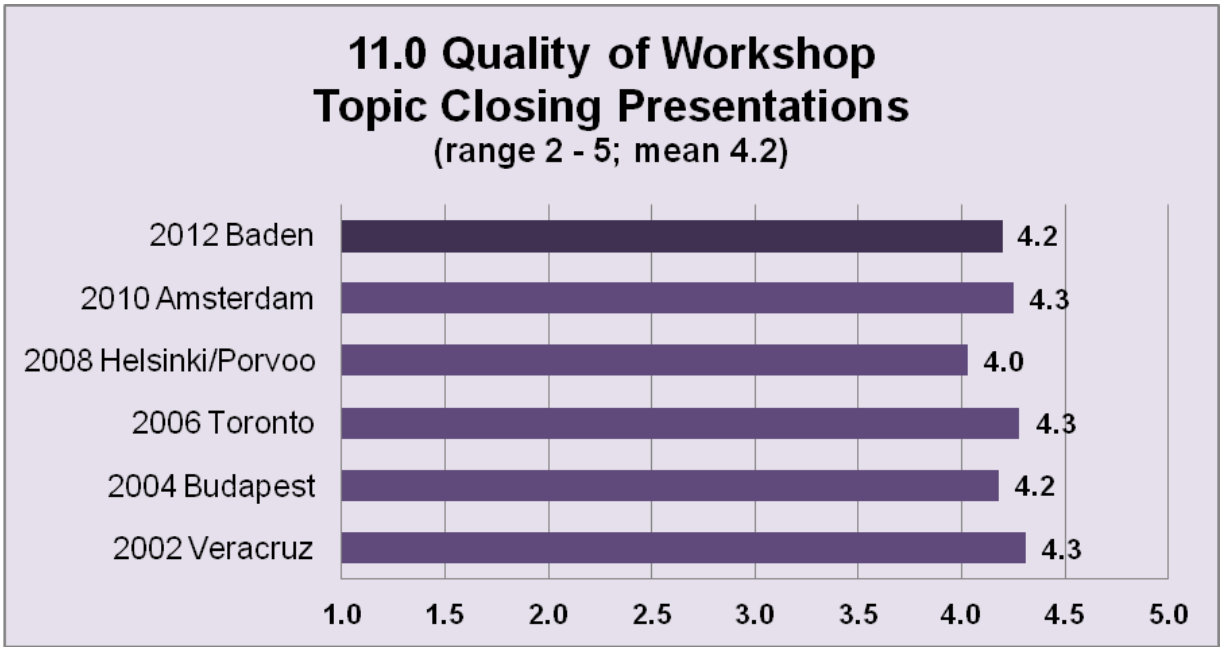
The results are again as in the previous areas among the best in all WGIP workshops history. They confirm that WGIP members have become more efficient in preparing and running the workshop. The success of each workshop is dependent on good preparation by the WGIP and co-ordination between the facilitators and recorders for each topic. As discussed in previous proceedings, social interaction outside the workshop sessions clearly enhances the discussions.

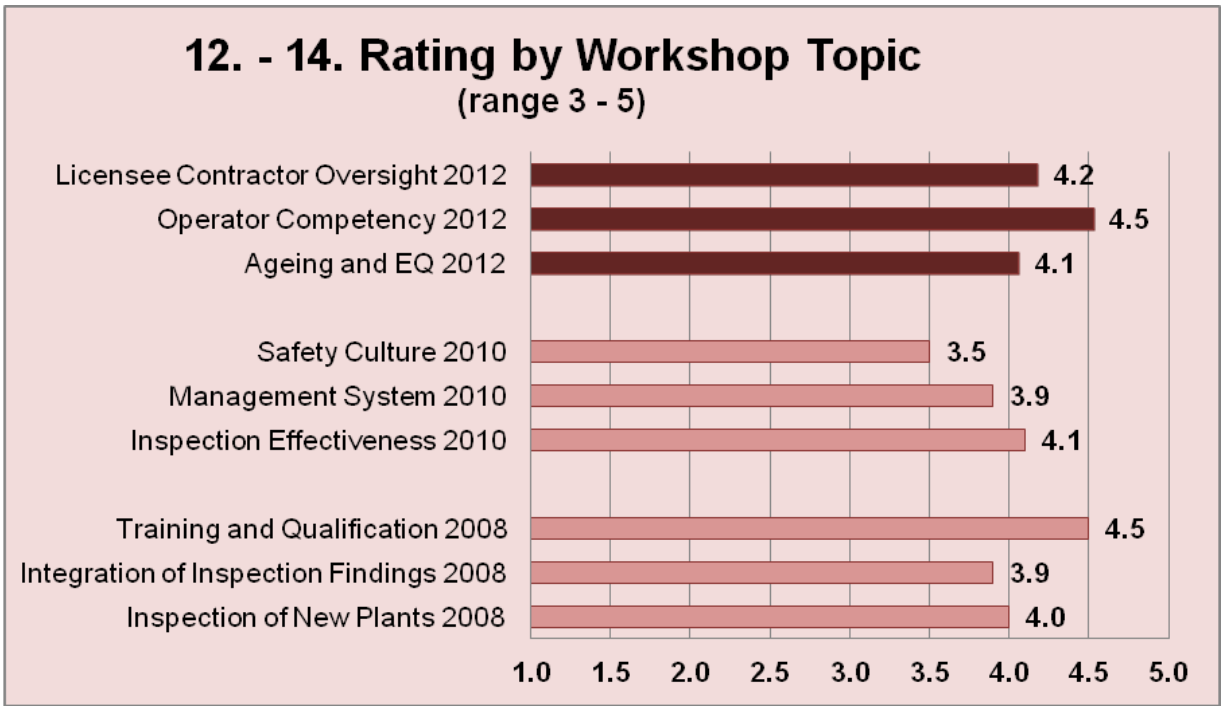
Workshop Topics

In order to assess how well the topics have been addressed, participants are asked to give a rating on whether they perceived the topics were covered adequately.





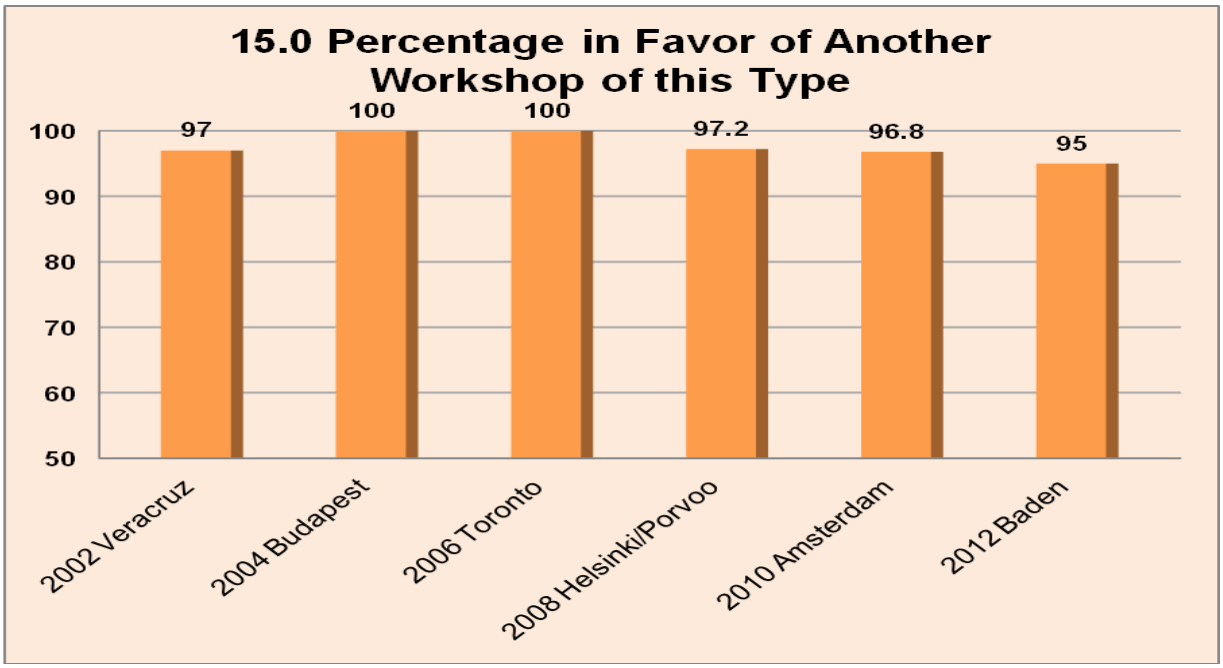


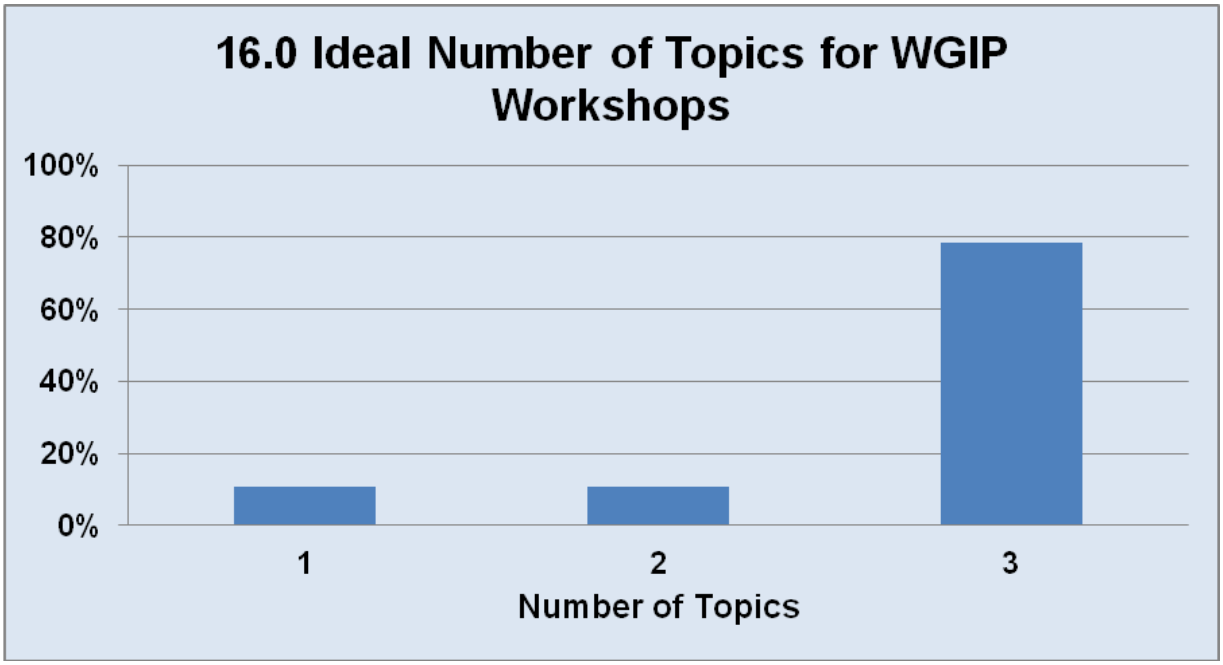


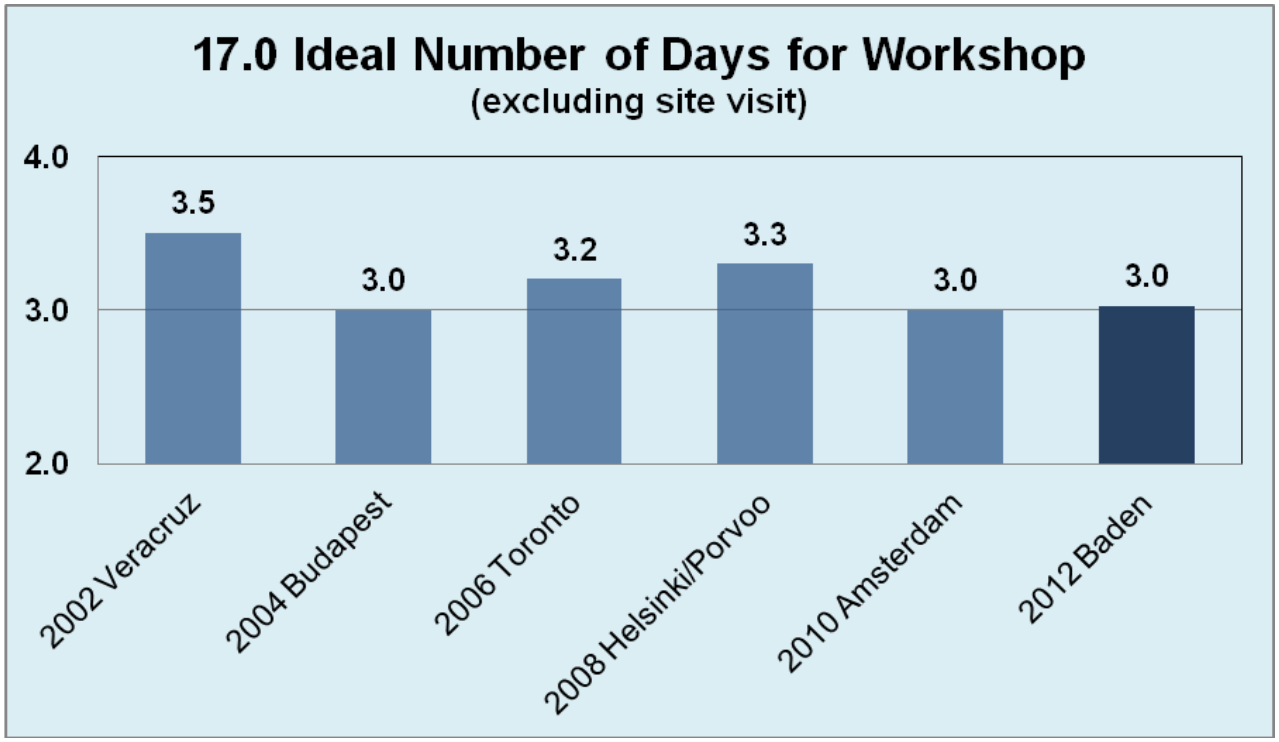
Workshop participants were generally satisfied with the selection of topics and how they were addressed. The scores recorded were similar to past workshops and the importance of operator competency is clearly depicted.

Future Workshops

While section 7.3 looks at the way workshop sessions are conducted, this section provides a perspective of the type of format, the overall value of having workshops and how they can be bettered.







Workshop participants who responded showed strong support endorsing future workshops. The results show that most participants also agree with the existing format regarding the number of topics and the length of the workshop.

7.2 Suggested Future Topics

Participants were asked to provide their input on potential future topics. 21 topics were listed in the responses. While no specific analysis was applied to the results, WGIP and the CNRA will evaluate these and use them in proposing topics for future workshops. The topics mentioned (randomly listed not prioritised) were as follows:

- Inspection of Long Term Operation issues.
- Inspection of power uprate issues.
- Inspection of organisational capability.
- Inspection of requalification process.
- Inspection of Fire Protection.
- Treatment of modifications.
- Regulating Foreign Technologies.
- Oversight of Contractors – new build.
- Inspection of Nuclear Power Plant construction.
- Inspection of Post-Fukushima modifications (how to inspection modifications, operations, EP, security).
- Inspection programme changes in response to Fukushima.

- Pro-activeness of Regulator and inspectors.
- Developing guide procedures for inspection of various topics.
- Effective inspection of RB.
- Review method of performance indicators.
- Post-Fukushima lessons learned with regards to Human Factors.
- How to ensure that your Safety Analysis Report (SAR) is up-to-date.
- Inspection techniques in various topics.
- Focus on special technical topics.
- Inspection of radiation protection.
- Inspection of fuel handling.

Additional Comments Received:

- Working in the ageing topic, I completely missed of interest and therefore, to miss out a presentations on the other WS areas. Many participants have a wide range of interest and to miss the other presentations is not good.
- By good planning, that all participants can take part in ALL final presentations.
- Presentations of findings inconsistent. Clearer guidance to group leaders may have helped.
- Workshops should not have a so broad range as contractor's oversight.
- Very good discussion in the small groups.
- Shorten lunch.
- Very nice but sometimes a long time in waiting (breaks, lunch) but very tasteful.
- Prefer PC and projector rather than flip chart.
- Great.

8. LIST OF PARTICIPANTS

BELGIUM

Mr Dirk ASSELBERGHS	Brussels	BEL-V	Dirk.Asselberghs@BelV.be
Mr Pierre BARRAS	Brussels	BEL-V	pierre.barras@belv.be
Mr Alain GEENS	Brussels	BEL-V	alain.geens@belv.be

CANADA

Mr Francois NEWBURY	Ottawa	CNSC	Francois.newbury@cnsc-ccsn.gc.ca
Mr Burton VALPY	Ottawa	CNSC	burton.valpy@cnsc-ccsn.gc.ca

CZECH REPUBLIC

Ms Jolana KORINKOVA	Prague	SUJB	jolana.korinkova@sujb.cz
Mr Zdenek TIPEK	Prague	SUJB	zdenek.tipek@sujb.cz

FINLAND

Mr Jukka KUPILA	Helsinki	STUK	jukka.kupila@stuk.fi
Mr Petri VUORIO	Helsinki	STUK	petri.vuorio@stuk.fi

FRANCE

Mr Paul BERENGUIER	Lyon	ASN	Paul.Berenguier@asn.fr
Ms Anais NOUAILLES-MAYEUR	Font.-aux-Roses	ASNFAR	Anais.nouailles-mayeur@asn.fr
Ms Carmen RODRIGUEZ-MATE		ASN	Carmen.rodriguez-mate@asn.fr
Mr Olivier VEYRET	Lyon	ASN	olivier.veyret@asn.fr

GERMANY

Dr Walter GLÖCKLE		GER	walter.gloeckle@um.bwl.de
Dr Matthias SCHNEIDER	Salzgitter	BFSSALZ	m.schneider@bfs.de

HUNGARY

Mr Gyula FICHTINGER	Budapest	HAEA	fichtinger@haea.gov.hu

INDIA

Mr A.P. (Arvind Paul) GARG	Mumbai	AERB	apgarg@aerb.gov.in

JAPAN

Mr Masakuni KOYAMA	Tokyo	JNES	koyama-masakuni@jnes.go.jp
Mr Masaaki WATANABE	Tokyo	JNES	watanabe-masaaki@jnes.go.jp
Mr Yoshihiro YAMAMOTO	Tokyo	JNES	yamamoto-yoshihiro@jnes.go.jp

KOREA (REPUBLIC OF)

Dr Sweng-Woong WOO	Daejon	KINS	k097wsw@kins.re.kr

MEXICO

Mr Luis Miguel GUTIERREZ RUIZ	MexicoCity	CNSNS	lgutierrez@cnsns.gob.mx

POLAND

Mr Andrzej GLOWACKI		POL	andrzej.glowacki@paa.gov.pl

SLOVAK REPUBLIC

Dr Mikulas BENCAT	Bratislava	NRAS	mikulas.bencat@ujd.gov.sk

SPAIN

Mr Julio CRESPO	Madrid	CSN	jcb@csn.es
Mr Alejandro DE SANTOS	Madrid	CSN	ascjo@csn.es

SWEDEN

Ms Helene BELAIEFF	Stockholm	SSM	helene.belaieff@ssm.se
Mr Johan ENKVIST	Stockholm	SSM	johan.enkvist@ssm.se
Mr Tage ERIKSSON	Stockholm	SSM	tage.eriksson@ssm.se
Mr Per-olof HAGG	Stockholm	SSM	perolof.hagg@ssm.se

SWITZERLAND

Mr Hans-Rudolf FIERZ	Brugg	ENSI	hans-rudolf.fierz@ensi.ch
Dr Albert FRISCHKNECHT	Brugg	ENSI	albert.frischknecht@ensi.ch
Dr Johannes HAMMER	Brugg	ENSI	johannes.hammer@ensi.ch
Mr Swen-Gunnar JAHN	Brugg	ENSI	swen-gunnar.jahn@ensi.ch
Mr Davide MEDUGNO	Brugg	ENSI	davide.medugno@ensi.ch
Dr Roland SCHEIDEGGER	Brugg	ENSI	roland.scheidegger@ensi.ch
Dr Susanne SCHULZ	Brugg	ENSI	susanne.schulz@ensi.ch

UNITED KINGDOM

Mr Reginald HADDEN	Bootle	ONR	reg.hadden@hse.gsi.gov.uk
Mr Stephen LEWIS	Bootle	ONR	steve.onr.lewis@hse.gsi.gov.uk
Mr Paul SMITH	Bootle	ONR	paul.onr.smith@hse.gsi.gov.uk
Mr David WALDEN	Bootle	ONR	david.walden@hse.gsi.gov.uk

UNITED STATES OF AMERICA

Mr Timothy KOBETZ	Washington	NRC	timothy.kobetz@nrc.gov
Mr Richard RASMUSSEN	Washington	NRC	Richard.Rasmussen@nrc.gov

INTERNATIONAL ORGANISATIONS

Ms Diane JACKSON	Issy-les-Moulineaux	NEA	diane.jackson@oecd.org

9. PREVIOUS WGIP REPORTS

CNRA reports are available to download for free at:
http://www.oecd-nea.org/nsd/docs/indexcnra.html

10th International Nuclear Regulatory Inspection Workshop on Effectiveness of Regulatory Inspections, Inspection of Licensee Safety Culture, and Inspection of Licensee Safety Management System - Workshop Proceedings and Appendix, Amsterdam, the Netherlands, May 2010, NEA/CNRA/R(2010)6 and NEA/CNRA/R(2010)5.

Inspection of Licensee Corrective Action Programme, NEA/CNRA/R(2010)7.

9th International Nuclear Regulatory Inspection Workshop on Training and qualification of inspectors, Integration of Inspection Findings, and Inspection of new Plants under Construction, WGIP – Workshop Proceedings, Porvoo, Finland, June 2008, Proceedings and Appendix (Compilation of Survey Responses), NEA/CNRA/R(2010)1 and NEA/CNRA/R(2010)2.

Fire Inspection Programmes NEA/CNRA/R(2009)1.

Inspection of Digital I&C Systems - Methods and Approaches: Proceedings of a CNRA Workshop, Garching, Germany, September 2007, NEA/CNRA/R(2008)6.

8th International Nuclear Regulatory Inspection Workshop on How Regulatory Inspections Can Promote, or Not Promote, Good Safety Culture; Inspection of Interactions Between the Licensee and its Contractors; and Future Challenges for Inspectors (e.g., New Techniques, Developing Competence, etc.), WGIP – Workshop Proceedings, Toronto, Canada, May 2006, NEA/CNRA/R(2007)1 and NEA/CNRA/R(2007)2.

Regulatory Inspection practices to bring about compliance, NEA/CNRA/R(2005)1.

7th International Nuclear Regulatory Inspection Workshop on Risk Informed Inspection, Inspection of Performance of Licensee Organisation, and Inspection Aspects of Plant Near or at End-of-Life, WGIP – Workshop Proceedings, Fekete-Hegy (near Budapest), Hungary, April 2004, NEA/CNRA/R(2005)4 and NEA/CNRA/R(2005)5.

Comparison of Inspection Practices of Research Reactors in Relation to the Practices Carried Out at Nuclear Power Plants, NEA/CNRA/R(2004)1.

6th International Nuclear Regulatory Inspection Workshop on Regulatory Inspection Activities related to Inspection of Events and Incidents, Inspection of Internal and External Hazards, and Inspection Activities related to Challenges Arising from Competition in the Electricity Market - WGIP-Workshop Proceedings, Veracruz, Mexico, May 2002, NEA/CNRA/R(2003)1 and NEA/CNRA/R(2003)2.

Inspection of Fuel Cycle Facilities in the NEA Member Countries, NEA/CNRA/R(2003)3.

Nuclear Regulatory Inspection of Contracted Work Survey Results, NEA/CNRA/R(2003)4.

5th International Nuclear Regulatory Inspection Workshop on Regulatory Inspection Activities related to Radiation Protection, Long Shutdowns and Subsequent restarts, and the Use of Objective Indicators in Evaluating the performance of Plants, Baltimore, USA, May 2000, NEA/CNRA/R(2001)4 and 5.

Inspection of Maintenance on safety Systems During NPP Operation, NEA/CNRA/R(2001)6.

The Effectiveness of Nuclear Regulatory Inspection, NEA/CNRA/R(2001)7.

The Effectiveness of Licensees in Inspecting the Management of Safety, NEA/CNRA/R(2001)9.

Status Report on Regulatory Inspection Philosophy, Inspection Organisation and Inspection Practices, NEA/CNRA/R(94)3; NEA/CNRA/R(97)3, OECD/GD(97)140, Paris 1997, and NEA/CNRA/R(2001)8, Paris, November 2001.

Commendable Practices for Regulatory Inspection Activities, NEA/CNRA/R(2000)2, April 2000 .

Regulatory Practices for Decommissioning of Nuclear Facilities with Special Regard of Regulatory Inspection Practices, NEA/CNRA/R(99)4, February 2000.

Regulatory Inspection Activities Related to Older Operating NPPs, Risk Evaluation and Licensee Resource Commitment, WGIP-Workshop Proceedings, Prague Czech Republic 8-11 June 1998, NEA/CNRA/R(99)2, March 1999.

Comparison of the Inspection Practices in Relation to the Control Room Operator and Shift Supervisor Licenses, NEA/CNRA/R(98)1, Paris April 1998.

Inspection of Licensee Activities in Emergency Planning, NEA/CNRA/R(98)2, April 1998.

Performance Indicators and Combining Assessments to Evaluate the Safety Performance of Licensees, NEA/CNRA/R(98)3, Paris April 1998.

Regulatory Inspection Practices on Fuel Elements and Core Lay-out at NPPs, NEA/CNRA/R(97)4, Paris February 1998.

Regulatory Inspection Activities related to Inspection Planning, Plant Maintenance and Assessment of Safety, Proceedings of an International WGIP-Workshop, Chester, United Kingdom, 19-23 May 1996, NEA/CNRA/R(97)1 and OECD/GD(97)62, Paris 1997.

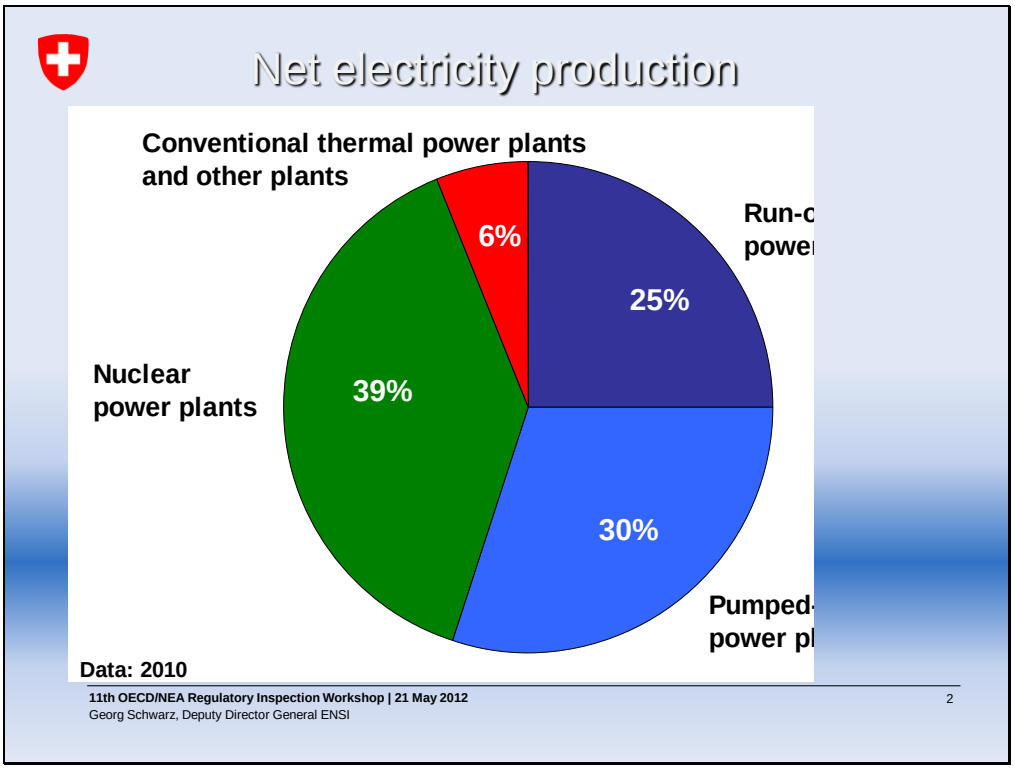
Inspector Qualification Guidelines, NEA/CNRA/R(94)1, Paris July 1994.

Conduct of Inspections for Plant Modifications, Event Investigations and Operability Decisions, Proceedings of an International WGIP-Workshop Helsinki, May 1994, NEA/CNRA/R(94)4 and OECD/GD(95)14, Paris 1995.

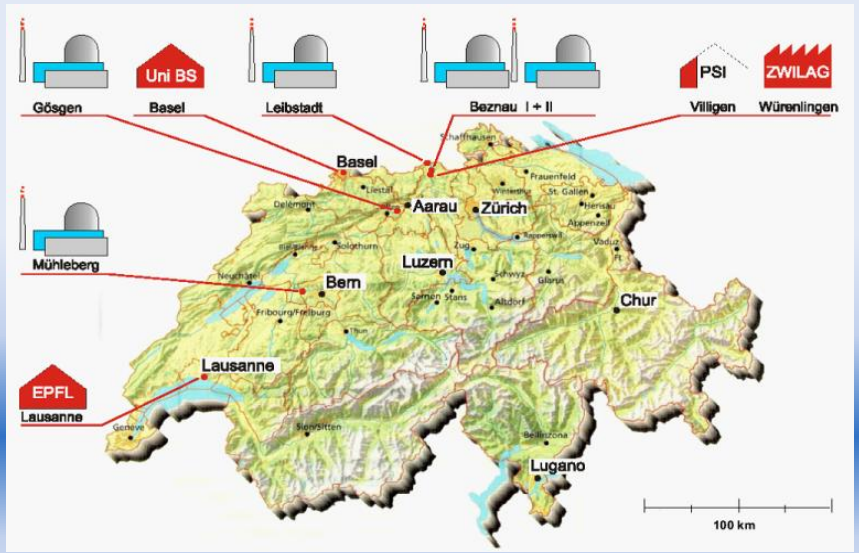
Proceedings of the International Workshop on Conduct of Inspections and Inspector Qualification and Training, held at Chattanooga, Tennessee September 1992, NUREG/CP-0128 and NEA/CNRA/R(92)3, Washington res. Paris 1992.

10. WORKSHOP OPENING PRESENTATION


Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Federal Nuclear Safety Inspectorate ENSI
Regulatory Challenges in Switzerland
11th OECD/NEA International Nuclear Regulatory Inspection Workshop
Baden, 21. – 24. May 2012


Net electricity production
Conventional thermal power plants and other plants
6%
Run-c
powe
25%
Nuclear power plants
39%
30%
Pumped-
power pl
Data: 2010
11th OECD/NEA Regulatory Inspection Workshop | 21 May 2012
Georg Schwarz, Deputy Director General ENSI
2

Nuclear Installations



ENSI's Mission

- Supervise reactor and radiation safety in Swiss nuclear installations:
  - Nuclear Power Plants
  - Research and training reactors
  - Intermediate storage facilities
- Supervise the safety of transports of nuclear materials to and from nuclear installations
- Assess the safety of proposed solutions for the geological disposal of radioactive waste
- Approve safety-relevant changes to nuclear installations within the current licences

ENSI: Staff and Finance

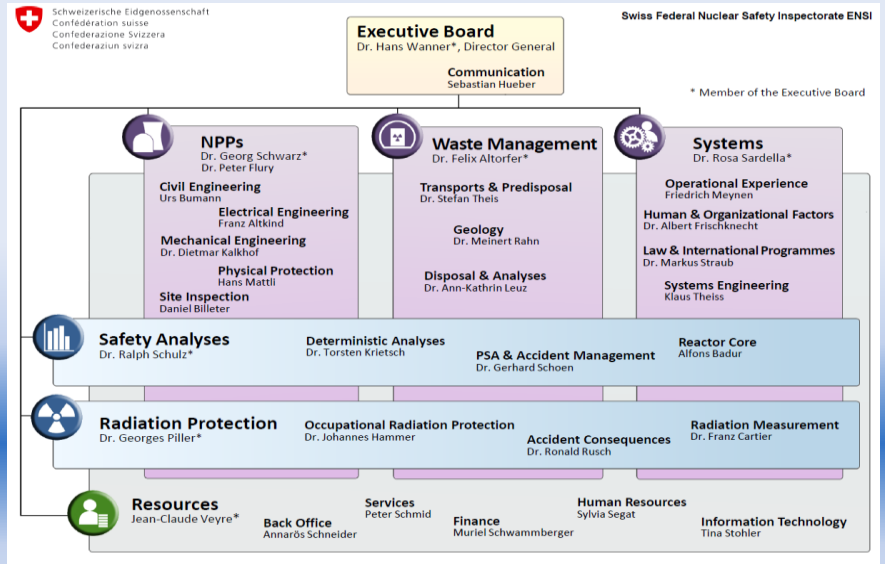
Staff

- 140 employees
- Professions:
  physicists, mechanical/electrical/civil engineers, chemists, geologists, geophysicists, IT specialists, biologists, psychologists, etc.

Finance

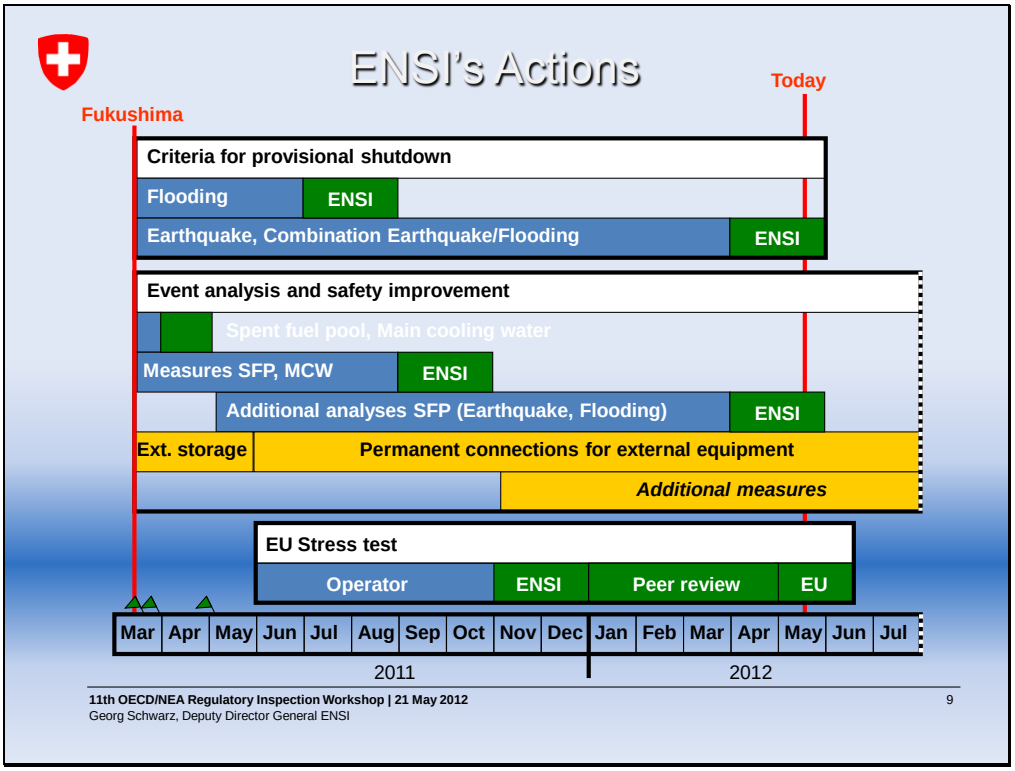
- Budget: 55 million Swiss Francs
- Funded from fees and regulatory charges paid by operators of nuclear facilities (covering 90-95% of budget); rest: Swiss Federation (mainly research)

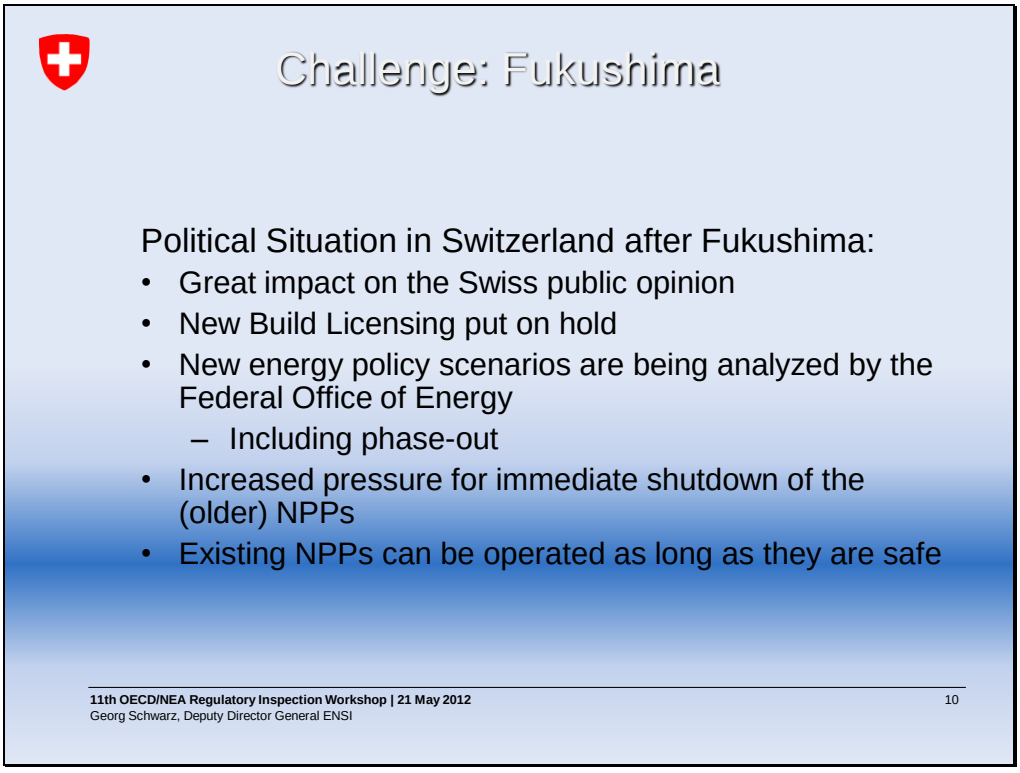
ENSI's Organization



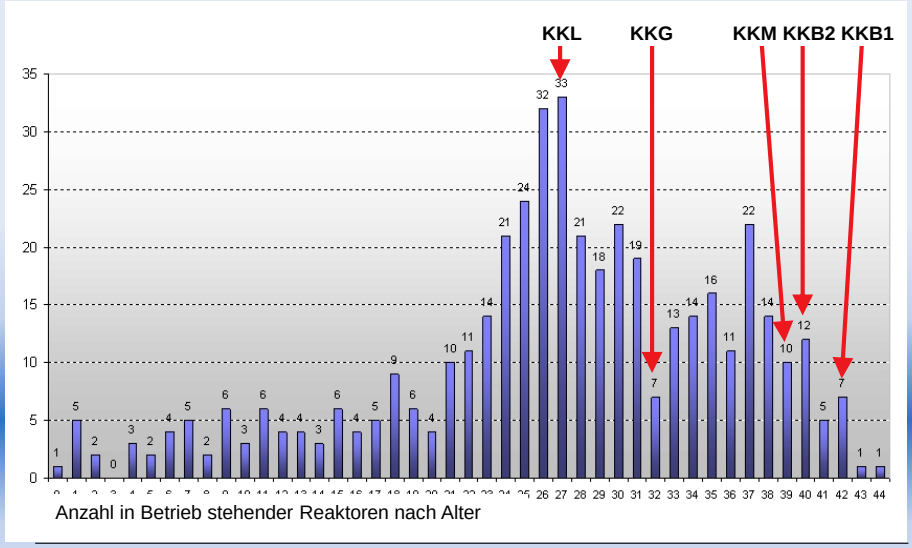
Switzerland: Nuclear Phase-Out

Federal Council and Parliament → no new builds


ENSI's Actions
Today
Fukushima
Criteria for provisional shutdown
Flooding
ENSI
Earthquake, Combination Earthquake/Flooding
ENSI
Event analysis and safety improvement
Spent fuel pool, Main cooling water
Measures SFP, MCW
ENSI
Additional analyses SFP (Earthquake, Flooding)
ENSI
Ext. storage
Permanent connections for external equipment
Additional measures
EU Stress test
Operator
ENSI
Peer review
EU
Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul
2011
2012
11th OECD/NEA Regulatory Inspection Workshop | 21 May 2012
Georg Schwarz, Deputy Director General ENSI
9


Challenge: Fukushima
Political Situation in Switzerland after Fukushima:
• Great impact on the Swiss public opinion
• New Build Licensing put on hold
• New energy policy scenarios are being analyzed by the Federal Office of Energy
– Including phase-out
• Increased pressure for immediate shutdown of the (older) NPPs
• Existing NPPs can be operated as long as they are safe
11th OECD/NEA Regulatory Inspection Workshop | 21 May 2012
Georg Schwarz, Deputy Director General ENSI
10

Swiss nuclear power plants



Anzahl in Betrieb stehender Reaktoren nach Alter

Oversight on LTO

Ageing Plants require closer attention

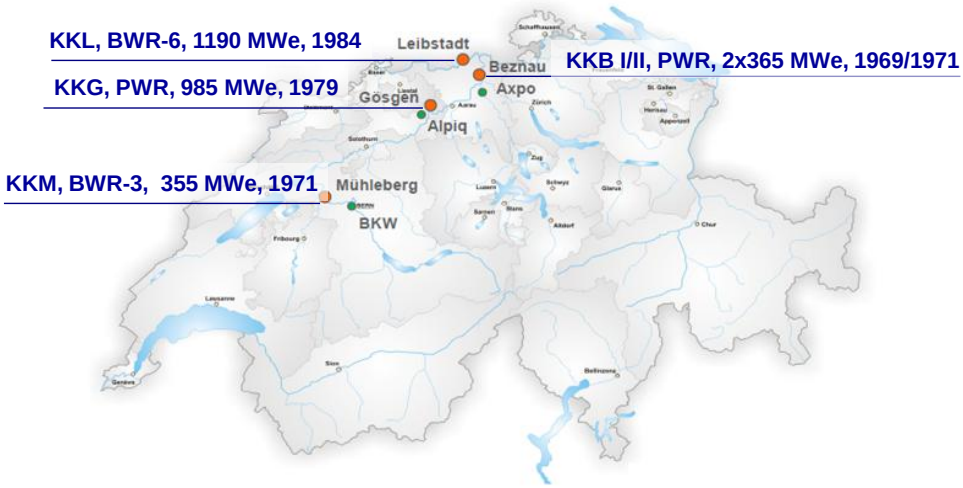
- More inspections
- New inspection techniques
- Regulatory research on effects of ageing

Maintaining Nuclear Know-How

- Nuclear Industry lacks major projects
- Difficult to motivate young professionals
- Few schools offer nuclear curriculum
- Generation gap at nuclear installations

11. LICENSEE PRESENTATION: COMPETENCY OF OPERATORS

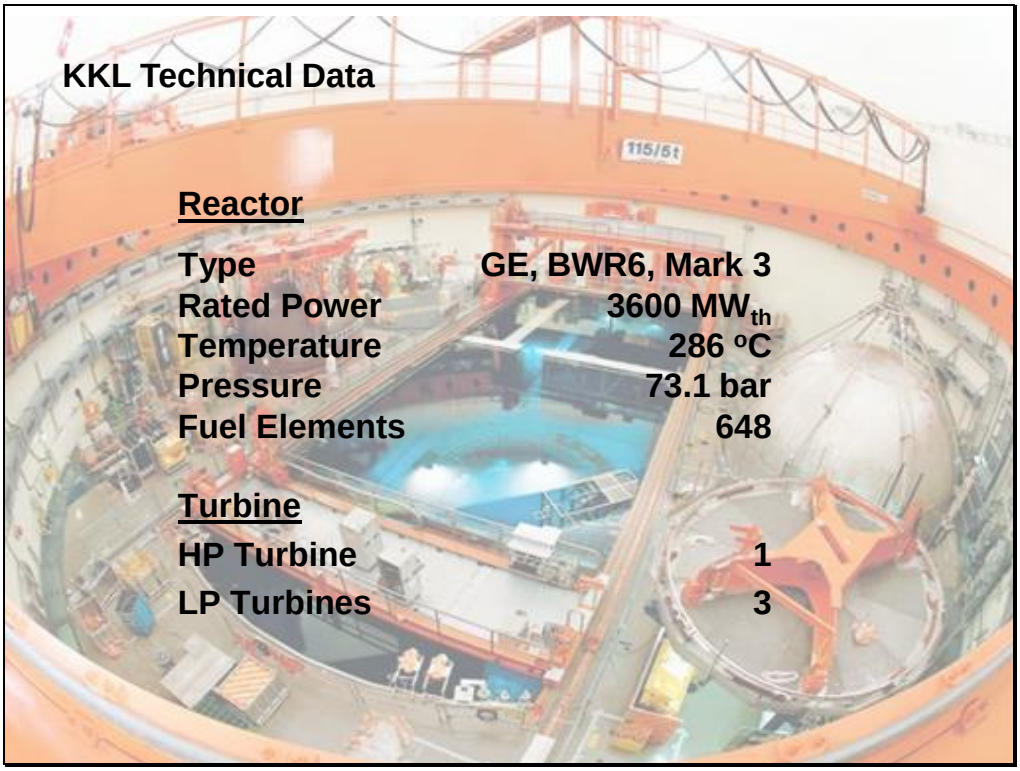
Swiss nuclear Power Plants

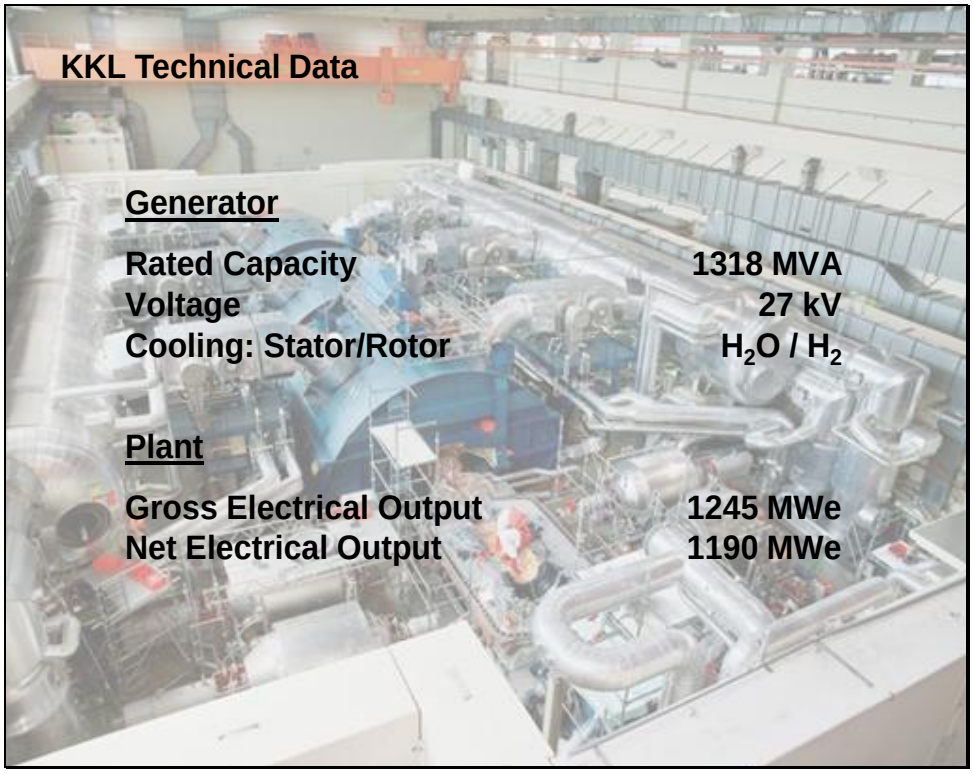


Kernkraftwerk Leibstadt

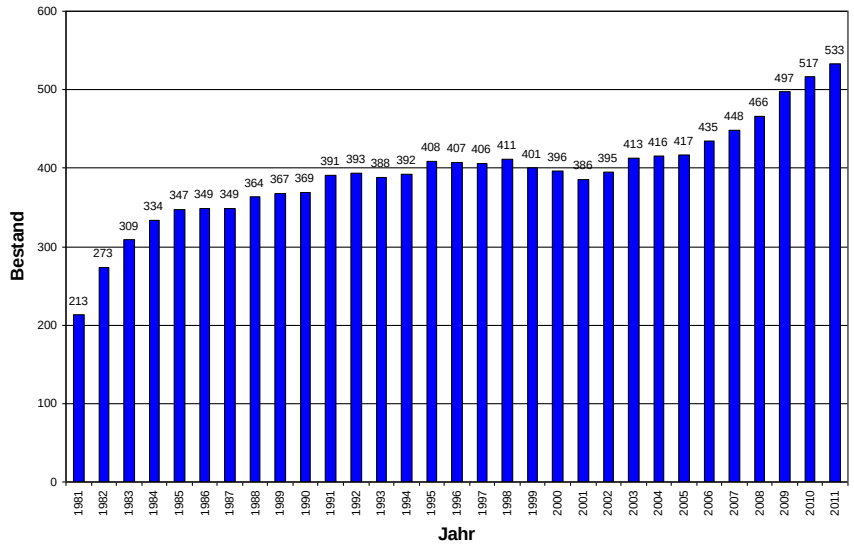
WGIP May 2012

Folie 2

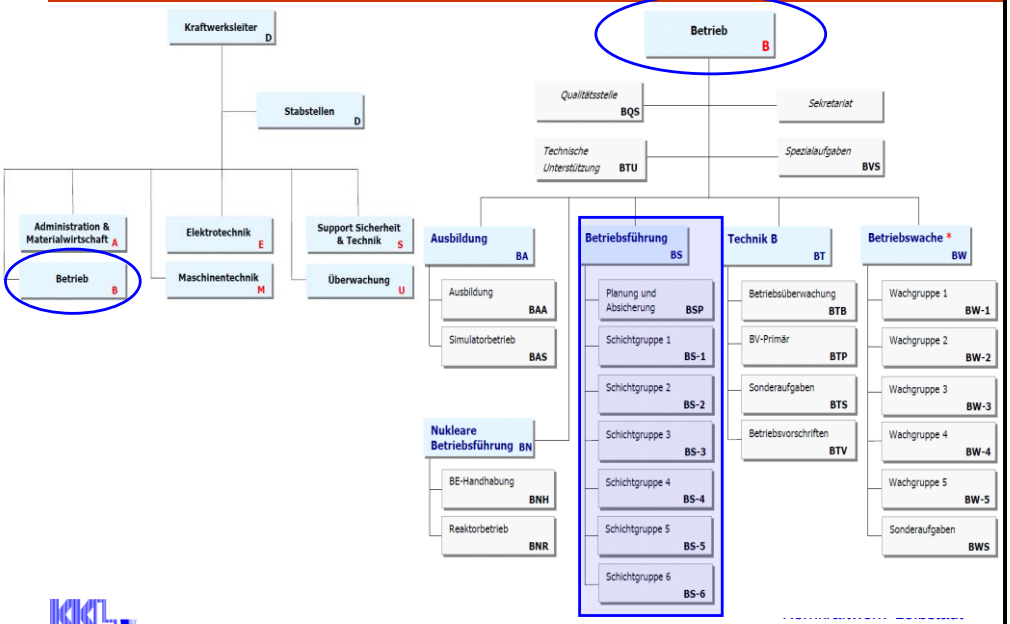

KKL Technical Data
115/5t
Reactor
Type GE, BWR6, Mark 3
Rated Power 3600 MWth
Temperature 286 °C
Pressure 73.1 bar
Fuel Elements 648
Turbine
HP Turbine 1
LP Turbines 3


KKL Technical Data
Generator
Rated Capacity 1318 MVA
Voltage 27 kV
Cooling: Stator/Rotor H2O / H2
Plant
Gross Electrical Output 1245 MWe
Net Electrical Output 1190 MWe

KKL Employees 1981 - 2011



Organisation



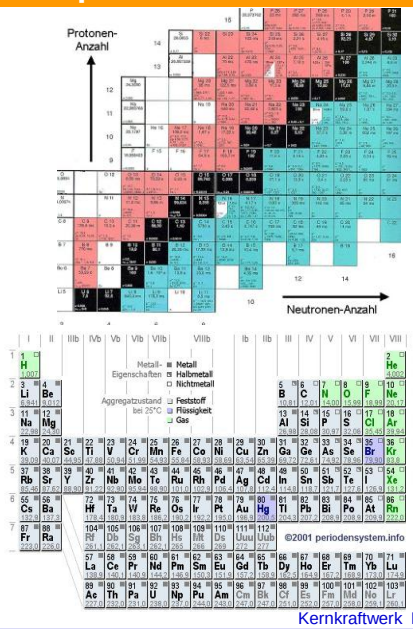
Organization

- **6 Shift Teams (nominal composition)**
  - 1 Team Leader — Licensed as Shift Supervisor
  - 1 Deputy — Licensed as Shift Supervisor
  - 4 Reactor Operators — Licensed as Reactor Operator
  - 4 Field Operators — Not licensed
- **Total number of licensed personnel**
  - Pickett engineers — 11
  - Shift supervisors — 19
  - Reactor operators — 27

What means „Competency of Operators“

What means „Competency of Operators“

- **Nuclear Basics**
  - ☼ Reactor physics
  - ☼ Thermo hydraulics
  - ☼ Health physics
  - ☼ Chemistry

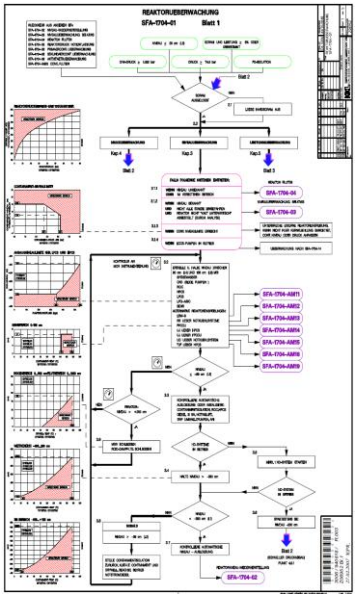


What means „Competency of Operators“

- **Technical Knowledge**
  - ☼ Mechanical Components
  - ☼ Electrical Components
  - ☼ Instrumentation & Controllers

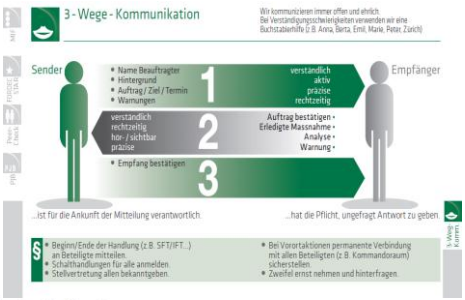
What means „Competency of Operators“

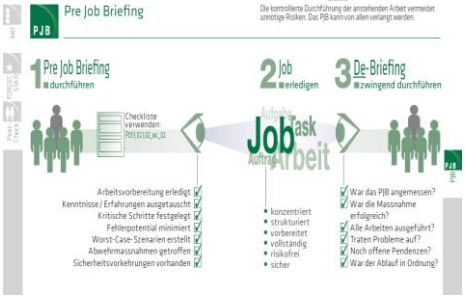
- **Plant Performance**
  - ☼ Normal Operation
  - ☼ Operational Occurrences
  - ☼ Design Basis Accidents
  - ☼ Severe Accidents
- **Phenomenology**
- **Operating Procedures**
  - ☼ Normal Operations
  - ☼ Emergency Procedures



What means „Competency of Operators“

- **Human Performance Tools**
  - ☼ 3 Way Communications
  - ☼ Peer Checking
  - ☼ STAR
  - ☼ Pre Job Briefing



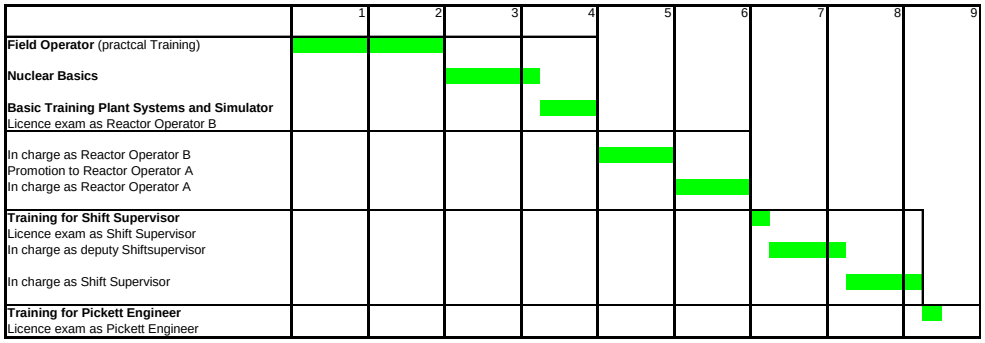


How to develop and keep Operator Competence

How to develop and keep Operator Competence

- **Methods**
  - Classroom Sessions
  - Self studies according to a defined Program
  - Simulator Training
  - E-Learning
  - On the Job Training (Surveillance Testing)
  - Emergency Drills

Basic Training



Retraining (average Training days per operator in a year)

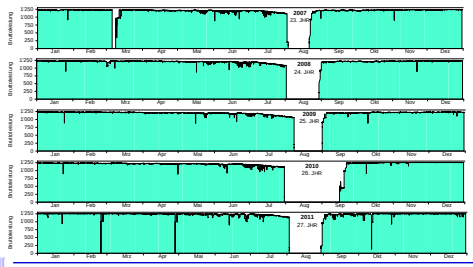
Nuclear Basics	**2**
System &Technical Knowlege	**2**
Plant Modifications	**1**
Simulator Training Operating Procedures Human Perfomance Tools	**9**
Nuclear Safety Design Basis Technical Specifications SAR, TSL, PSA	**1.5**
Various Healthphysics Fire Protection	 **0.5** **1**
Guided Training Days per year	**15 -20**

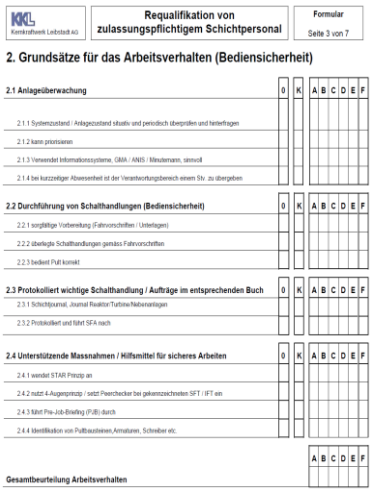
Basic - & Retraining

- **Recruitment**
  - ☼ 4 Operators per year (average)
- **Basic Training (operators in training today)**
  - ☼ 7 Operators started the training in nuclear basics
  - ☼ 8 Operators started the basic system technology and simulator training
- **Retraining**
  - ☼ 80 Field operators, Reactor operators, Shift supervisors and Pickett engineers join the various Retraining courses

Results

- **Plant performance**
- **Simulator Qualification**
- **Events Reports**
- **Inspection Reports (ENSI)**
- **WANO Peer Review Reports**
- **Self evaluation**

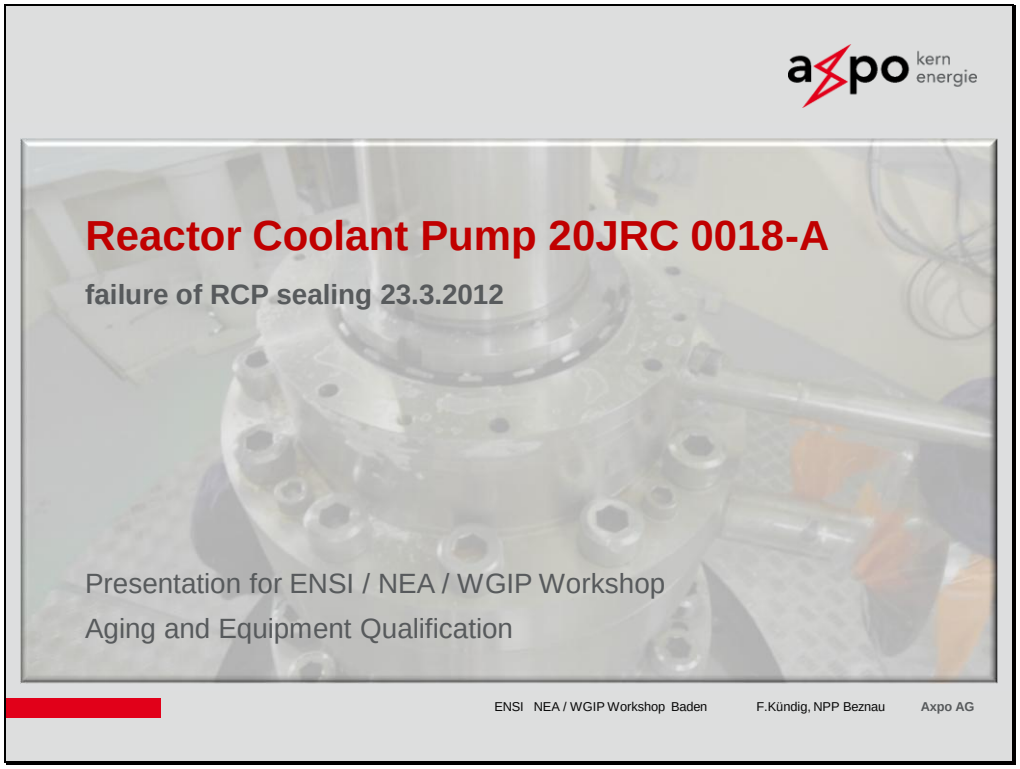


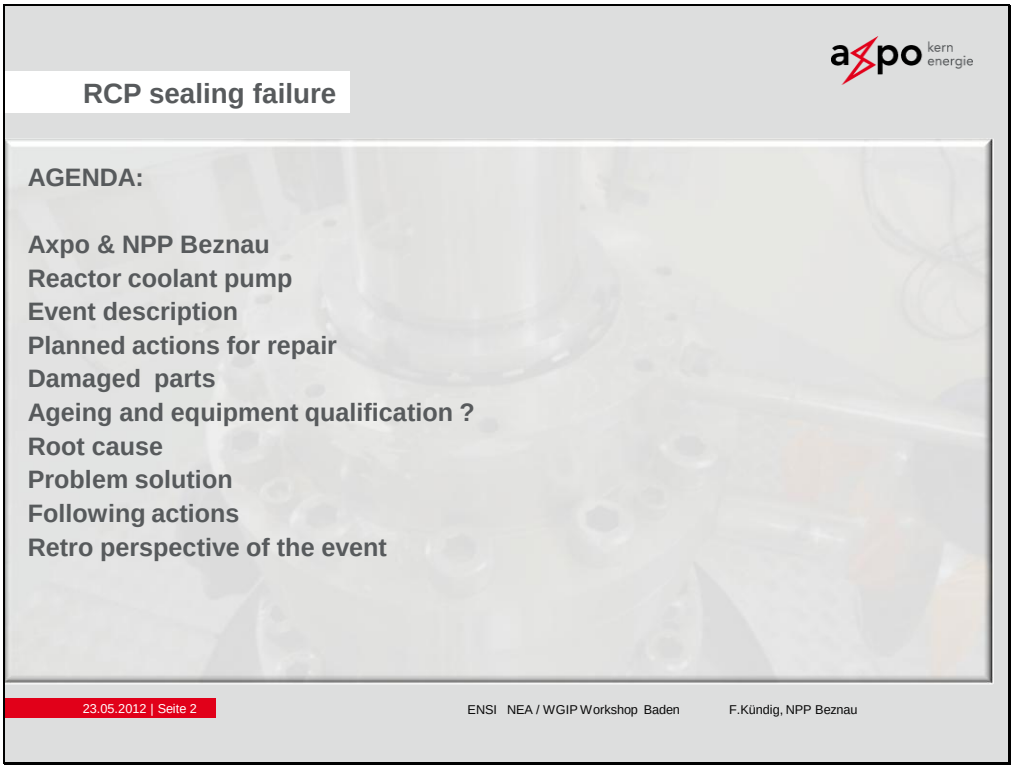


Concluding Remarks

- **Competency of Operators means knowledge and skills in wide range of topics as well as character (personality)**
- **A good knowledge of the plant design and the procedures is necessary to assess the individual operator and team competence.**
- **Improvement is only possible by sharing experience between NPP's as well as between NPP's and Regulators**
- **Our goal is the improvement of operator competence everyday**

12. LICENSEE PRESENTATION: REACTOR COOLANT PUMP SEAL FAILURE


axpo kern energie
Reactor Coolant Pump 20JRC 0018-A
failure of RCP sealing 23.3.2012
Presentation for ENSI / NEA / WGIP Workshop
Aging and Equipment Qualification
ENSI NEA / WGIP Workshop Baden F.Kündig, NPP Beznau Axpo AG

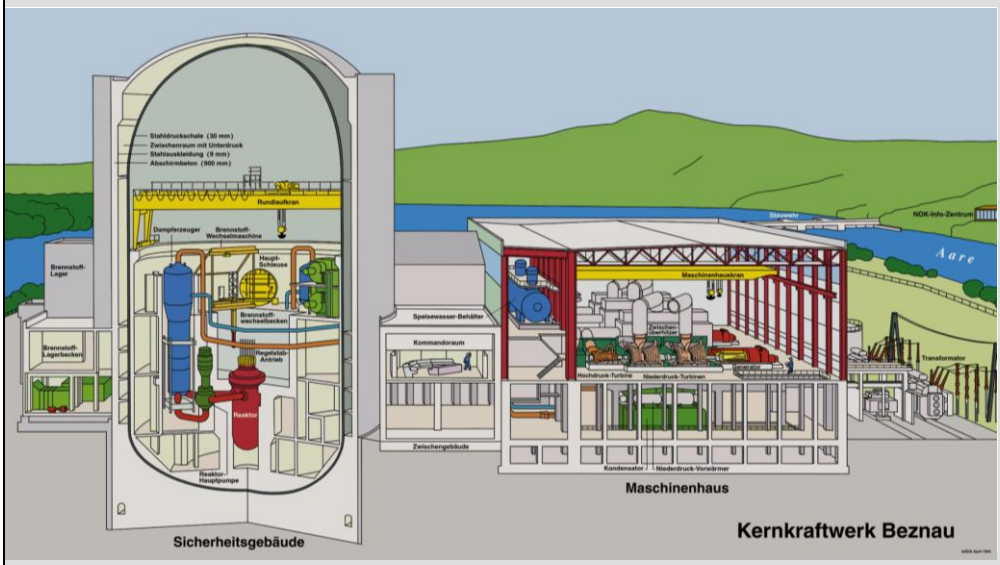

axpo kern energie
RCP sealing failure
AGENDA:
Axpo & NPP Beznau
Reactor coolant pump
Event description
Planned actions for repair
Damaged parts
Ageing and equipment qualification ?
Root cause
Problem solution
Following actions
Retro perspective of the event
23.05.2012 | Seite 2
ENSI NEA / WGIP Workshop Baden F.Kündig, NPP Beznau

Nuclear Power Plant Beznau

23.05.2012 | Seite 3

ENSI NEA / WGIP Workshop Baden F.Kündig, NPP Beznau

Axpo & NPP Beznau



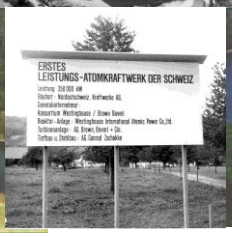
23.05.2012 | Seite 4

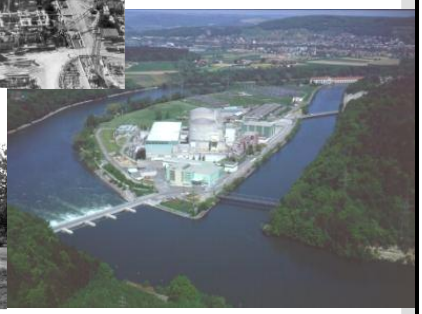
ENSI NEA / WGIP Workshop Baden F.Kündig, NPP Beznau

Axpo & NPP Beznau

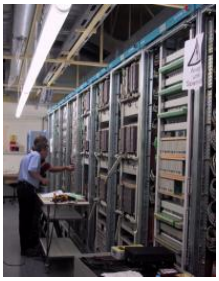
1969:
first large power NPP in Switzerland

2012:
most experienced NPP in the world



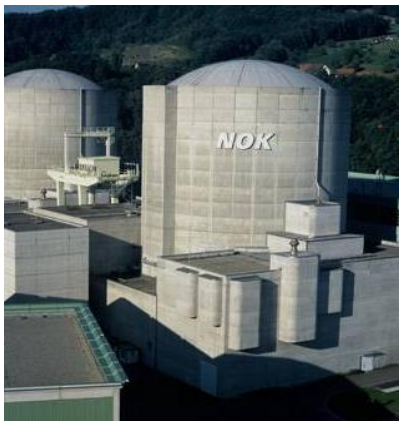


Axpo & NPP Beznau



Axpo & NPP Beznau

Backfits & Renewals



Original plant :

3 Safety injection pumps
2 Spray pumps
2 Recirc.pumps
4 6kV Trains including hydro plant
2 Diesels (380V)

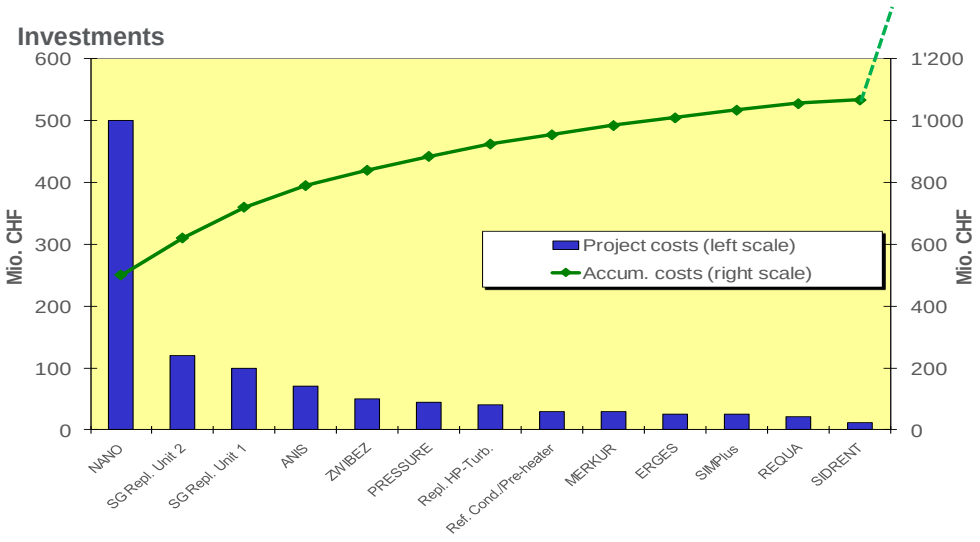
New (with bunkered systems):

+ 1+1 bunkered boric acid water tank
+1 bunkered Safety injection pump
+1 bunkered recirc-& spray pump
+1+1 bunkered emergency diesels (6kV)
+2 bunkered boric acid accus (52 bar)
+1+1 bunkered wellwater system
+ various AM connections to firewater

and the implementation of SIDRENT

Axpo & NPP Beznau

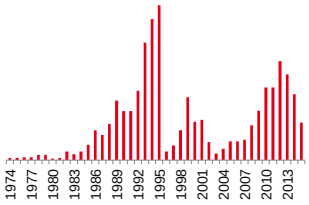
Investments

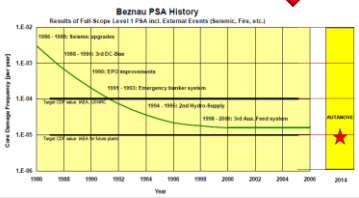


Axpo & NPP Beznau

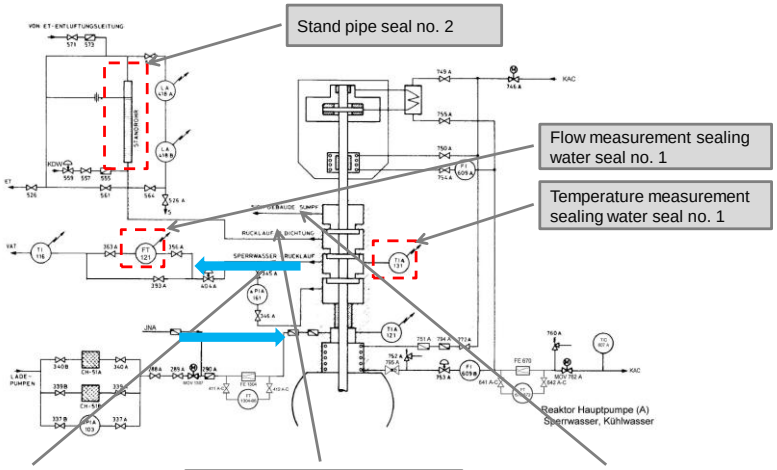
main Projects / Investments

NANO	Bunkered Emergency Systems
SG Repl. Unit 1&2	Replacement of Steam Generators
ANIS	Distributed Plant Computer System
ZWIBEZ	Intermediate Storage Building
PRESSURE	New Digital Reactor Protection and Control Systems
Repl. HP-Turb.	Replacement of High Pressure Turbines
MERKUR	New Digital Secondary Protection and Control Systems
ERGES	Additional Emerg. Feedwater
REQUA	Seismic Requalification/Upgrade
SIDRENT	Containment Venting System
...	

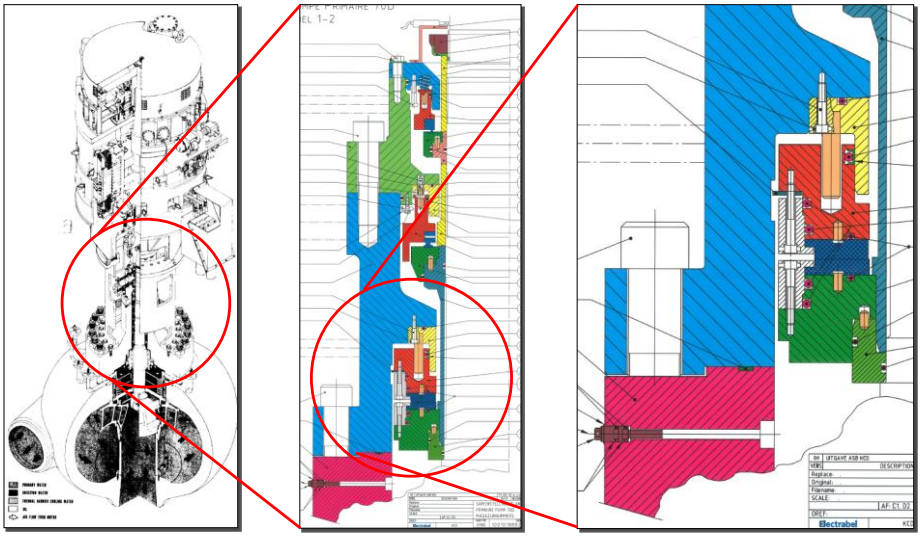




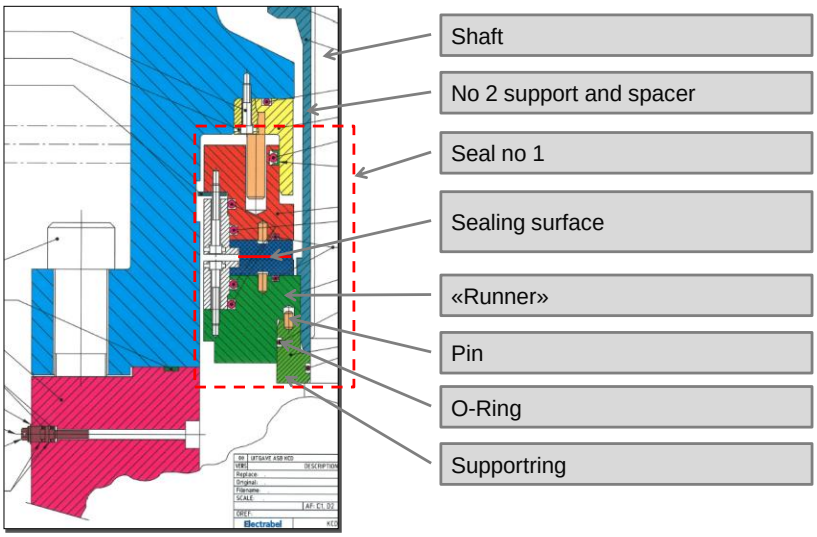
Beznau RCP



Beznau RCP (systematically)



Beznau RCP (systematically)

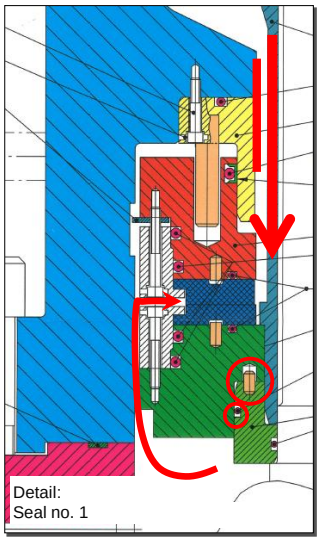


event description

Since 07.03.12 slight changes (peaks) in seal water backflow
-> awareness of shift and system engineer.

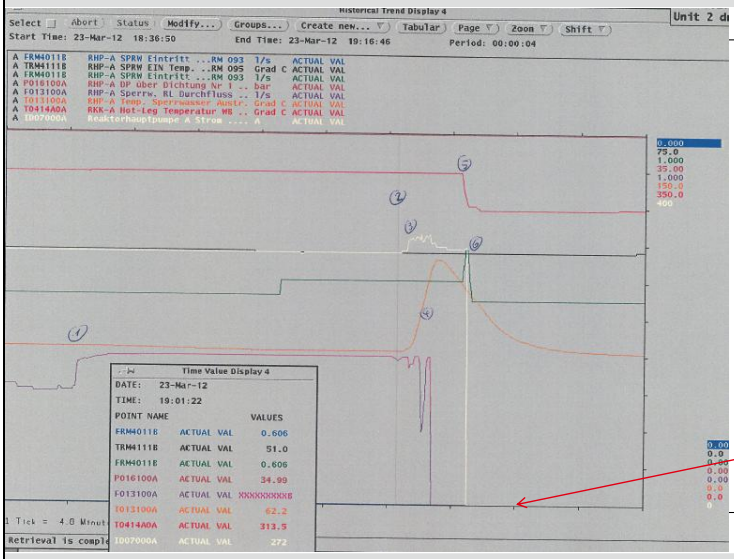
Friday, 23.03.12
05.26 flow of seal water changes but seal water temperature not increasing
18.25 flow of seal water >0,3 l/s, PI (STA) informed
18.33 seal water deviation in flow , call operation and mechanical department for a meeting at 20:00
18.41increase of seal water flow over 0,4 l/s , temperature stable
19.01temperature increase up to 100 °C and drop after minutes to 86 °C
19.01AlarmVibration on RCPs high, current of 6kV-motor 272 to 290 A
19.03 Alarm RCP-A, sealing Nr. 1 „temperature outlet high“
19.03 seal water flow RCP-A drops to zero
19.03 Alarm high level in standpipe and level increase in JRC-relieve tank
19.05 manual Rx-Trip and after 20sec. RCP-A trip

event description



Reduced pretension of the seals due to discrepancy in geometry
Movement of the supportring and the spacer
Damage of the pin of the supportring and of the O-ring
Due to the movement debris went through seal no. 1
Damage of seal no.1
Change of sealing water leak-off of seal no. 1
Insufficient cooling of seal no.1
Barreling of the no. 2 Support and spacer (increase of pressure due to damaged O-ring)
Rubbing marks on the lower sealing housing caused by the no. 2 support and spacer
Sealing water flow intermittent
Vibrations!!
Reactortrip and (after 20 seconds) pumptrip

event description (in ANIS)



Legend:

1 first increase of seal water backflow

2 Vibrations >300um (out of range) of RCP-A

3 Increase of RCP-power of app.. 120 kW (20A)

4 rapid increase of seal water tempertature to 100°C

5 Rx-Trip according procedures

6 RCP-A stop after 20 seconds according procedures

1Tick = 4 minutes

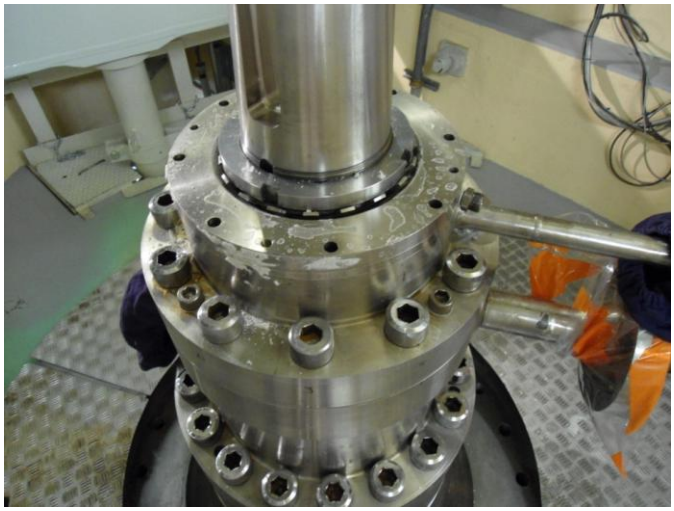
planned actions

Actions:
shut down planning (implementation of cleaning phase, tests,..)
immediate contact with all involved parties (on friday evening)

Procedures :
IV-M-171: Inspectionof RCP High Seal leak off and High Vibration Trouble Shooting Plan), 30.3.2012
BV-B-JRC-18: Operation of RCP
IV-M-058 : Inspection of RCP sealings
IV-M-133 : replace RCP-Motor
IV-M-134 : replace RCP-Internals
AN-572-M12009 : Foordec of RCP-sealing damage
ENSI-Richtlinie B03: announcement for restarting the plant
TM-572-MP12018 : Technical report for restarting the plant
MANE 12-2001 internal event report

RCP damage

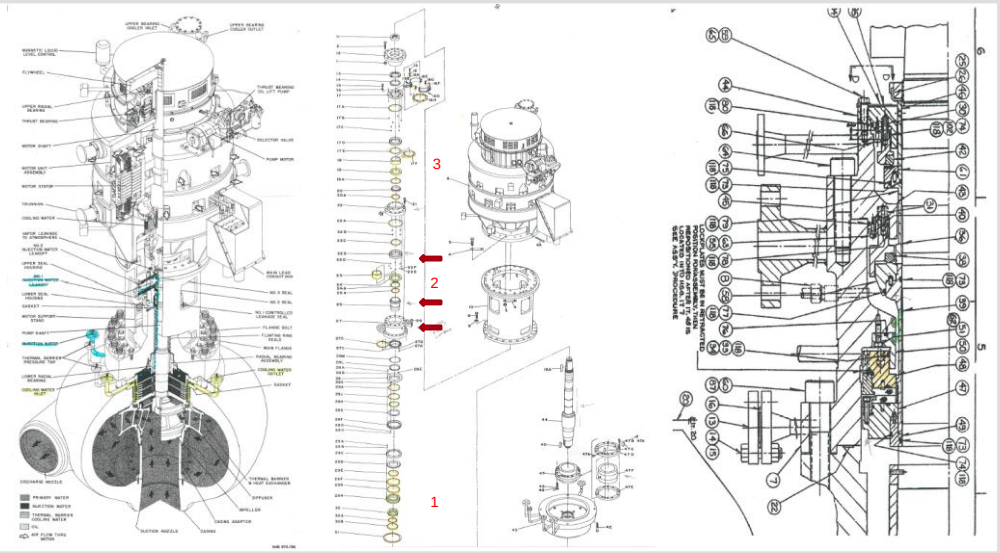
Area of the
Nr.1-3 sealing



RCP damage

Controlling parts

RCP damage



RCP damage

Rillenartige Beschädigungen an den keramischen Dichtung Nr. 1 (Pos. 2)

Defekter O-Ring im Supportring des beweglichen Teils der Dichtplatten der Dichtung Nr. 1

Ausgeschlagener Verbindungsstift zwischen Supportring und dem Dichtringhalter Dichtung Nr. 1.

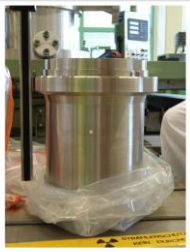
metallische Abriebteile

spanartiges metallisches Einzelteil

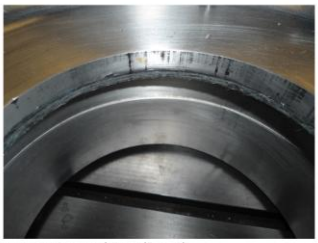
Oberflächen-Mikrodellen auf der Auflagefläche

RCP damage

Ausgebeulte Distanzbüchse zwischen Dichtung Nr. 1 und Dichtung Nr. 2 mit starken Schleifspuren an der aufgebeulten Aussenseite (Pos. 6).

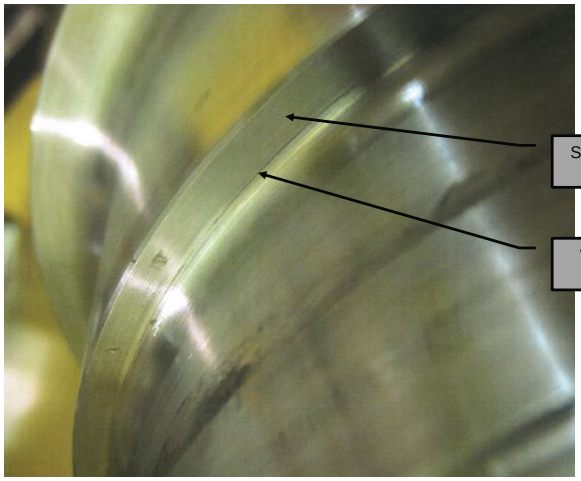


Vergleich mit neuem Teil



Starke Schleifspuren am touchierten, gegenüberliegenden unteren Lagergehäuse (Pos. 1)

RCP damage



RCP ageing and equipment qualification?

immediate questions:

find the (real) root cause(es)

single failure, combination or common cause?

Are there other affected parts?

was the failure a ageing problem?

Was there any lack in qualification?

RCP root cause

First impression:

O-Ring defect

facts:
+real missing O-ring parts
+logical defects in sealing 1 upstreams
+logical trend in ANIS

but:
-wear on pin?
-microdenting on surface of support ring?

RCP root cause

revised root cause:

displaced support ring created O-Ring defect

facts:
+real missing O-ring parts
+logical defects in sealing 1 upstreams
+logical trend in ANIS
+wear on pin
+microdenting on surface of support ring

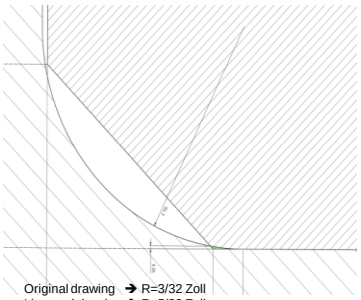
but:
-why mispositioning after 40 (?) years

RCP root cause

2nd revised root cause:

geometrical difference of parts create displaced support ring &O-Ring defect

facts:
+real missing part
+logical defects in sealing 1 upstreams
+logical trend in ANIS
+wear on pin
+microdenting on surface of support ring
+why mispositioning after 40 (?) years ->
replaced Support ring 2011
+with new shaft visible misposition support ring
->geometrical difference on radius of the shaft (5/32“ instead 3/32“)



Original drawing → R=3/32 Zoll
Licenced drawing → R=5/32 Zoll

RCP root cause

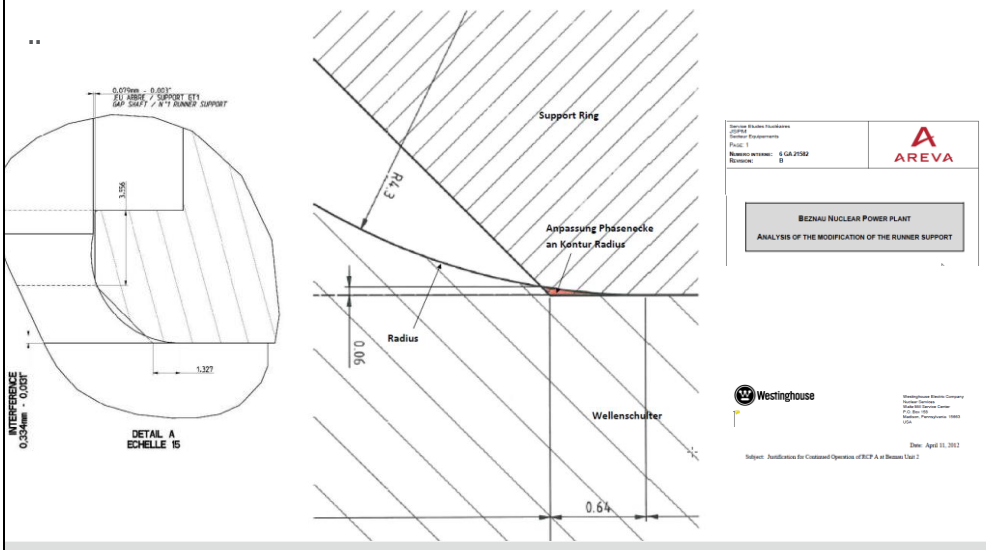
3rd revised root cause:

defficiency in drawing creates all the problems

+real missing part
+logical defects in sealing 1 upstreams
+logical trend in ANIS
+wear on pin
+microdenting on surface of support ring
+why mispositioning after 40 (?) years -> replaced Support ring 2011
+with new shaft visible mispositioning
+geometrical difference on radius of the shaft (5/32“ instead 3/32“)
+geometrical difference also on the removed shaft
-> mistake while adopting the drawing (original -> licensee)

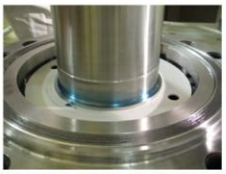
solving the problem

..

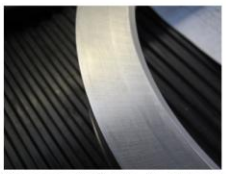
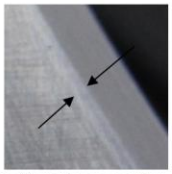


solution of the problem


Bedingt durch den zu grossen Radius an der Wellenschulter konnte sich der Supportring nicht korrekt auf der Wellenschulter aufsetzten, Spuren sind an den Kanten bei 1) und 2) sichtbar.



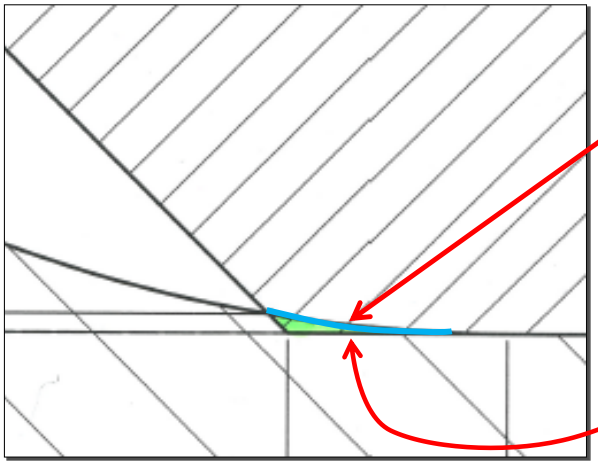
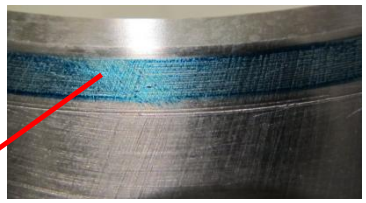
Schulter, auf der der Supportring aufliegt

Angepasste Kante (rechts starke Vergrösserung der Auflagefläche mit Facette, zwischen den Pfeilen befindet sich der Übergang in den Radius hinein)

solution of the problem

verification of contact area

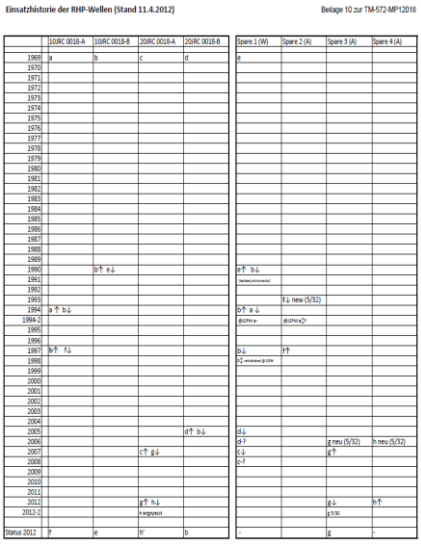




RCP following actions

MANE – actions:
(measures after incident, internal)

In total 8 measures for short/medium/ long term were identified:

- additional knowledge for root cause(s)?
- other new shafts in use?
- other deviations RCP parts?
- design of support ring?
- spares from OEM or licenced manufacturer?
- optimizing procedures?
- rework radius on shafts?
- other lessons learned?


Einsatzhistorie der RHP-Wellen (Stand 11.4.2012)

Beilage 10 zur TM-572-MP12018

	10/RC 001B-A	10/RC 001B-B	20/RC 001B-A	20/RC 001B-B	Spare 1 (W)	Spare 2 (A)	Spare 3 (A)	Spare 4 (A)
1969	a	b	c	d	e			
1970								
1971								
1972								
1973								
1974								
1975								
1976								
1977								
1978								
1979								
1980								
1981								
1982								
1983								
1984								
1985								
1986								
1987								
1988								
1989								
1990		b↑ c↓			e↑ b↓			
1991								
1992								
1993						f↓ new (5/32)		
1994	a ↑ b↓				b↑ a ↓			
1994-2								
1995								
1996								
1997	b↑ f↓				b↓	f↑		
1998								
1999								
2000								
2001								
2002								
2003								
2004								
2005				d↑ b↓	d↓			
2006					g-?		g neu (5/32)	h neu (5/32)
2007			c↑ g↓		f↓		g↑	
2008					c-?			
2009								
2010								
2011								
2012			g↑ h↓				g↓	h↑
2012-2			c neu (5/32)				g 5/32	
Status 2012	f	e	h'	b	-		g	-

RCP retro perspective

missing 2 mm in shaft-radius & 2 missing holes in spacer ring

created:

☹

23 days shut down

about 3 man-years of unplanned manpower

loss of 210'000MWh equals about 10 MCHF

damage of some parts in the RCP sealing area

☺

excellent teamwork (weekends, Easter, internal and external employees)

excellent support of our management as well as from ENSI and SVTI-N

root case is no ageing problem, but EQ-qualification problem (drawing)


thank you
for your attention
23.05.2012 | Seite 33
ENSI NEA / WGIP Workshop Baden F.Kündig, NPP Beznau

13. TOPIC A: EXPERIENCE FROM INSPECTION OF AGEING AND EQUIPMENT QUALIFICATION

OPENING PRESENTATION

11th International Nuclear Regulatory Inspection Workshop

Topic A:

Experience from inspection of ageing and equipment qualification.

Hosted by: ENSI, Swiss Federal Nuclear Safety Inspectorate

Baden, Switzerland, 21th – 23th May, 2012

Committee on Nuclear Regulatory Activities (CNRA)

Working Group on Inspection Practices (WGIP)

Julio Crespo, CSN (Spanish RB)

As nuclear facilities age, the continued effectiveness of systems, structures and components (SSCs) affected by aging mechanisms and equipment qualification must be verified.

The focus of this workshop topic is to identify commendable inspection practices for gaining confidence on verifying the licensee's ability to maintain the effectiveness of aging SSCs.

BACKGROUND

Regulatory Aspects of Life Extension and Upgrading of NPPs,

NEA/CNRA/R(2001)1 and 2001)2)

Regulatory Inspection Activities related to Older Operating NPPs,

NEA/CNRA/R(1999)2.

First set of questions related to requirements of qualified SSCs and assessments performed by the RBs

With a few exceptions all licensees qualify active and passive components to be able to cope with an important event applying Seismic and Environmental standards,

Several methods such as Test, Analysis, Code/calculation or some combination of these methods are used, and RBs inspect the process.

Not all RBs required approval of the qualifications.

Is knowledge/expertise in the RB experts or in TSO?

Do Licensees maintain enough competence and technical training to verify the adequacy of qualification?

Second set of questions related to how requirements have evolved during the past years

Some modifications in requirements, mainly to adapt changes of the standards, in general, more severe.

More modifications related to ageing mechanisms.

Not significant changes in the scope of qualified SSCs, **more in the scope of oldest plants**,

Some SSCs with inadequate qualification,

Many changes revealed through PSR.

Has your RB required the licensee to implement specific ageing program?

YES,

Modifications related to ageing mechanisms.

Updated or new rules, standards and safety guides are recently being introduced.

Use of OPEX.

How are carried out the specific RB inspections on this subject?

What are the main challenges?

How long has the ageing program been fully implemented?

Are RBs involved in research programs?

Use of references such as NS-G-2.12, NUREG-1801.

Has your licensee or RB identified problems related to obsolescence, unavailability, etc. of qualified SSCs? Does your licensee use new qualified materials, equipment?

YES, Current problem in all countries. Examples:

Belgium, 380 V electrical distribution boards, batteries, transducers,

Finland, Actuator spare parts.

India, Instrumentation and electrical components.

Are licensee's upgrading SSCs? ***YES, some countries are using dedication process to upgrade some components from commercial grade.***

Does your RB inspect the strategy and management of stocks for qualified SSCs? (Identification of obsolescence & availability)

How is surveyed the procurement and replacement process?

Control of vendor chain: feedback from Topic 3

How does your RB manage the lack of conformity (non-conformances) when it is discovered?

Justification by formal process.

Analysis of the impact on the safety.

Requiring supplementary controls with a time frame.

Example: Use of lubricant different to the recommended by manufacturers

Do RBs check whether the licensees have an appropriate interaction with vendors and follow manufacturers´ recommendations?

Are aware licensees of modifications in the service life of components?

Do the licensees use trends or indicators of weaknesses related to qualified SSCs and ageing problems?

Role of the CAP (corrective action program)

How has operating experience been applied concerning qualified SSCs?

General use where the licensees evaluate the applicability of the problem.

Assessment of the transferability to other national NPPs.

In some cases it is considered a way of qualification, in general supported by supplementary analyses.

Does your RB noticed an increase in the issues we are dealing with?

Use of OPEX of other industries.

Has your RB assessed how to inspect SSCs with limited access?

YES, with a few exceptions, by:

- Periodic safety reviews,
- In-service inspections, specific monitoring program.
- Stricter design and qualification requirements,

What are the main inspection challenges?

Findings self-revealed versus findings discovered by inspection.

14. TOPIC A: EXPERIENCE FROM INSPECTION OF AGEING AND EQUIPMENT QUALIFICATION

CLOSING PRESENTATION

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Committee on Nuclear Regulatory Activities (CNRA)
Working Group on Inspection Practices (WGIP)

11th International Workshop on Nuclear Regulatory Inspection Activities

Experience from inspection of ageing and Equipment Qualification
Group A1 & A2

Hosted by ENSI, Swiss Federal Nuclear Safety Inspectorate
Baden, Switzerland, 21-23 May 2012

1

Agence pour l'énergie nucléaire
Nuclear Energy Agency

The Team

	Inspection of aging and equipment qualification							
	Group 1					Group 2		
1	Mr.	Julio	Crespo	Spain	Ms.	Carmen	Rodriguez Mate	France
2	Mr.	Reginald	Hadden	UK	Mr.	Mikulas	Bencat	Slovakia
3	Mr.	Arvind Paul (A.P.)	Garg	India	Mr.	Luis Miguel	Gutierrez	Mexico
4	Mr.	Alain	Geens	Belgium	Mr.	Tage	Eriksson	Sweden
5	Mr.	Petri	Vuorio	Finland	Mr.	Masakuni	Koyama	Japan
6	Dr.	Sweng-Woong	Woo	Korea				

2

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Workshop Objectives

- **The focus of this workshop topic is to identify commendable inspection practices for gaining confidence on verifying the licensee's ability to maintain the effectiveness of ageing SSCs.**

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- IAEA recognises that licensees have identified a need to manage ageing processes of SSCs.
- Following this recognition IAEA issued a requirement for licensees to establish an Ageing Management Programme (AMP).
- To support the requirement IAEA issued Guidance document NS-G-2.12.
- Further IAEA guidance for older plant Safety Assessment for Long Term Operation (SALTO) exists in SRS 57.

4

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- An observation of this working group is that not all licensees have implemented arrangements to address the IAEA requirements (NS-R-2, SSR-2/2) and are not following this guidance.
- The Regulatory Bodies (RB) should check if all licensees have an adequate AMP in place that reflects IAEA guidance.

5

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Commendable Practices

- It is important that RBs inspect the licensee's AMP to ensure :
  - the licensee's programme is fully implemented, including consideration of the safety significance of SSCs in order to grade the importance, and that it is functioning.
  - this should include a physical inspection together with review of documentation.

6

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- The RB should confirm by inspection that the licensees act proactively by the implementation of the Plan Do Check Act Review (PDCA) process that aligns with IAEA Guidance for the systematic approach to managing ageing of a structure or component.

7

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- Plan : Planning, Design and Qualification
- Do : Operation under planned conditions

- Check : Plant Monitoring and Inspection, Aging Detection including any deviation of environmental conditions
- Act : Reconsider Qualification and how to manage the impact of aging changes

8

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- RBs should ensure by inspection that licensees carry out inspections, tests and any other reasonable activities, which should include OPEX data.

This approach should lead to a determination of the aged condition of components by providing a prediction of its remaining life.

9

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- RBs should confirm by inspection that licensees and vendors ensure that the Equipment Qualification (EQ) process contains reasonable measures for identifying and minimizing uncertainties included in the process for determining component's life.

10

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- RBs should confirm by inspection that :
  - licensees keep and maintain a record of all nonconformances related to EQ.
  - licensees have a system in place for assessing the impact on safety of EQ related nonconformances.
  - licensees have a system in place for assessing the accumulated effect on safety of all EQ related nonconformances.

11

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- It is important that the RB :
  - is kept informed of all research related to ageing and its mitigation.
  - ensures by inspection that the licensees have research programs related to aging.

12

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- SALTO report identifies that control of chemistry is an important factor in mitigating aging effects
- Group observed not all licensees are paying adequate attention to these aspects.
- The RBs should ensure by inspection that licensees have in place adequate chemistry programmes.

13

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- Group observed that a large number of licensees have SSCs that are difficult to access for inspection and maintenance activities.
- To address this problem some licensees have identified and developed a list of SSCs difficult to access. They have implemented arrangements to ensure that safety is maintained through either inspection, maintenance or justification.

14

Agence pour l'énergie nucléaire
Nuclear Energy Agency

- The RBs should confirm through inspection that licensees are considering the impact on safety of SSCs with limited access.

15

Agence pour l'énergie nucléaire
Nuclear Energy Agency

REMARKS

- An observation of this working group is that RBs, licensees and vendors may have a lack of knowledge and competence of the ageing mechanism of the SSCs important to safety.
- Therefore the development and implementation of a knowledge management system for ageing should be considered by all relevant parties.

16

15. TOPIC B: INSPECTION OF COMPETENCY OF OPERATORS

OPENING PRESENTATION

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Committee on Nuclear Regulatory Activities (CNRA)
Working Group on Inspection Practices (WGIP)

11th International Workshop on Nuclear Regulatory Inspection Activities

Inspection of Competency of Operators
Groups 3 & 4

Hosted by ENSI, Swiss Federal Nuclear Safety Inspectorate
Baden , Switzerland, 21.-23, May 2012

1

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Why was this topic selected?

- All of the major nuclear accidents (TMI, Chernobyl, Fukushima) and numerous other incidents show that competent control room operators are key element in safety of nuclear power plants.
- Control room operators hold a key position for safety
  - Normal plant operations
  - Work control, nuclear and industrial safety
  - Testing and surveillance
  - Limitation of disturbances
  - Accident management, back-up, control, information
  - Severe accident management, emergency preparedness

Are regulators aware of the licensees operating practices and competences of the control room operators?

2

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What may have changed?

- Old generation of operators are leaving the industry
- New operators learn their profession in different kind of environment and they are educated with different methods
- Plant modifications and upgrades are changing the plants and the plants are aging
- Complacency on all levels of licensee's organization should be avoided
- Automation and control room modernizations are changing the way plants are operated
- Requirements of control room operations and managements systems are more stringent

Have regulators found any new or emerging safety aspects that may need more attention?

3

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Background from questionnaires

- What the questions responses told us?
- What else did the responses identify?
- What other questions should we be asking?

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Question 1
Field Observations
a. Does the RB perform field inspections

- a. yes.
  - Resident inspectors / RB inspection team
  - Plant status, alarms, logbooks, interview, work control systems, appropriate staffing, procedure usage, professional behavior

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Question 1
Field Observations
b. Does the RB assess human performance
c. Does the RB assess operator performance
d. How does the RB ensure they do not interfere with operators during inspections?

- b. yes.
  - Inspection guidance or against licensee's own rules and standards (conservative decision making, error prevention techniques, three way communication, STAR method, pre-job briefing, post-job debriefing)
- c. yes.
  - Normal and outage operation are part of inspections.
  - Few countries participate training events.
  - Operational events are reviewed
  - SAT or task analyzed training programs
- d. experience, inspector training, inspection preparation, expectations discussed

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Question 2

Control room operator initial training and qualification
a. Does the operator have a training and qualification program?
b. Describe the qualification process.
c. What role does the RB have in the process?

- a. yes.
- b. training programs are quite extensive 2-3 years, simulators are used, on-the-job training, work experience,

  Note: formal education level from high school level to master of science level (university)
- c formal license test by regulator OR licensee have their internal tests and RB inspect other aspects eg. training

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Question 3

Control room operator requalification and refresher training
a. Does the operator have a requalification program; approved by RB?
b. What role does the RB have in the program?

- See question 2. Similar apporoach.

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What could be included in conversations

- Formal / Informal Apporoach to licensing operators
- Education Requirements
- Simulator usage
- Severe accident training

- Questions???

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Task ahead

- Process Suggestions and Recommendations to how regulators should assure that main control room operators are competent?

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Examples

- Operating experience indicates an industry trend with operators making non-conservative decisions
- Large overall impact on plant safety
- Difficult to identify issues that could indicate a larger problem

**Special thanks to Rebecca Sigmon, NRC, Operating Experience Branch for the data analysis

Agence pour l'énergie nucléaire
Nuclear Energy Agency

2011 Significant Events Included:

- Taking actions affecting reactor power without a full understanding of the plant conditions
- Making operability determinations without appropriate evaluation
- Working through, and around, inadequate procedures to complete work

12

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Specific Examples

In 2011 2 plants experienced unexpected reactivity excursions during planned plant evolutions with the reactors operating in Mode 1.

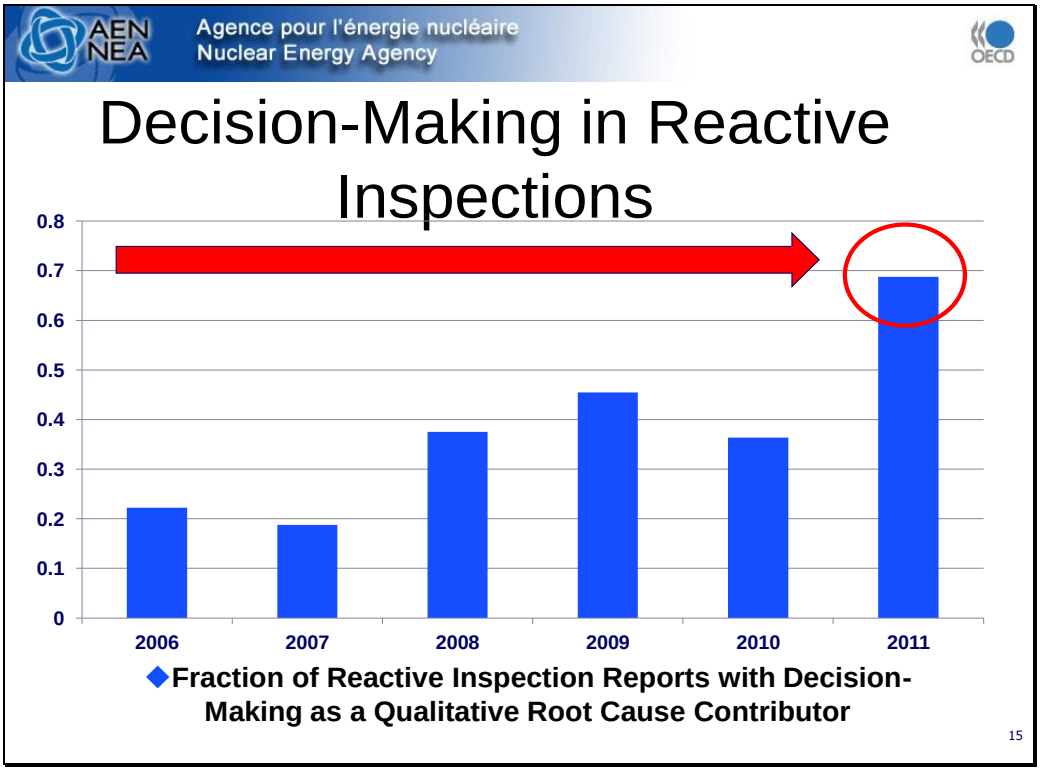
- These issues consisted of a series of non-conservative decisions which were made because the operators either did not understand or did not appreciate the cumulative effects of their decisions on plant safety.
- In both cases, the licensees experienced unexpected conditions, and instead of following procedures directing that the plant be placed in a safe condition until the indications were fully understood, they continued with the evolutions, potentially compromising reactor safety.

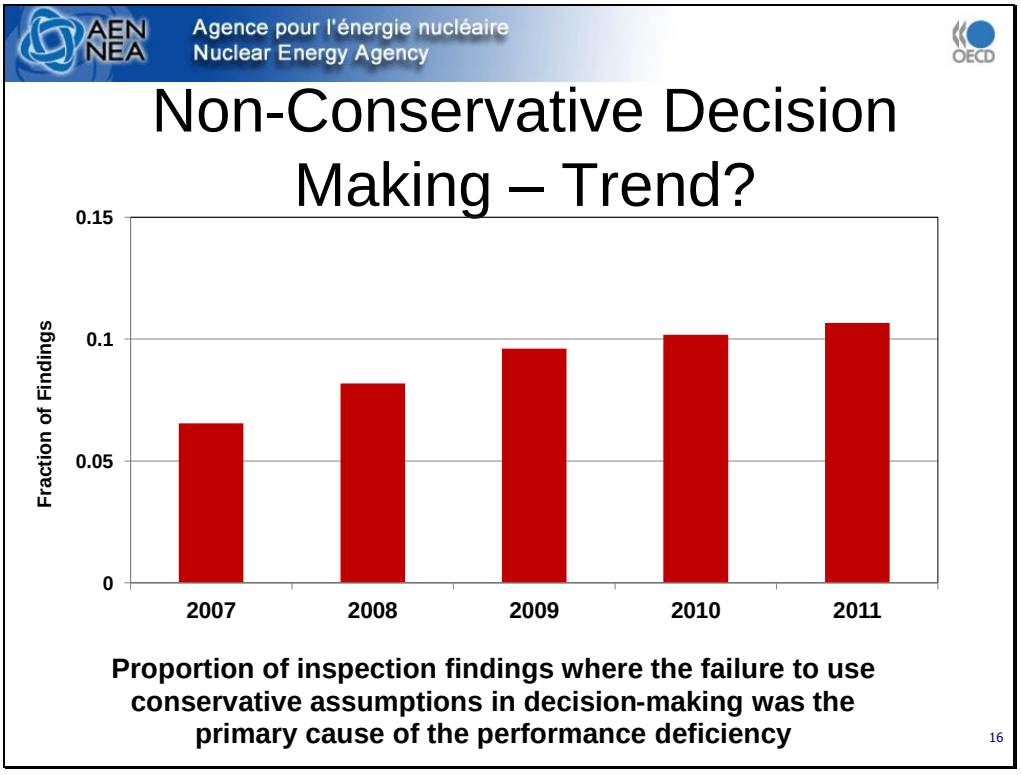
Agence pour l'énergie nucléaire
Nuclear Energy Agency

Reactive Inspection Analysis

- Common themes seen in multiple events which were complicated by factors related to decision-making
  - Lack of a questioning attitude when faced with unexpected indications
  - Failure to communicate concerns
  - Rationalization of less conservative actions
    - Group think

14


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Decision-Making in Reactive Inspections
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
2006
2007
2008
2009
2010
2011
Fraction of Reactive Inspection Reports with Decision-Making as a Qualitative Root Cause Contributor
15


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Non-Conservative Decision Making – Trend?
Fraction of Findings
0.15
0.1
0.05
0
2007
2008
2009
2010
2011
Proportion of inspection findings where the failure to use conservative assumptions in decision-making was the primary cause of the performance deficiency
16

Agence pour l'énergie nucléaire
Nuclear Energy Agency

NRC Actions

- Operating Experience Smart Sample for review of operability determinations
- Revision to Inspection Procedure for evaluation of operator performance
- Exploring improvements to the Significance Determination Process to evaluate findings driven by human performance errors

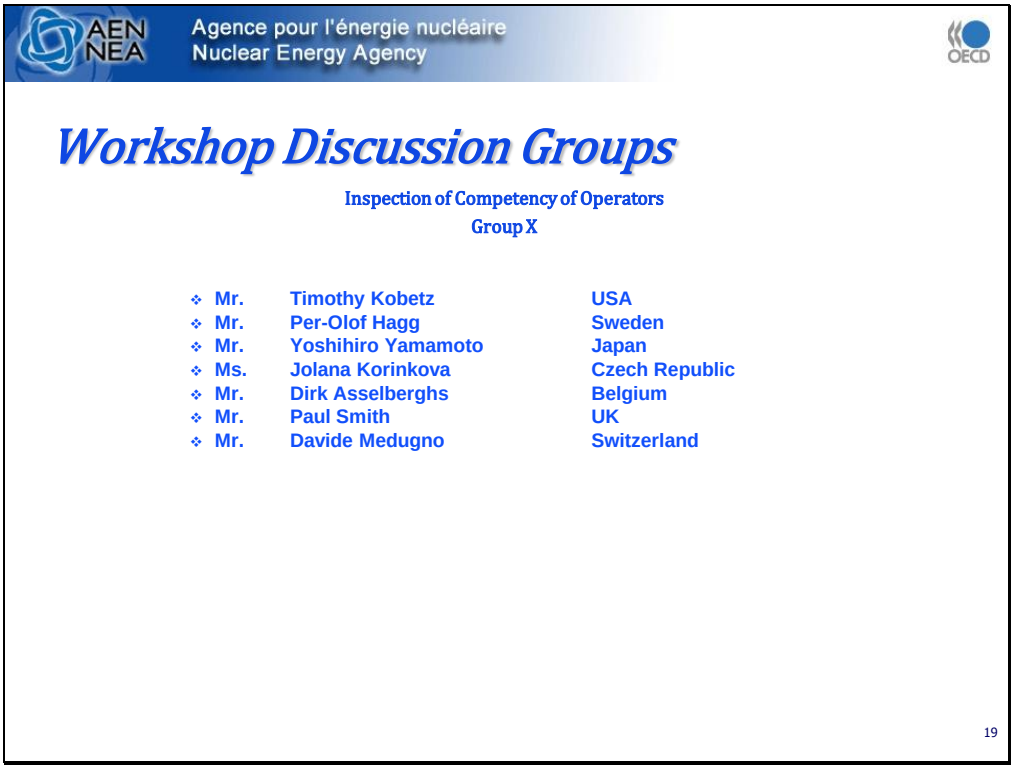
17

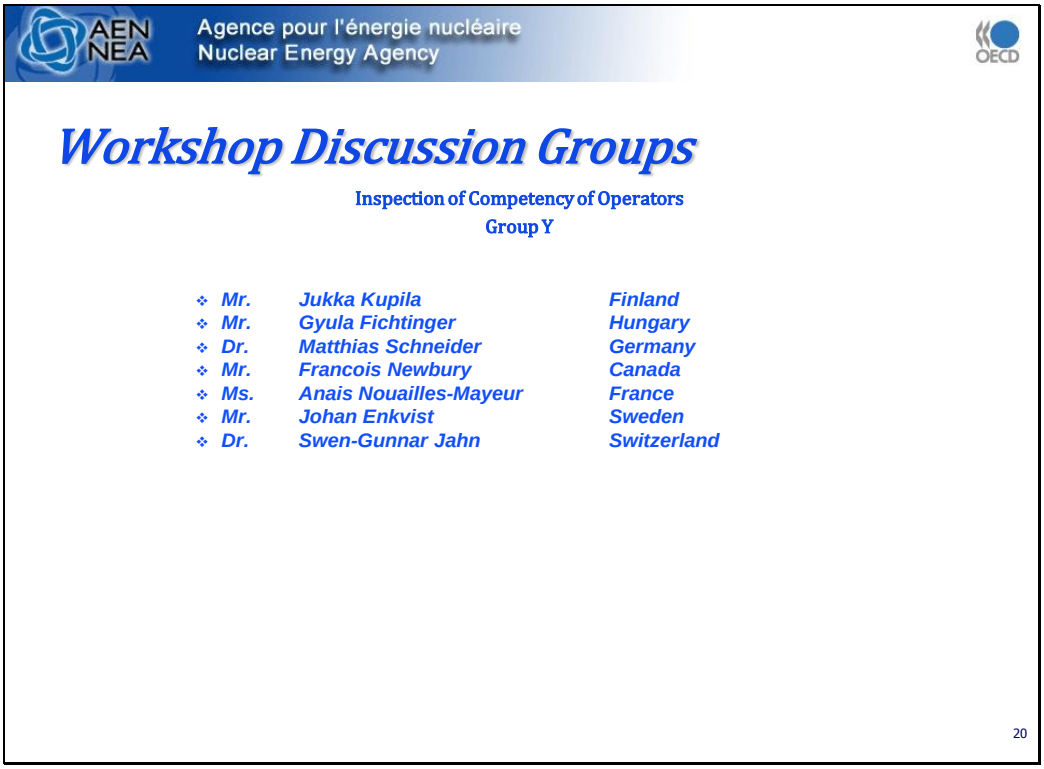
Agence pour l'énergie nucléaire
Nuclear Energy Agency

Summary

- Increasing trend across the industry of performance deficiencies related to decision-making
- In 2011, decision-making had a noticeable impact on a number of significant events
- Industry groups noted a similar trend and have initiated actions to address it

18


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Workshop Discussion Groups
Inspection of Competency of Operators
Group X
Mr. Timothy Kobetz USA
Mr. Per-Olof Hagg Sweden
Mr. Yoshihiro Yamamoto Japan
Ms. Jolana Korinkova Czech Republic
Mr. Dirk Asselberghs Belgium
Mr. Paul Smith UK
Mr. Davide Medugno Switzerland
19


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Workshop Discussion Groups
Inspection of Competency of Operators
Group Y
Mr. Jukka Kupila Finland
Mr. Gyula Fichtinger Hungary
Dr. Matthias Schneider Germany
Mr. Francois Newbury Canada
Ms. Anais Nouailles-Mayeur France
Mr. Johan Enkvist Sweden
Dr. Swen-Gunnar Jahn Switzerland
20

16. TOPIC B: INSPECTION OF COMPETENCY OF OPERATORS

CLOSING PRESENTATION

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Committee on Nuclear Regulatory Activities (CNRA)
Working Group on Inspection Practices (WGIP)

11th International Workshop on Nuclear Regulatory Inspection Activities

Conclusions of
Inspection of Competency of Operators
Groups 3 & 4

Hosted by ENSI, Swiss Federal Nuclear Safety Inspectorate
Baden , Switzerland, 21-14, May 2012

1

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Workshop Objectives

- Exchange of information between workshop participants on the inspection of control room operators.
- Discuss inspection practices of workshop participants.
- Develop conclusions, observations, and commendable inspection practices

2

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Workshop Discussion Groups

Inspection of Competency of Operators
Group 3

Mr.	Timothy Kobetz	USA
Mr.	Per-Olof Hagg	Sweden
Mr.	Yoshihiro Yamamoto	Japan
Ms.	Jolana Korinkova	Czech Republic
Mr.	Dirk Asselberghs	Belgium
Mr.	Paul Smith	UK
Mr.	Davide Medugno	Switzerland

3

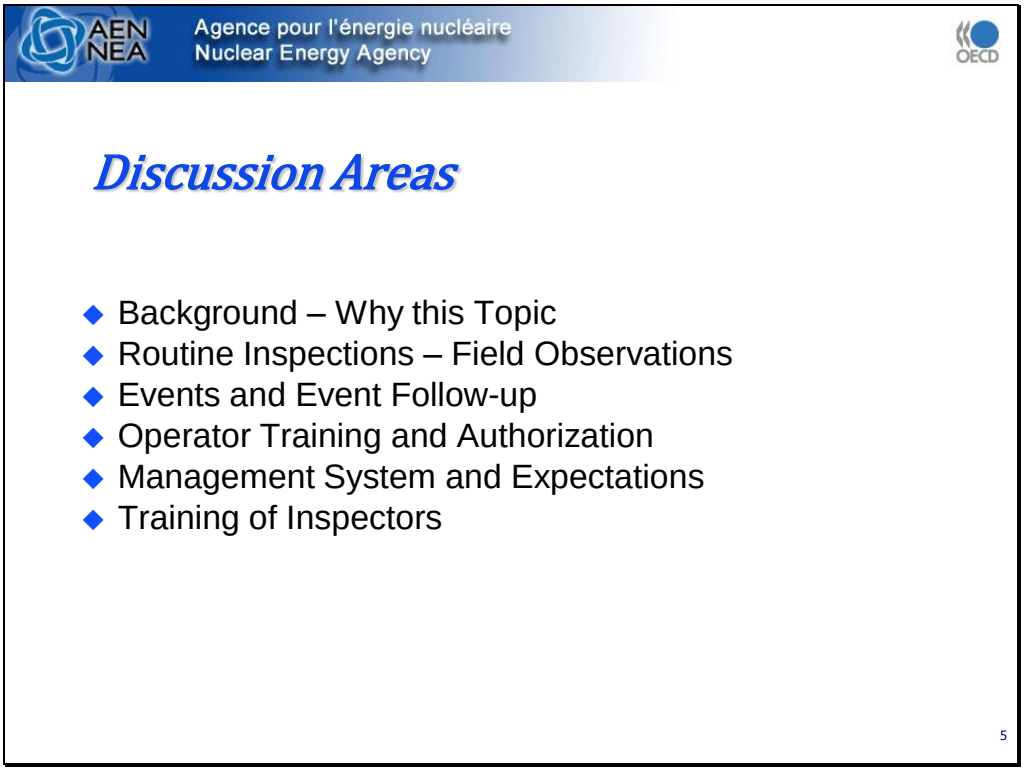
Agence pour l'énergie nucléaire
Nuclear Energy Agency

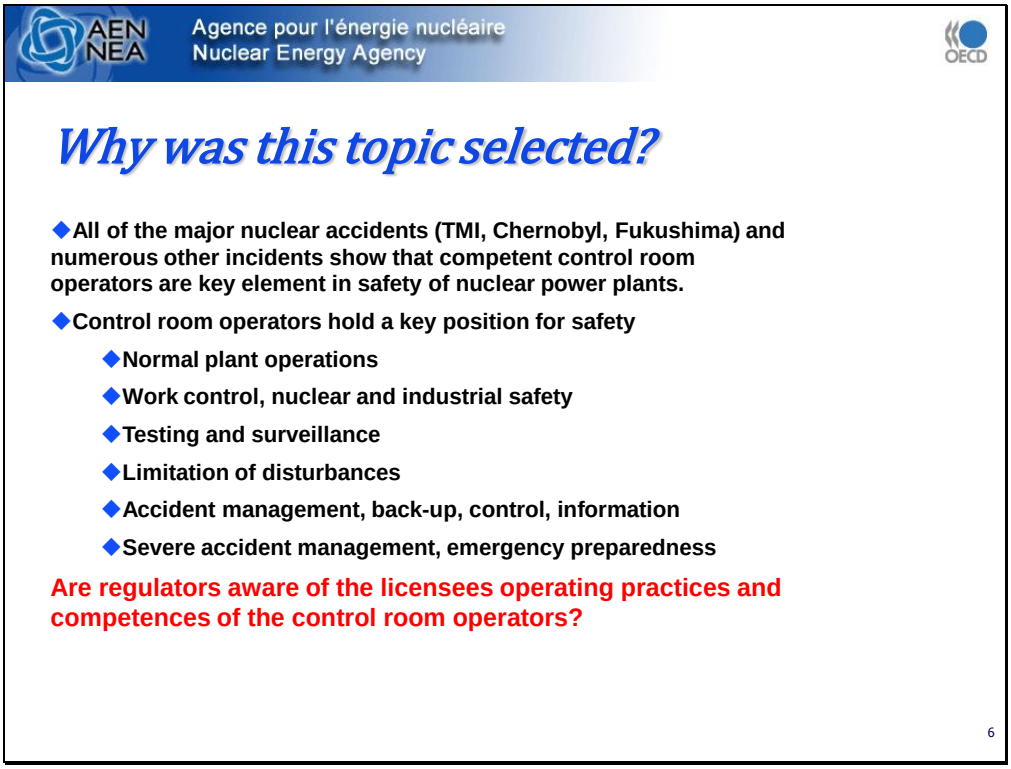
Workshop Discussion Groups

Inspection of Competency of Operators
Group 4

Mr.	*Jukka Kupila*	*Finland*
Mr.	*Gyula Fichtinger*	*Hungary*
Dr.	*Matthias Schneider*	*Germany*
Mr.	*Francois Newbury*	*Canada*
Ms.	*Anais Nouailles-Mayeur*	*France*
Mr.	*Johan Enkvist*	*Sweden*
Dr.	*Swen-Gunnar Jahn*	*Switzerland*

4


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Discussion Areas
Background – Why this Topic
Routine Inspections – Field Observations
Events and Event Follow-up
Operator Training and Authorization
Management System and Expectations
Training of Inspectors
5


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Why was this topic selected?
All of the major nuclear accidents (TMI, Chernobyl, Fukushima) and numerous other incidents show that competent control room operators are key element in safety of nuclear power plants.
Control room operators hold a key position for safety
Normal plant operations
Work control, nuclear and industrial safety
Testing and surveillance
Limitation of disturbances
Accident management, back-up, control, information
Severe accident management, emergency preparedness
Are regulators aware of the licensees operating practices and competences of the control room operators?
6

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What may have changed?

- Old generation of operators are leaving the industry
- New operators learn their profession in different kind of environment and they are educated with different methods
- Plant modifications and upgrades are changing the plants and the plants are aging
- Complacency on all levels of licensee's organization should be avoided
- Automation and control room modernizations are changing the way plants are operated
- Requirements of control room operations and managements systems are more stringent

Have regulators found any new or emerging safety aspects that may need more attention?

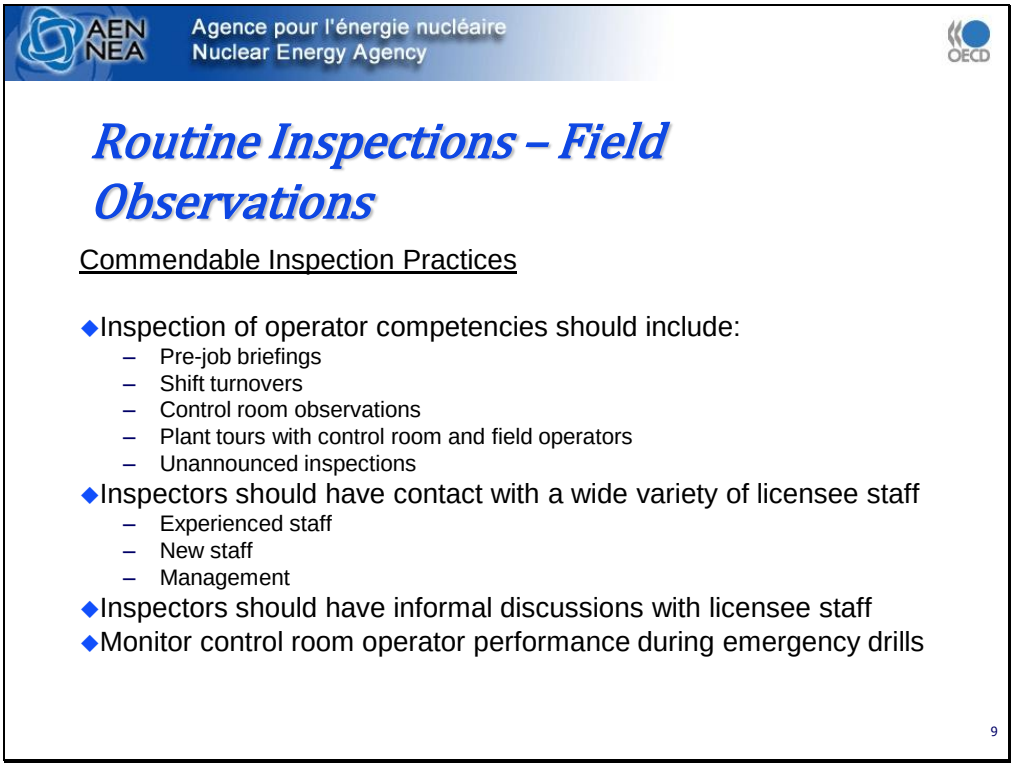
7

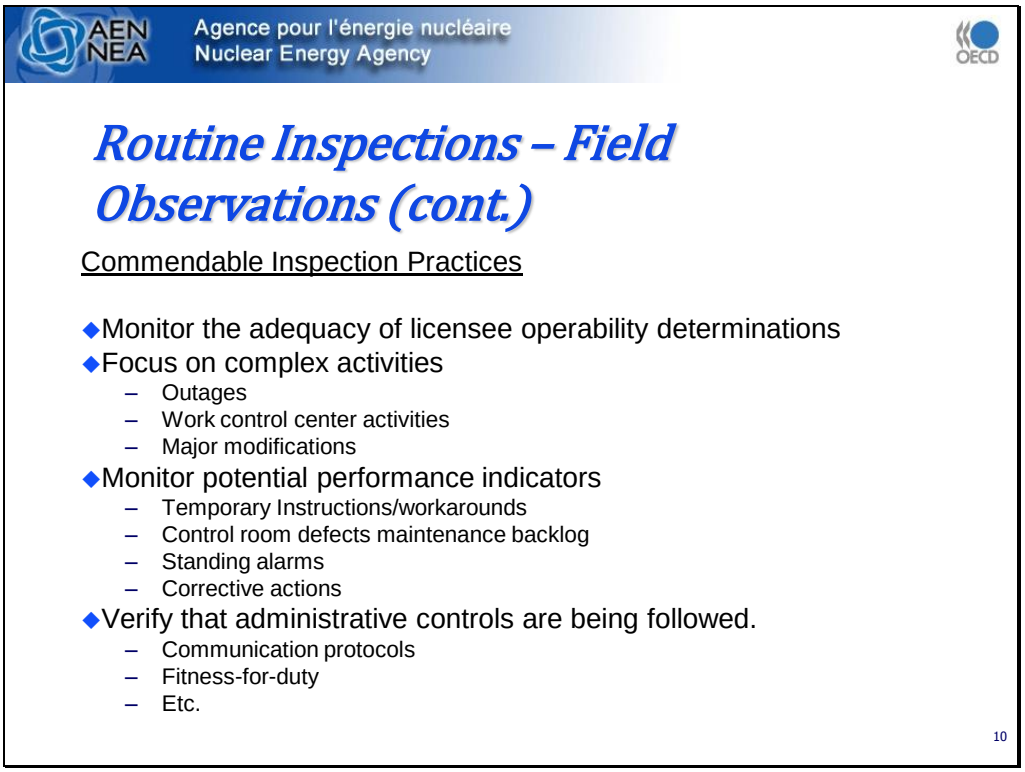
Agence pour l'énergie nucléaire
Nuclear Energy Agency

Use of Previous Workshops

- Safety Culture (10th WGIP Workshop in Amsterdam – 2010)
- Integration of Operating Experience with Inspection Activities (WGOE/WGIP Workshop in Helsinki – 2011)

8


AEN NEA
Agence pour l'énergie nucléaire
Nuclear Energy Agency
OECD
Routine Inspections – Field Observations
Commendable Inspection Practices
Inspection of operator competencies should include:
Pre-job briefings
Shift turnovers
Control room observations
Plant tours with control room and field operators
Unannounced inspections
Inspectors should have contact with a wide variety of licensee staff
Experienced staff
New staff
Management
Inspectors should have informal discussions with licensee staff
Monitor control room operator performance during emergency drills
9


AEN NEA
Agence pour l'énergie nucléaire
Nuclear Energy Agency
OECD
Routine Inspections – Field Observations (cont.)
Commendable Inspection Practices
Monitor the adequacy of licensee operability determinations
Focus on complex activities
Outages
Work control center activities
Major modifications
Monitor potential performance indicators
Temporary Instructions/workarounds
Control room defects maintenance backlog
Standing alarms
Corrective actions
Verify that administrative controls are being followed.
Communication protocols
Fitness-for-duty
Etc.
10

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Routine Inspections – Field Observations (cont.)

Inspection Techniques

- Use informal checklists for walkdowns and control room observations
- Call on technical and human factors support if needed
- Talk to your fellow inspectors
- Use available safety culture tools to assess operator actions
- Use Regulatory Body senior management site visits to help convey your concerns to the licensee

11

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Events and Event Follow-up

Commendable Inspection Practices

- Review of event reports should include human and organizational factors
- Inspectors should independently gather data and assess operator response to plant events
- Team inspections should be used as necessary to evaluate operator response to significant events

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Operator Training and Authorization

Commendable Inspection Practices

- Provide inspection oversight of the licensee's systematic approach to training (including teamwork, leadership, communication, education, etc.)
- Provide inspection oversight of the authorization and re-authorization process
- Verify the competency of the trainers
  - Subject area
  - Training skills
- Assess the scope and adequacy of the simulator scenarios

Inspection Techniques

- Review operator authorization and re-authorization failure rates

13

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Management Systems and Expectations

Commendable Inspection Practices

- Evaluate whether management expectations for operator performance are implemented, understood, and effective
- Evaluate the effectiveness of the licensee's training programme feedback process
- Evaluate whether operators have been properly trained on plant modifications and procedural changes
- Verify that simulator has been updated to reflect affected plant modifications and provide training to operators as appropriate

Inspection Techniques

- Evaluate the licensee's knowledge management programme including, mentoring and succession planning.
- Evaluate whether plant modifications have taken into account human factors considerations (e.g., analogue to digital conversions)

14

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Training for Inspectors

- Inspectors should be provided training on how to observe control room observations including the assessment of human factors issues
- Inspectors should consider training on the site specific or generic simulator

15

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Other Things to Consider....

Questions.....

16

17. TOPIC C: INSPECTION OF LICENSEE'S OVERSIGHT OF CONTRACTORS

OPENING PRESENTATION

WGIP Workshop 2012
Baden

Opening session

"Inspection of licensee's oversight of contractors"

Oversight of contractors: not a new issue

- 2006 WGIP workshop in Toronto: "Inspection of the interactions between the licensee and its contractors"
- NEA booklet: "The nuclear regulator's role in assessing licensee oversight of vendor and other contracted services"
  - Increased use of contracted services
  - Challenges for licensees and regulators related to:
    - retention of nuclear expertise
    - effective management of the interfaces between licensees and contractors
    - oversight of contractor manufacturing quality
  - RB must address these challenges to provide re-assurance that the licensee maintains its responsibility for the safety of the facility, regardless of who provides goods and services for the facility or where the activities involved in the supply chain take place

Commendable practices (workshop 2006) (1/3)

- The RB inspects all aspects of the contracting process:
  - Contract placement,
  - Bid assessment,
  - Contractor requirements,
  - Contract delivery,
  - Contract completion,
  - The audit & review and feedback process,

  on the basis of safety relevance, risk assessment and engineering judgement, with links down to all-subcontractors.

Commendable practices (workshop 2006) (2/3)

- The RB inspects the policy of the licensee to keep its ability to:
  - Carry out its contract management tasks,
  - Judge competency of contractors,
  - Understand its responsibilities under the law,
  - Understand the safety features and hazards of its plant and how contract may affect these.
- The RB inspects in the field rather than only reviewing records and uses multidisciplinary teams when appropriate.

Commendable practices (workshop 2006) (3/3)

- The RB has sufficient guidelines to describe the inspection of contracting.
- The RB directs its inspection on licensee's contracting activities, based on records and trending.
- The RB treats large or small, foreign or domestic contractors equally. Regulatory Bodies cooperate concerning work with foreign contractors, but are aware of different standards.

Synthesis of the answers to questionnaire (1/9)

- In most of the countries, there is no specific regulatory framework to support the direct inspection of contractors.
  - Inspections are focused on licensees and their ability to correctly oversight contractors
  - The same kind of answer was given at the Toronto workshop.
- In some countries, licensee uses independent inspection agencies to assist him in oversight of contractors.
  - Mostly in specific areas (pressure retaining components, for instance in the frame of ASME code,…)
  - RB not always performs a direct oversight of these agencies

Synthesis of the answers to questionnaire (2/9)

- No country where RB certify contractors who may work
- Licensees usually developed a certification process of their contractors
  => This is this process which is examined by RB
- Licensee's process for selection of contractors is almost always examined by RB (and approved in one case)
- RB usually inspects the licensee's processes for supervising contractor services
  - This can be achieved by checking the performance of the work, the supervision by the dedicated plant personnel…

Synthesis of the answers to questionnaire (3/9)

- Products and works performed by contractors are in most of the countries inspected by RB
  - not necessarily because the work is performed by a contractor
  - because the product of work itself is safety related
- In a lot of countries, RB does not inspect the retention of contractor's safety related information
  - In some of the countries, there is specific regulation making mandatory for contractors to deliver safety related information
- Wide range of practices
  - from (only) "high level" inspections to (only) spot checks [to verify the results of the licensee's oversight of contractors]
  - In a lot of countries, RB perform both "process oriented" inspections and "result oriented" inspections

Synthesis of the answers to questionnaire (4/9)

- Almost all RB perform visits of contractors or vendor-manufacturer sites
  - The extent and content of these inspections however vary
    - In some countries, these visits are only done for some specific projects or activities (for instance attendance to qualification tests of new equipment)
    - In some countries, RB performs these inspections by arrangement and together with the licensee.
    - In one country, RB visits at contractor sites are an integral part of the inspection programme
- RB have (or not) the authority to directly inspect the contractors and subcontractors premises of licensees
  - Specific arrangements are taken if necessary

Synthesis of the answers to questionnaire (5/9)

- In some cases, no cooperation at all with other RB for oversight of foreign contractors
- A lot of countries are engaged in cooperation and sharing of information through international fora and bi-lateral agreements
- Some countries are also engaged in MDEP process (Multi-national Development Evaluation Programme)

  MDEP: multinational initiative taken by national safety authorities to develop innovative approaches to leverage the resources and knowledge of the national regulatory authorities who are currently or will be tasked with the review of new reactor power plant designs

Synthesis of the answers to questionnaire (6/9)

- In some countries, direct inspections of contractors are performed
- In some other countries, RB visits the contractor as an observer of the licensee's inspection
- There are also countries where RB performs an inspection of both the contractor and the ability of licensee to oversight the contractor
- In most of the countries, the main selection criteria for RB inspections of contractors are the safety significance of the equipment or activity and the experience feedback (including radiation protection issues)

Synthesis of the answers to questionnaire (7/9)

- Areas actually inspected cover mainly:
  - QA
  - test results
  - Documentation
- In some countries, more specific topics are also inspected
  - contractor qualification
  - communication and interfaces between licensee and contractor
- In most of the countries, RB ensure that licensee has enough in-house competence to supervise the works / services done by contractors
  - inspections of the QA or management system
  - specific inspections

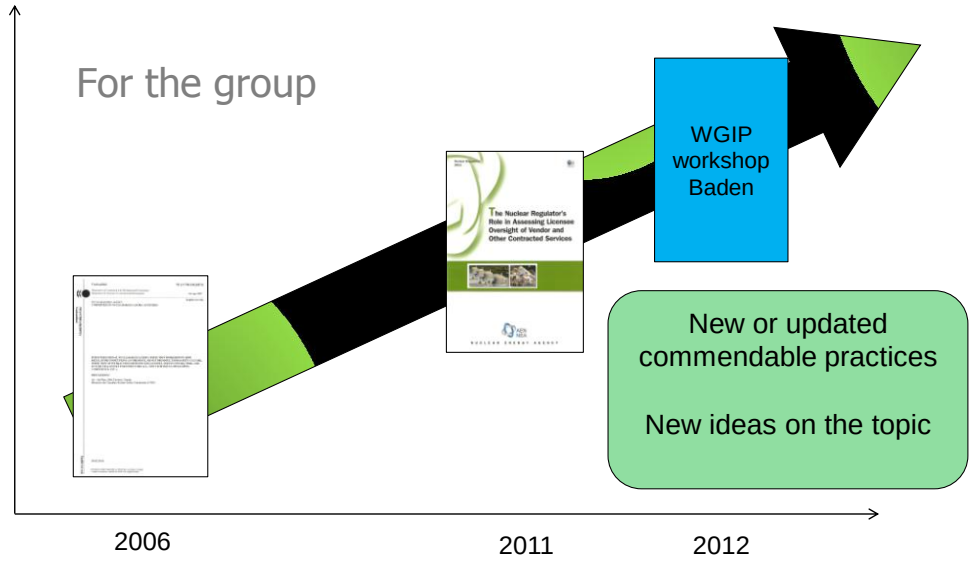
Synthesis of the answers to questionnaire (8/9)

- In almost all of the countries, RB does not inspect licensee's safety performance indicators for the oversight of contractor performance. In addition, it seems that licensees haven't developed such general indicators
- Examples of problems detected:
  - differences in culture or language
  - adequately performing commercial-grade dedication
  - problems tend to be random rather than systematic
  - are usually identified through events or inspections
- In almost all of the countries, there is a licensee's process to evaluate the contractor's performance
  - This process is inspected by RB

Synthesis of the answers to questionnaire (9/9)

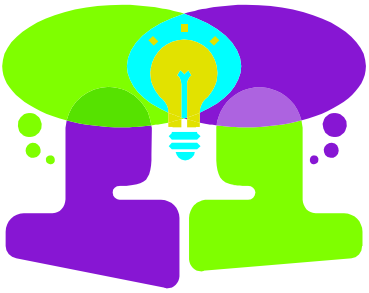
- No general trend or systematic kind of event can be attributed to the use of contractors
- Nevertheless, keep in mind:
  - growing ratio of events caused by human factors related to contractors
  - issue in adequately performing commercial-grade dedication
  - events related to the fact that licensee does not properly oversight the use of contractor
- In almost all of the countries, no specific RB inspection effort to make sure that safety related recommendations by contractors are communicated to licensee, assessed and implemented by licensee
- Possible new topics to discuss:
  - RB activities related to safety culture of (sub)contractors personnel

Goals of this workshop (1/2)



Goals of this workshop (2/2)

- For each one: Share experience and ideas
  - In the frame of the topic discussed
  - on other topics (during the breaks,…)

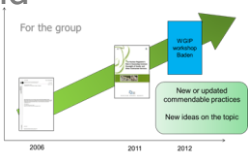


Topics to be discussed

- It's up to the group !
- Some possible ideas
  - How to adequately perform an inspection of licensee's oversight of contractors with limited resources
  - Focus on a specific process:
    - Inspection on the retention of contractor's safety related information
    - Qualification of contractors
    - Verification that licensee has enough in-house competence to supervise works done by contractors
    - RB activities related to safety culture of (sub)contractors personnel
    - …
  - On-site vs off-site contractors

Way of working

- 2 sub-groups
  - Each one going it's way
  - Sharing results (facilitators and recorders)
- Only 3 half-days
  - Take some time to define the main issues that your sub-group wants to discuss
  - Keep sub-group's target in mind
  - Listen AND talk
  - Never forget the group's goal



18. TOPIC C: INSPECTION OF LICENSEE'S OVERSIGHT OF CONTRACTORS

CLOSING PRESENTATION GROUP C1

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Committee on Nuclear Regulatory Activities (CNRA)
Working Group on Inspection Practices (WGIP)

11th International Nuclear Regulatory Inspection Workshop

Inspection of licensee's oversight of contractors
Results from group C1

Hosted by ENSI
Baden, Switzerland, 21st – 24th May 2012

1

Agence pour l'énergie nucléaire
Nuclear Energy Agency

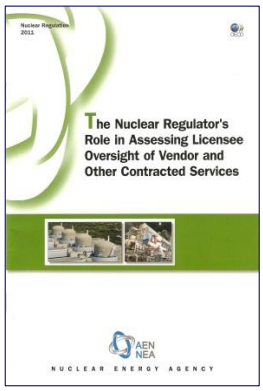
Group composition

Pierre Barras (Belgium)
Walter Glockle (Germany)
Richard Rasmussen (USA)
Masaaki Watanabe (Japan)
Paul Berenguier (France)
Suzanne Schulz (Switzerland)
Roland Scheidegger (Switzerland)

2

Agence pour l'énergie nucléaire
Nuclear Energy Agency

How we worked



- Roundtable:
  - Short presentation (background)
  - Specific interests for the topic
- Define the target to reach
  - Possible questions to answer
- For each question:
  - Brainstorming / exchange of experience and ideas
  - Statements
  - Commendable practices
- Reference document

3

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Questions addressed

- How should Regulatory Body (RB) ensures that contractors have a strong safety culture?
- What is an « intelligent customer »? How should RB verify it?

4

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Strong safety culture for contractors Statements

- Contractors should have a positive safety culture.
- Licensee should communicate it's expectations about safety culture (in addition to technical requirements) to the contractor and ensures that the expectations are passed down to sub-contractors.
- Licensees should verify that it's expectations are met and the contractors have a strong safety culture.

5

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Strong safety culture for contractors Commendable practices

- The RB should not develop their own performance indicators related to contractor performance. However, the RB should collect and analyze data relevant to the licensee's oversight of contractors for the long term (say 1 year):
  - Allegations and complaints
  - Industrial safety issues
  - Radiation protection issues
  - Significant delays/rework
  - Results of RB routine inspections
  - OPEX (including information from other industries)
  - licensee meetings/reports

6

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Strong safety culture for contractors
Commendable practices

- Regarding the licensee's communication of expectations, the RB should:
  - Verify that these expectations are:
    - documented
    - clear and unambiguous for the whole of the chain of contractors
  - Verify that these expectations cover at least:
    - knowledge of the safety importance of their work
    - training of contractor personnel in the field of safety culture
    - visible leadership by the contractor management
    - use of the corrective action program
    - continuous improvement of processes and documents
    - transmission of relevant operating experience

7

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Strong safety culture for contractors
Commendable practices

- The RB should inspect:
  - Licensee oversight of the way expectations are met
  - How licensee expectations are met:
    - RB inspection of the contractors works (onsite/offsite)
    - RB inspection of licensee oversight
- The RB should conduct meetings with licensees to discuss contractor performance and oversight

8

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Strong safety culture for contractors Commendable practices

- The RB should inspect leadership:
  - Licensee management:
    - Communication
    - contracts
    - management meetings
    - resolution of corrective actions
    - general feedback meetings
    - feedback from contractors to the licensee
    - licensee management observations of contractor work
  - Contractor management:
    - RB observation of licensee audits
    - RB inspection of work activities
    - RB inspection of contractor's management reviews

9

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Statement

- The licensee should be an « intelligent customer » when procuring goods and services

10

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The RB should verify that the licensee is an « intelligent customer » by inspection of the licensee's pass down of:
  - technical requirements
  - regulatory requirements
  - quality assurance requirements
  - safety culture expectations, including safety importance of work
  - training/qualification/re-qualification requirements
  - qualification for equipment use
  - interfaces (with nuclear power plant, licensee and contractors)
  - deviation reporting
  - reporting of operating experience (similar to Part 21 in US)
  - access for licensee and regulator oversight
  - limits for use and control of subcontractors
  - performance measures and penalties

11

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The regulatory body should verify the licensee's process/procedure to develop contracts (this should address the items of previous slide).
- The regulatory body should inspect the licensee's guidance for determining the scope/limits for contracting.

12

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The regulatory body should inspect the licensee's oversight of contractors work:
  - licensee observation of work in progress
  - licensee management observations
  - licensee awareness of corrective action program information
  - observation of licensee/contractor meetings
  - review of licensee/contractor audits/self assessments
  - inspect licensee review of contractor accreditations / qualifications
  - licensee evaluation of contractors
  - licensee evaluation of corrective action program implementation
  - licensee project management

13

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The regulatory body should inspect the licensee's technical capabilities to adequatly oversee contracted work activities:
  - training
  - participation in trade groups/conferences
  - ability to discuss technical issues

14

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The regulatory body should understand the relationship between the licensee and contractors to gage the regulatory body actions/level of engagement:
  - long term relationships for safety significant activities
  - monopolies
  - ratio of licensee to contractor employees
  - frequent changes of contractors

15

Agence pour l'énergie nucléaire
Nuclear Energy Agency

What is an « intelligent customer »? Commendable practices

- The regulatory body should inspect the licensee's quality management system applicable to contractor qualification (pre-contract):
  - processes
  - application/results
  - selection should prioritize technical staff input

16

Agence pour l'énergie nucléaire
Nuclear Energy Agency

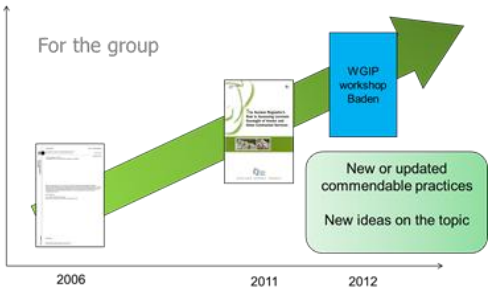
Concluding Remarks

- Fruitful discussions
  - Sharing of experience within all group members
  - Good open interaction
- New commendable practices

17

Agence pour l'énergie nucléaire
Nuclear Energy Agency

Concluding Remarks



ok !

18

19. TOPIC C: INSPECTION OF LICENSEE'S OVERSIGHT OF CONTRACTORS

CLOSING PRESENTATION GROUP C2

Inspection of licensee's oversight of contractors

Work Group Two

Topics Identified for Discussion

- Control of the supply chain
- Intelligent customer
- Extent of contractorisation
- Nuclear QM v ISO9001
  - dropped

Topics Identified for Discussion

- Additional requirements for contractors
  - outage v operation
- Training and qualifications of inspectors
  - concentrated on higher issues
- Use of independant inspection agencies
  - dropped

Discussion Breakdown

- Control of the Supply Chain
  - Management system
    - R&R for (sub)contractor oversight
    - manage new contractors
  - Contractor arrangements
    - NS terms in contracts driven down to subs
    - specify RB access in (sub)contracts
  - (Sub)Contractor nuclear awareness
    - RB and licensee checks

Discussion Breakdown

- Intelligent customer
  - Licensee justify sufficient competent resourses
  - Sufficient (sub)contractor oversight resources
    - particulary during outages
  - Defined work breakdown structure for contracts
    - ITP
  - Assurance that licensee in control
  - Changes to IC shared with RB

Discussion Breakdown

- Contractorisation
  - Strategy for inhouse v contracted
  - Some easier some difficult or not allowable
    - design v design authority
    - maintenance v maintenance strategy
  - Nuclear safety roles clearly defined
    - maintained within licensee
    - changes identified and justified

Discussion Breakdown

- Outage v Operation
  - Significant resource burden on both RB & L
  - planning function has to be able to provide ovesight
  - Scheduling and coordination has NS implications
    - Emergent work
  - Contractor events being reported to licensee
  - Manage document influx

Commendables

- Inspect adequacy of licensee management system to provide oversight
- inspect adequacy and competance of licensee resources
- RB framework supports (sub)contractor inspection
- RB recognize and use QP for inspection basis

Commendables

- RB confirm requirement for nuclear safety awareness is included in contract documentation
- RB observation of licensee inspection of (sub)contractors to confirm NS awareness
- RB confirm sufficent competent resources
- RB review of licensee KPI etc.
- RB awareness of changes to licensee intelligent customer capability

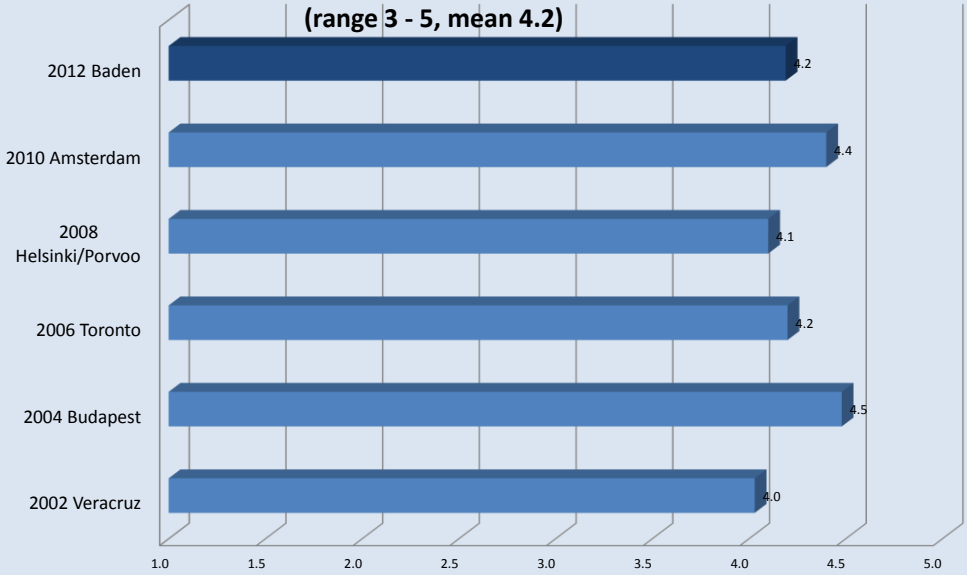
Commendables

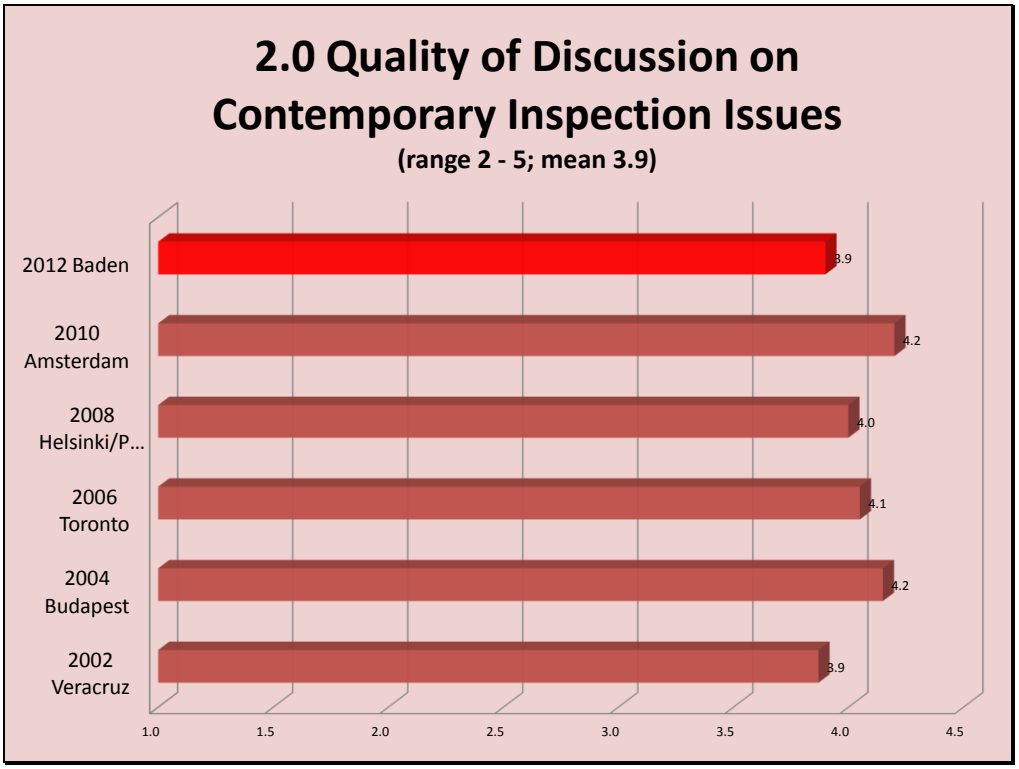
- RB recognize increasing outsourcing, and that many activities can be outsourced
- RB inspect basis and justification for outsourcing
- RB confirm licensee core competance is adequate
- RB confirm outage activities are adequately planned with oversight
- RB confirm contractor awareness of NS during outages

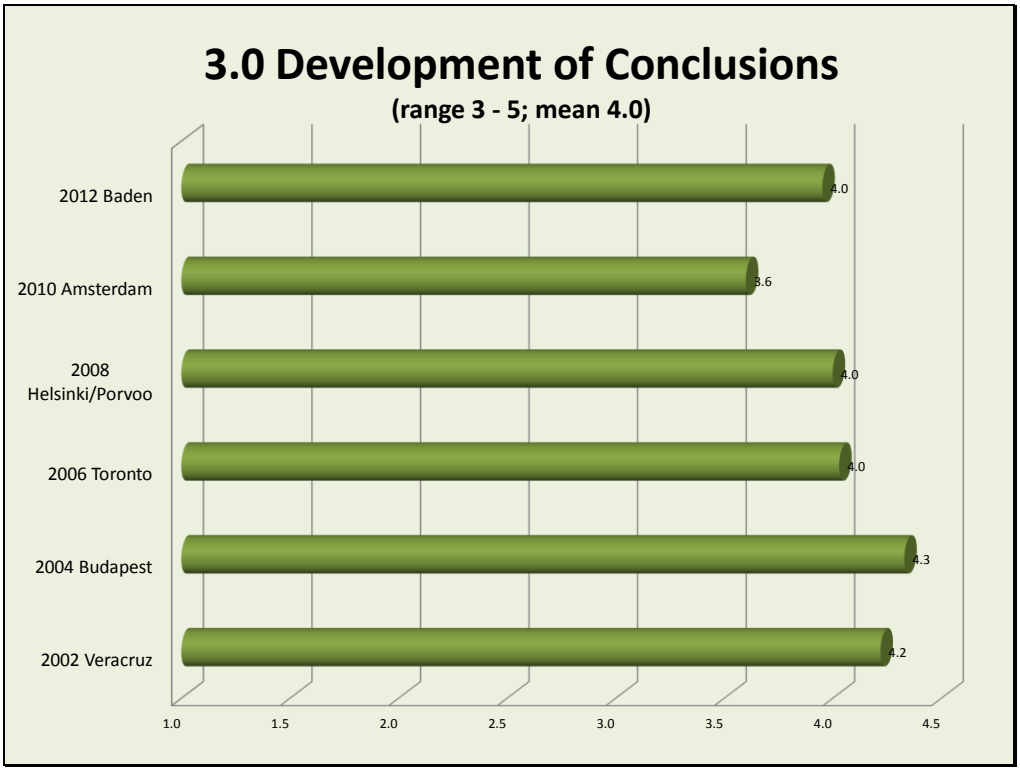
20. WORKSHOP EVALUATION FORM RESULTS PRESENTATION

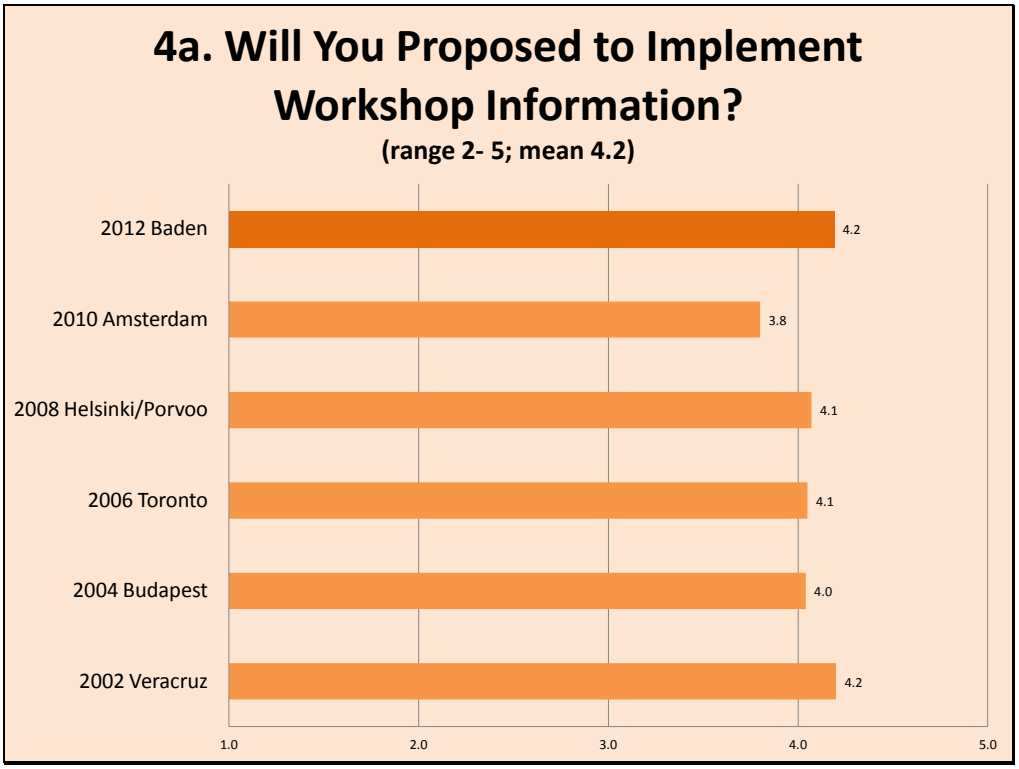
11th WGIP Workshop Evaluation Form Results

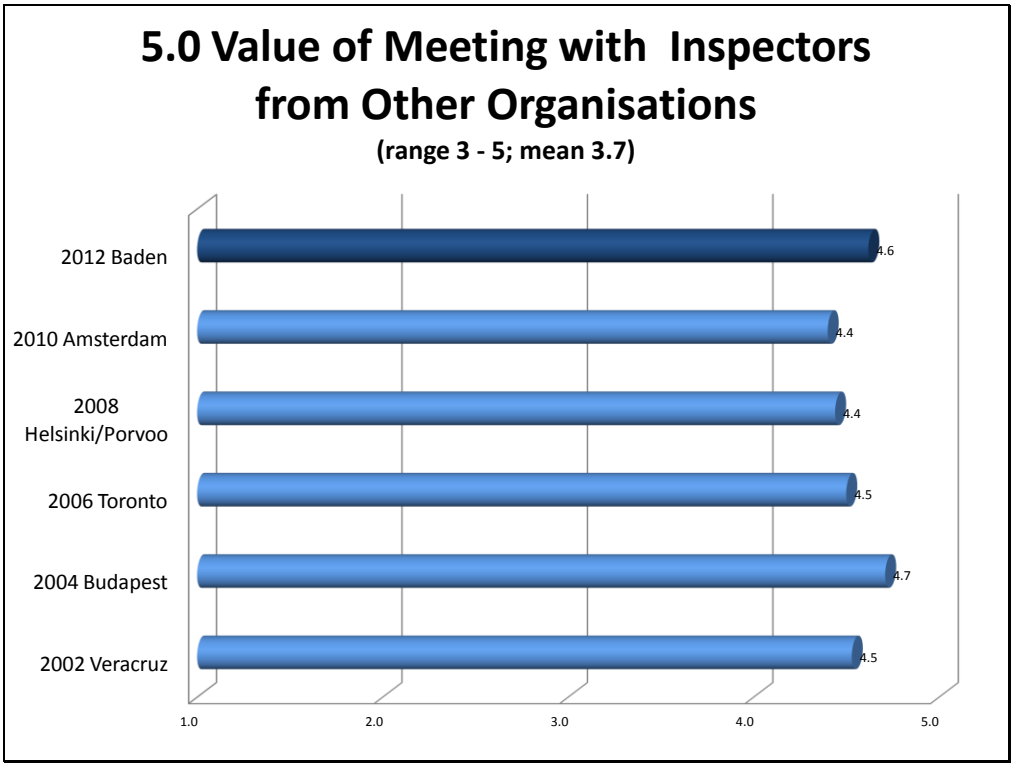
1.0 Exchange of Regulatory Information



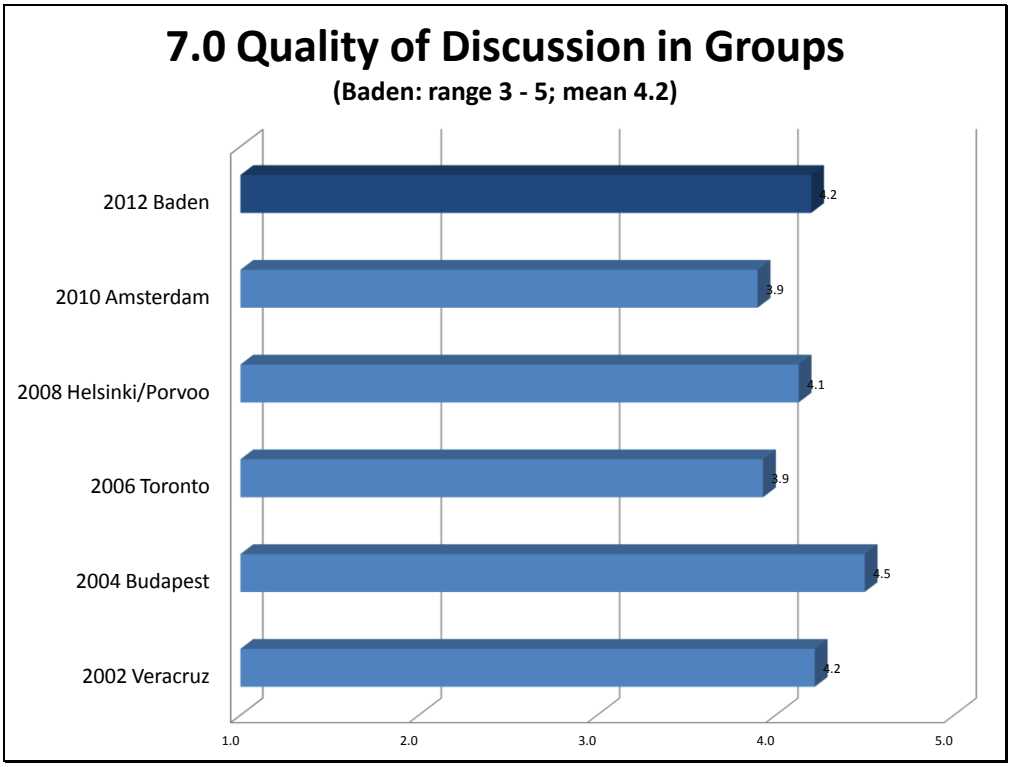

2.0 Quality of Discussion on Contemporary Inspection Issues
(range 2 - 5; mean 3.9)
2012 Baden
2010 Amsterdam
2008 Helsinki/P...
2006 Toronto
2004 Budapest
2002 Veracruz
3.9
4.2
4.0
4.1
4.2
3.9
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

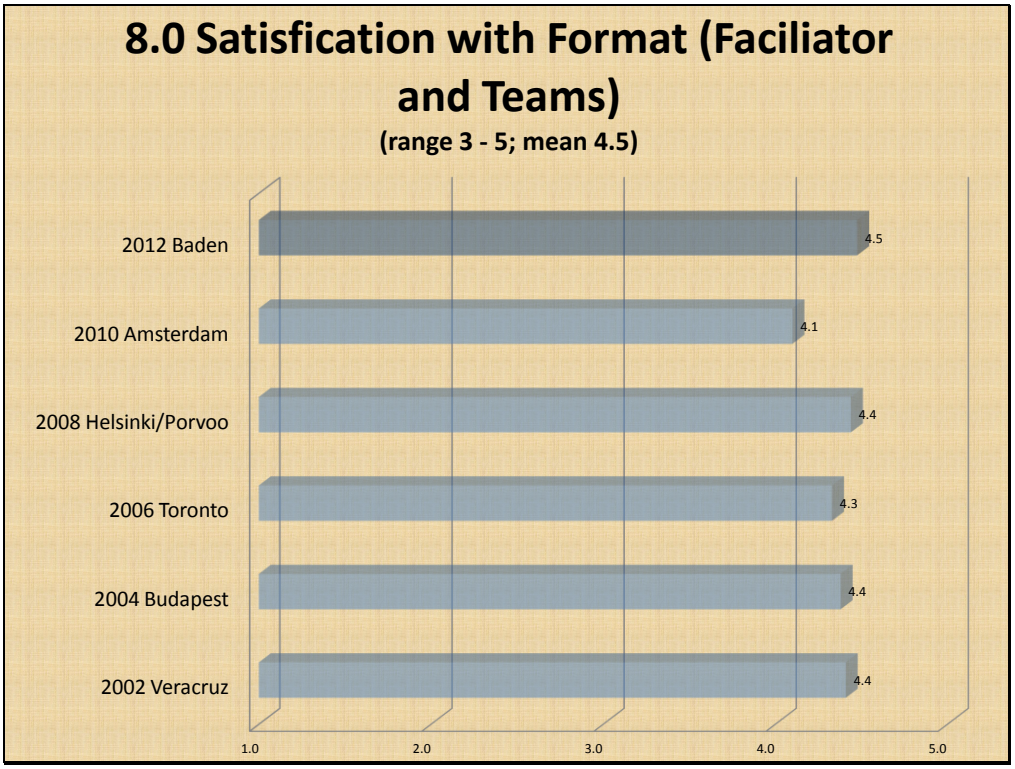

3.0 Development of Conclusions
(range 3 - 5; mean 4.0)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.0
3.6
4.0
4.0
4.3
4.2
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5

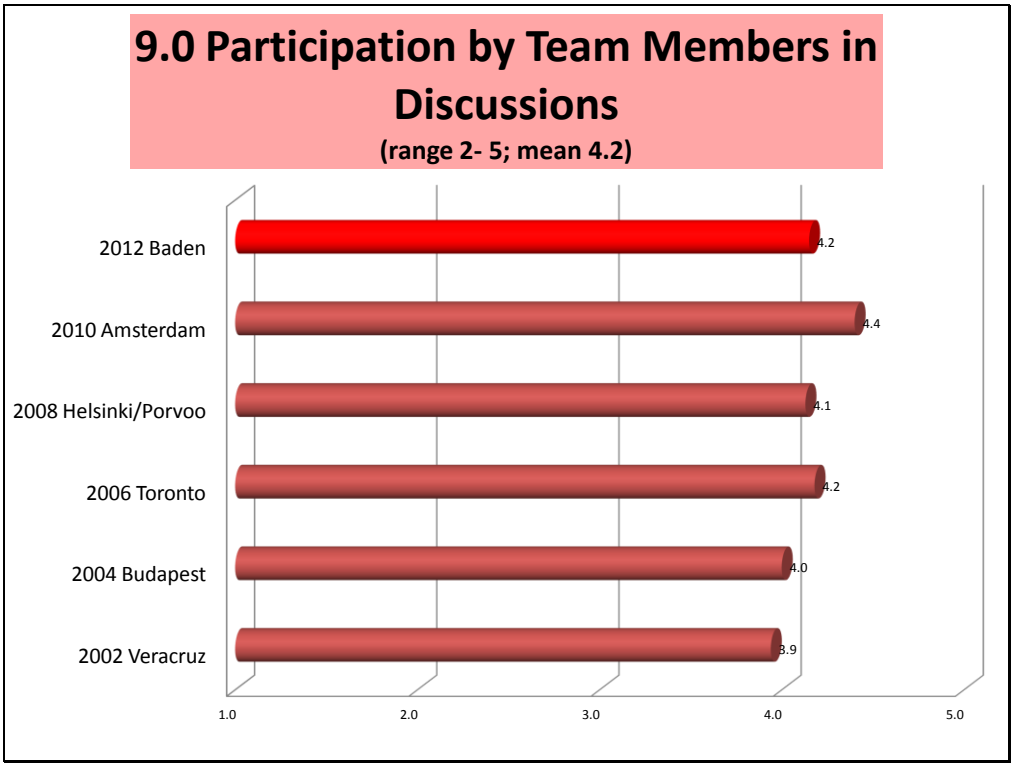

4a. Will You Proposed to Implement Workshop Information?
(range 2- 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
3.8
4.1
4.1
4.0
4.2
1.0
2.0
3.0
4.0
5.0

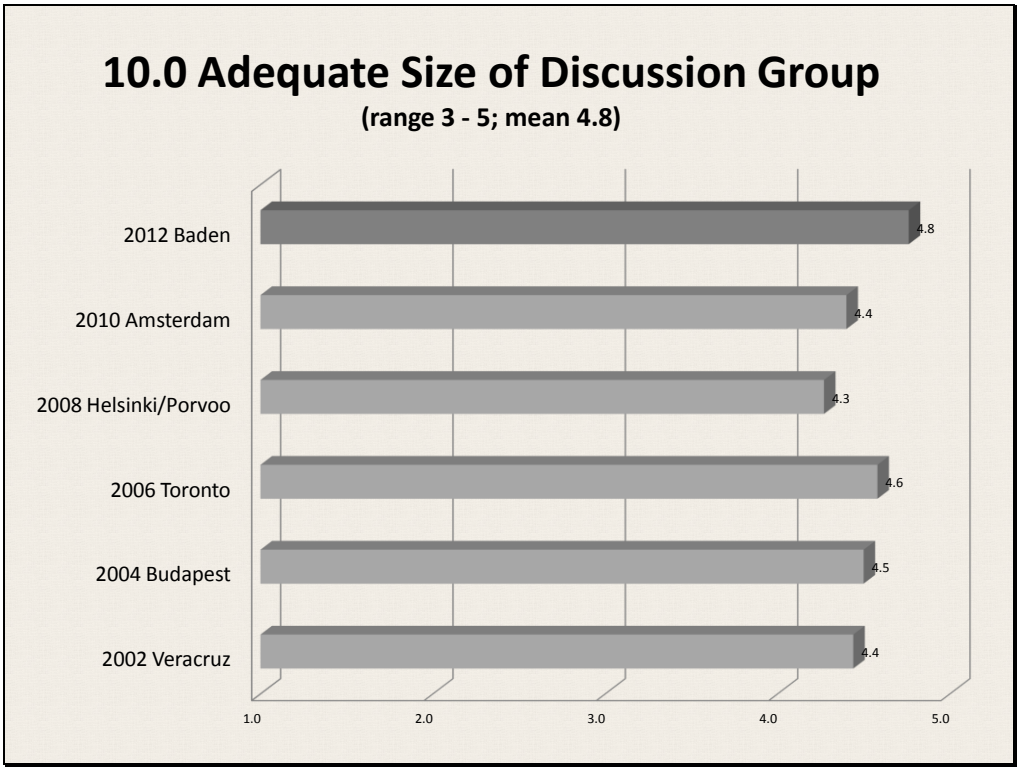

5.0 Value of Meeting with Inspectors from Other Organisations
(range 3 - 5; mean 3.7)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.6
4.4
4.4
4.5
4.7
4.5
1.0
2.0
3.0
4.0
5.0

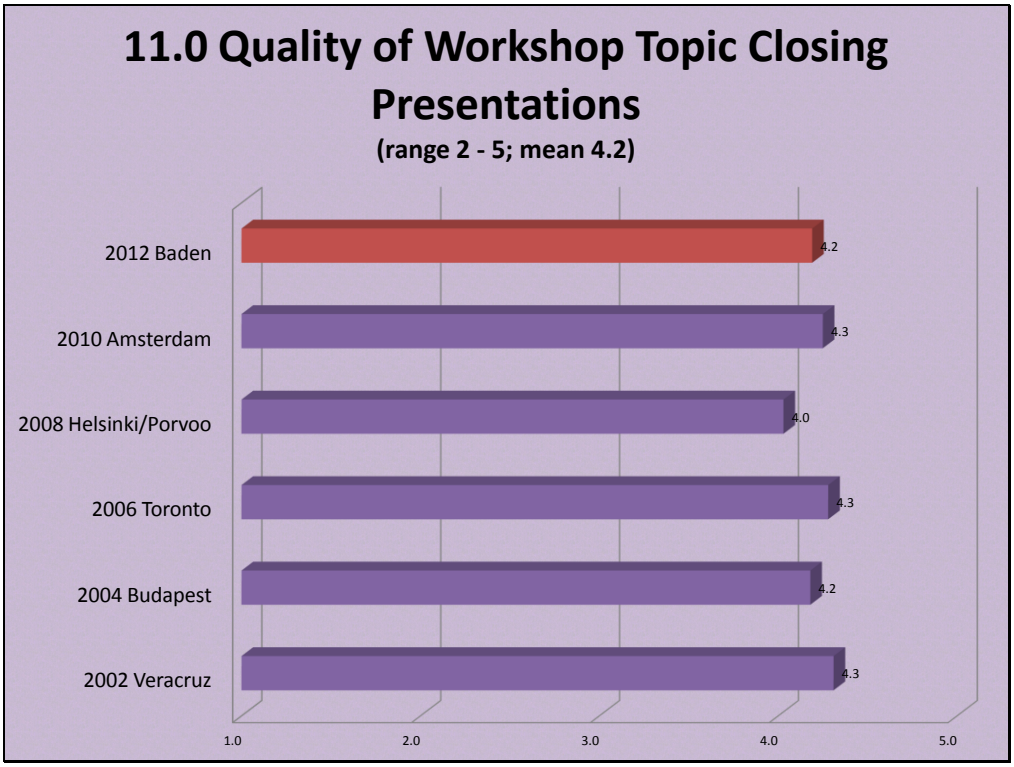

6.0 Opening Session - Workshop Topic Presentations
(range 3 - 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
3.8
4.1
4.0
4.1
4.0
1
2
3
4
5

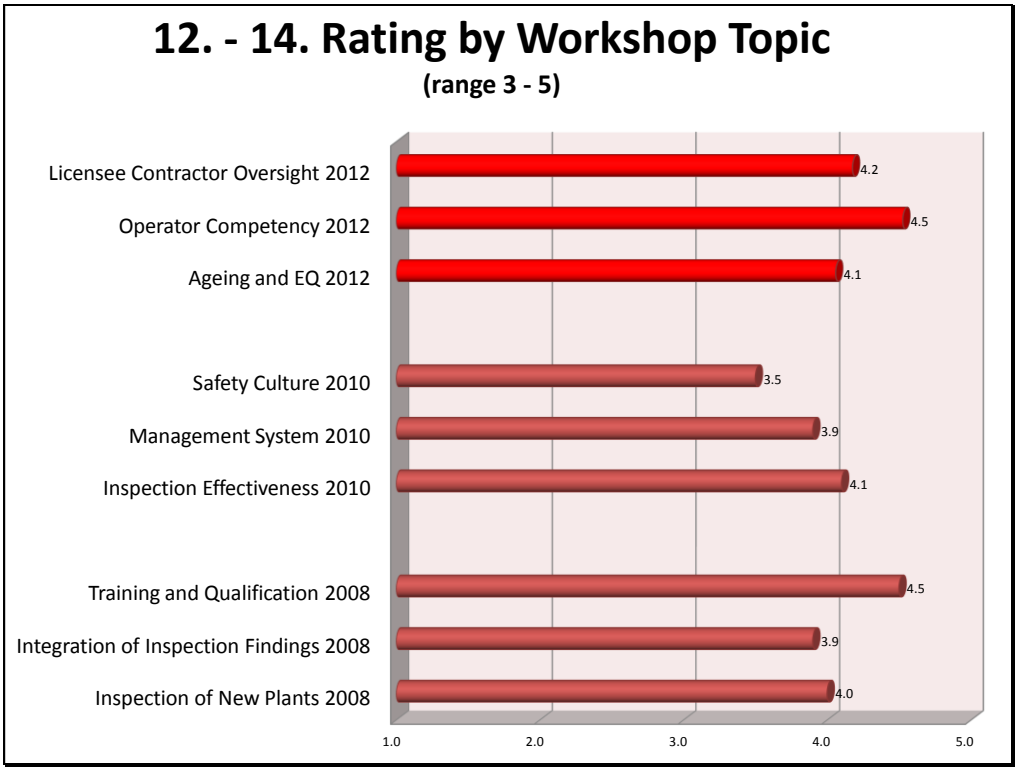

7.0 Quality of Discussion in Groups
(Baden: range 3 - 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
3.9
4.1
3.9
4.5
4.2
1.0
2.0
3.0
4.0
5.0


8.0 Satisfication with Format (Faciliator and Teams)
(range 3 - 5; mean 4.5)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.5
4.1
4.4
4.3
4.4
4.4
1.0
2.0
3.0
4.0
5.0


9.0 Participation by Team Members in Discussions
(range 2- 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
4.4
4.1
4.2
4.0
3.9
1.0
2.0
3.0
4.0
5.0


10.0 Adequate Size of Discussion Group
(range 3 - 5; mean 4.8)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.8
4.4
4.3
4.6
4.5
4.4
1.0
2.0
3.0
4.0
5.0


11.0 Quality of Workshop Topic Closing Presentations
(range 2 - 5; mean 4.2)
2012 Baden
2010 Amsterdam
2008 Helsinki/Porvoo
2006 Toronto
2004 Budapest
2002 Veracruz
4.2
4.3
4.0
4.3
4.2
4.3
1.0
2.0
3.0
4.0
5.0



Workshop Evaluation #15 – 17

15. Hold another similar workshop? 95% yes

16. How many topics? 3 (range 2-3)

17. Length of workshop? 3 days (range 2.5 – 3.5)

Suggested Topics

- Inspection of LTO issues
- Inspection of power uprate issues
- Inspection of organisational capability
- Inspection of requalification process
- Inspection of FP
- Treatment of modifications
- Regulating Foreign Technologies
- Oversight of Contractors – new build
- Inspection of NPP construction
- Inspection of Post-Fukushima modifications (how to inspection modifications, operations, EP, security)
- Inspection programme changes in response to Fukushima
- Pro-activeness of Regulator and inspectors
- Developing guide procedures for inspection of various topics
- Effective inspection of RB
- Review method of performance indicators
- Post-Fukushima LL with regards to Human Factors
- How to ensure that your SAR is up-to-date
- Inspection techniques in various topics
- Focus on special technical topics
- Inspection of radiation protection
- Inspection of fuel handling

General Comments - outcomes

- Commendable practices were too general without real inspection hints
- More emphasis on formulating a small number of clear and practicable commendable practices
- The workshop is a positive environment for sharing insights and was very worthwhile. The structure allow a lot of time for sharing formal and informal settings, which is a strong positive.
- Countries could be asked to submit some commendable practices in writing for the benefit of others

General Comments – closing

- Working in the ageing topic, I completely missed of interest and therefore, to miss out a presentations on the other WS areas. Many participants have a wide range of interest and to miss the other presentations is not good.
- By good planning, that all participants can take part in ALL final presentations.
- Presentations of findings inconsistent. Clearer guidance to group leaders may have helped

General Comments

- Workshops should not have a so broad range as contractor's oversight
- Very good discussion in the small groups
- Shorten lunch
- Very nice but sometimes a long time in waiting (breaks, lunch) but very tasteful
- Prefer PC and projector rather than flip chart
- Great

From the 2011 WGOE workshop in Helsinki, on Utilising Operating Experience in Inspection Programmes, some **inspection-related** topics were as follows:

- Inspection of new Builds (#1)
- How to utilize and combine inspection data to make a statement about the licensee organisational issues (#1)
- Database for inspection findings (#2)
- Inspection of the adequacy of UHS, including electrical power (#2)
- Improvement of exchange between RB's (e.g., by conducting cross audits, of process of RB's or during inspection of utilities) (#2)
- Inspection on the NPP's modification and their impact on the initial design (#3)
- Fukushima-related inspections: goals and results (measure to take)

From the 2010 10th WGIP Workshop in Amsterdam, some of more frequently mentioned topics (randomly listed not prioritised) were as follows:

- Safety Management (SM)
- Blending SM System (SMS) and SC assessment methodologies
- Special Aspects of SMS: maintenance, knowledge management, data collection
- License Renewal
- Operational Safety Assessment
- Use of Inspection Results
- Relationship between regulator and operator
- Performance Indicators
- Management: Analysis tools and indicators
- Inspection of adequacy of the NPP's Organisation
- Inspection of adequacy of the NPP's resources for safety measures
- Roll of RB and technical support organisation (TSO) in Nuclear Regulation
- Decision making