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13th International Nuclear Regulatory Inspection Workshop
17-21 April 2016
Bruges, Belgium

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NUCLEAR ENERGY AGENCY
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

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ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where the governments of 35 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, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, 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 31 countries: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Norway, Poland, Portugal, Russia, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Commission and the International Atomic Energy Agency also take 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 sound and economical use of nuclear energy for peaceful purposes;
- 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 analyses in areas such as energy and the sustainable development of low-carbon economies.

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.

COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

The Committee on Nuclear Regulatory Activities (CNRA) shall be responsible for the programme of the Agency concerning the regulation, licensing and inspection of nuclear installations with regard to safety. The Committee shall constitute a forum for the exchange of information and experience among regulatory organisations. To the extent practical, the Committee shall review developments that 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 unwarranted disparities among member countries. In particular, it shall review current management strategies and safety management practices and operating experiences at nuclear facilities with a view to disseminating lessons learnt. In alignment with the *NEA Strategic Plan*, the Committee shall promote co-operation among member countries to use the feedback from this experience to ensure high standards of safety, to further enhance the efficiency and effectiveness of the regulatory process and to maintain adequate infrastructure and competence in the nuclear safety field.

The Committee shall promote transparency of nuclear safety work and open public communication. The Committee shall maintain an oversight of all NEA work that may impinge on the development of effective and efficient regulation. The Committee shall focus primarily on existing power reactors and other nuclear installations and the construction of new power reactors; it may also consider the regulatory implications of new designs of power reactors and other types of nuclear installations. Furthermore, it shall examine any other matters referred to it by the steering committee. The Committee shall collaborate with, and assist, as appropriate, other international organisations for co-operation among regulators and consider, upon request, issues raised by these organisations.

The Committee shall organise its own activities. It may sponsor specialist meetings and working groups to further its objectives. In implementing its programme the Committee shall establish co-operative mechanisms with the Committee on the Safety of Nuclear Installations to work with that Committee on matters of common interest, avoiding unnecessary duplications. The Committee shall also co-operate with the Committee on Radiation Protection and Public Health and the Radioactive Waste Management Committee on matters of common interest.

FOREWORD

The main purpose of the workshop was to provide a forum for information exchange 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 identified methods that may help to improve their own inspection programmes.

The 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 13th International Nuclear Regulatory Inspection Workshop held by WGIP on regulatory inspection activities. This workshop, which is the 13th 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:

- experience from the inspection activities during the transition from an operating reactor to a defueled status with a commitment to permanently cease power operations;
- inspection of modifications;
- the inspectors' role in the enforcement process.

Members of the workshop organising committee wish to acknowledge the excellent planning and arrangements made by the staff of the host organisations, FANC and BelV, as well as the United States Nuclear Regulatory Commission (NRC). Special recognition is given to the Belgian CNRA members, Ms An Wertelaers, and Michel Van Haesendonck, for their leadership and support to the WGIP, and to the Belgian WGIP member, Mr Pierre Barras, for his essential co-ordination and efforts for the workshop.

Special acknowledgement is given to the WGIP members who facilitated the topic discussion groups, Mr Alexandre Leblanc, Mr Christopher Regan, Mr Paul Smith, Mr Pierre Barras, Mr Jukka Kupila, Dr Matthias Schneider and Mr Julio Crespo.

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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 (CPs) on the selected topics.

Regarding the 13th workshop organised by the WGIP, the three following topics were selected to be discussed and to identify commendable practices:

- Inspection activities during the transition from an operating reactor to a defueled status with a commitment to permanently cease power operations;
- Inspection of modifications;
- The inspectors' role in the enforcement process.

As part of the registration, participants were asked to respond to a questionnaire describing practices within their own countries on these topics. The complete compilation of questionnaire responses is contained in the appendix (NEA/CNRA/R(2016)2/ADD1) to this document.

Approximately 57 participants from 18 different countries and one participant from the IAEA took part in the workshop. Countries included: Belgium, Canada, the Czech Republic, Finland, France, Germany, Hungary, India, Japan, Korea, Poland, Russia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and the United States.

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

Evaluation of the workshop results were 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 were provided a unique opportunity to "calibrate" their own inspection methods against those from other countries. While exchanging inspection practices and learning new ideas were 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.

Various and complementary points of view were expressed. The workshop conclusions include observations and CPs for each of the three topics that were developed by the discussions groups. The essence of these exchanges and of the many commendable practices is mainly the following:

- In the field of inspection activities during the transition from an operating reactor to a defueled status with a commitment to permanently cease power operations, the workshop highlighted, in particular, the importance for the regulatory body to have the capacity to anticipate, prepare and implement in an adequate way its inspection programme. Due to the complexity and the duration of any transition phase, discussions also confirmed the need for the regulatory body to have sufficient resources to dedicate to its inspection programme. It was also underlined the importance for the regulatory body inspection programme to be comprehensive, optimised, highest significant safety issues related and adjustable. If the importance of technical issues of such operations were confirmed, aspects related to safety culture were highlighted as key issues to monitor too.
- In the field of modifications, the workshop highlighted, in particular, the need for the regulatory body to be able to evaluate, in an adequate and effective way, through various and complementary criteria, the graded approach implemented by the licensee to classify its modifications as permanent or temporary. Discussions highlighted the positive benefit for the regulatory body to implement an appropriate inspection process based both on documentation review and on-site controls. In particular, the on-site inspections should be conducted in such a way the regulatory body can collect sufficient and relevant insights and evidences on the process followed by the licensee to rank its modifications, in order to evaluate if the process is adequate for an optimal oversight of the temporary modifications and correctly applied.
- In the field of enforcement, based on the high-profile nature of enforcement actions, the workshop highlighted the need for the regulatory body to have a well-structured enforcement process with appropriate and understandable procedures. The need for the enforcement process to be as consistent, as clear and as transparent as possible was confirmed as being a key issue to give to the enforcement process and inspectors' decisions credibility and legitimacy and make them acceptable by the licensee.

2. ORGANISATION AND OVERVIEW OF WORKSHOP

2.1 Planning

Preliminary planning for this workshop, the 13th in a series of International Workshops on Regulatory Inspection Activities began following the conclusion of the previous workshop in Chattanooga, Tennessee, United States, in April 2014. Formal planning started following approval by the CNRA at its annual meeting in December 2014.

Members of the 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 Belgian Regulatory Body: FANC and Bel V in Bruges, Belgium, 17-21 April 2016.

In the evaluation at the previous workshop [references: NEA/CNRA/R(2014)8 and NEA/CNRA/R(2014)8/ADD1], 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. Three potential topics were developed and proposed to the CNRA. The Committee approved the three topics for the workshop at the December 2014 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 6–10 participants for each topic. In the plenary closing session, the leads present the results of the discussions and CPs 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 2015. 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 was produced as an appendix to these proceedings (NEA/CNRA/R(2016)2/ADD1).

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, Mr Olivier Veyret and Mr Julio Crespo led the training. Mr Veyret 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 Veyret and Mr Crespo reviewed techniques to promote active participation. They 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 held to allow participants to meet each other in an informal setting. Mr Veyret welcomed the attendees, introduced the group's leads and requested that participants join their group leads. This informal session allowed the workshop to begin in a more productive manner given that initial introductions have been completed.

Opening session

Mr Olivier Veyret, Chair of WGIP, welcomed the participants 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. He highlighted that the output of the workshop would be commendable inspection practices (CPs). He defined CPs as extracts from the topics, which will be discussed by the workshop participants and are thought to be reference for member countries. CPs are not international standards or guidelines.

Mr Jan Bens, Director-General of Federal Agency for Nuclear Control (FANC) and Mr Benoit De Boeck Director-General of Bel V, welcomed participants to the Belgium. Both DGs provided the audience with a background of their respective organisations that together represent the Belgian regulatory authority. They discussed the value the output from previous WGIP workshops, and they expect useful commendable inspection practices. Lastly, they encouraged the participants to actively participate.

Mr Ho Nieh, NEA Head of Nuclear Safety Division and WGIP technical secretariat, provided a welcome on behalf of the Nuclear Energy Agency CNRA. He provided the context of the senior regulators that serve on the CNRA and expressed their support and expectations for the workshop. Additionally, he noted that a major benefit for the countries was 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 summarised the responses and suggested additional questions for the discussion groups. The presentations are summarised in the topic chapters. The presenters and topics were as follows:

- **A**. Mr Alexandre Leblanc, CNSC, Canada, on Experience from the Inspection Activities during the Transition from an Operating Reactor to a Defueled Status with a Commitment to Permanently Cease Power Operations.
- **B**. Mr Paul Smith, ONR, United Kingdom, on Inspection of Modifications.
- **C**. Mr Jukka Kupila, STUK, Finland, on The Inspectors' Role in the Enforcement Process.

Group discussion sessions

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

Presentations by host country representatives

Mr Gaston Meskens made a presentation concerning, Ethical Aspects of Radiation Protection. The following is short abstract of the presentation:

Due to the specific character of the radiological risk, judgements on whether or not the use of nuclear technology would be justified in society have to take into account knowledge-related uncertainties and value pluralism. The justice of justification not only informs the right of the potentially affected to participate in decision making, but it also implies the responsibility of concerned actors to give account of the way they rationalise their own position, interests, hopes, hypotheses, believes and concerns in knowledge generation and decision making. The presentation characterises the evaluation of whether or not the use of nuclear technology would be justified in society as a 'complex social problem' and reflects on what it would imply to fairly deal with its complexity. Based on this assessment, the presentation proposes 'reflexivity' and 'intellectual solidarity' as ethical attitudes or virtues for all concerned actors, to be understood from a specific 'ethics of care' perspective 'bound in complexity'. Consequently, it argues that there is a need for an 'interactive' understanding of ethics in order to give ethical attitudes or virtues a practical meaning in a socio-political context and draws conclusions for the case of radiological risk governance."

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.

CPs 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 CPs can be useful reference when each country improves its inspection practices.

Closing remarks

Mr Veyret remarked on the success of the discussions. He 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:

- 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.

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

- The development of both CPs 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 workshop, Mr Veyret thanked the FANC and Bel V staff in particular the efforts of a few individuals who made major contributions. Mr Pierre Barras who co-ordinated the organisation efforts, the programme and ensured the success by his diligence and attention to all the many details involved. He also thanked Ms Nancy Salgado (OECD/NEA Technical Secretariat) for her service to the WGIP, which included support from NEA, all organisational aspects for the groups programme of work and for the group meetings and workshops.

In concluding, Mr Veyret 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 tours was made to the Central Organisation for Radioactive Waste (COVRA) in the Netherlands. Staff members of the facility organisation provided an introduction and guided tour of the facility.

Reception and dinner

A reception and dinner was held mid-way during the workshop. Participants were given the opportunity to socialise and exchange information in an informal setting. This dinner was an excellent means to meet other workshop participants that are outside of their discussion group and encouraged international bilateral exchanges.

3. TOPIC A: EXPERIENCE FROM THE INSPECTION ACTIVITIES DURING THE TRANSITION FROM AN OPERATING REACTOR TO A DEFUELED STATUS WITH A COMMITMENT TO PERMANENTLY CEASE POWER OPERATIONS

3.1. Topic introduction

When the decision to permanently cease power operations is made, new safety issues may arise. Regulatory bodies (RB) must be aware of these issues and be prepared to respond/address them through their inspection programmes. Areas such as organisation, human, technical and financial may require different inspection approaches.

The purpose of the task is to identify commendable practices and share information about methods, procedures and criteria used to inspect a licensee transitioning from an operating reactor to a defueled status, with a commitment to permanently cease power operations.

It should be recognised that the end point of this workshop topic was difficult to establish. However, for the purposes of the workshop topic, it was determined to limit the scope to the transition phase, which is defined as the time frame between the licensee's commitment (announced or unannounced) to permanently cease power operations and final defueling of the reactor vessel. This workshop topic excludes physical security.

3.2. Discussion group members

Group 1	**Group 2**
Alexandre Leblanc, Canada*	Christopher Regan, USA*
Dirk Asselberghs , Belgium	Chantal Mommaert, Belgium
Frederik Van Wonterghem, Belgium	Kristof Van Cutsem, Belgium
Matthias Papra, Germany	Marcel Buchholz, Germany
Helmut Scheib, Germany	Walter Glöckle, Germany*
Junichi Kimura, Japan	Chang Ju Lee, Korea*
Hans Rudolf Fierz, Switzerland*	Petr Rubtsov, Russia
Takayoshi Nezuka, NEA	

(*) WGIP members

3.3. Pre-workshop questionnaire

For preparation of the workshop, participants were invited to supply their national inspection approaches used according to the questionnaire contained in the appendix (NEA/CNRA/R(2016)2/ADD1).

3.4. Opening presentation

To provide workshop participants with a common basis for discussing Topic A, Mr Alexandre Leblanc delivered a presentation summarising the responses received from 14 countries to the pre-workshop questionnaire.

Experience has shown that premature and/or unexpected permanent shutdowns (i.e. before end of design life) of nuclear power plants have challenged RB in areas such as baseline and plant specific inspections, inspection practices, as well as dispositioning of unresolved safety concerns. Premature shutdowns may result in RB having minimal notification and could lead to insufficient time to adequately plan, prepare and conduct appropriate inspection activities. Even planned permanent shutdowns can necessitate adjustments to inspection programmes and activities prior to the shutdown while the facility is still operating.

The opening presentation set the stage for discussions on how RB can better prepare themselves for the transition phase and touched on four areas: regulatory framework, inspection programme, scope of inspections and regulatory body organisational management. Below is a brief summary of the presentation:

- In most countries, the same regulatory requirements apply to operating and transition phases.
- An operating reactor is no longer considered as such upon complete defueling of the core.
- Some countries have requirements explaining when and to whom licensees must provide notification of permanent shutdown. Others do not.
- In some countries, plant specific inspections are conducted to verify activities associated with the end of operation and preparations for shutdown and decommissioning. Changes to the inspection programme may include more inspections in areas such as problem identification and resolution (PI&R), staffing levels, qualification of staff, motivation, safety culture and organisational arrangements and structure, and fewer inspections in areas such as modifications and systems.
- In most countries, RB modify their inspection programme in the same manner whether they have significant or minimal advanced knowledge of the permanent shutdown
- There were two approaches to address unresolved safety concerns. The first approach is to follow a process and determine if corrective actions still needed to be implemented; if not, the corrective action is dropped. The second approach is to have the licensee continue implementing all corrective actions until shutdown.
- During the transition phase, some RB modify the scope and level of effort of inspections based on licensee activities, structures, systems and components (SSC) to remain in service, changes to licensee programmes and operating experience.
- Generally, in the wake of a licensee's commitment to permanently cease power operations, RB keep the same organisational structure and number of inspectors.

3.5. Group discussion summary

Group discussions were carried out in two sub-groups and focused on:

- regulatory body preparations for the transition phase;
- what to inspect during the transition phase;
- how to address outstanding regulatory commitments;

- what to do with non-compliances identified during the transition phase.

Throughout the discussions, the exchange of experience and practices among participants was very informative. The sub-groups met on a few occasions to discuss the results of each group. Generally, the sub-groups shared similar opinions and the participants agreed with the results of each group.

In addition to identifying numerous commendable inspection practices, ideas of how to implement them were also discussed and can be found in the closing presentation as well as the section below.

3.6. Conclusions and closing presentation

The following conclusions emerged from the 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 with inspectors from participating countries share).

Although the discussions in the two discussion sub-groups were different (reflecting the individual experiences of the participants and showing different emphasis of aspects of the workshop topic within the groups), the two sub-groups agreed in following CP as a common result. The results were presented in the closing presentation by Mr Alex LeBlanc and discussed in the exit meeting.

CPs for gaining confidence that sufficient oversight of licensee activities will be maintained during the transition phase are listed below; some sub-bullets provide guidance on how to implement the proposed CP. The CPs are not necessarily specific to inspection practices but were deemed applicable to this workshop topic. Moreover, they may be applicable beyond the transition phase.

*When compared to the final presentation slides, some of the CPs and sub-bullets below contain minor edits for readability purposes.

CP1: The RB should be prepared in advance for a licensee in the transition phase

- Information needed from the licensee to establish an appropriate inspection programme should be defined (e.g. proposed changes to technical specifications, plant modifications and the licensee's organisation etc.).
- A communication scheme with the licensee should be established to ensure appropriate awareness of future licensee actions (e.g. provide sufficient time for inspection planning).
- The RB should ensure that adequate licensee performance indicators are in place.
- An analysis should be conducted to determine necessary RB inspection programme changes.
- An analysis of necessary RB organisational changes (preferably prior to an announcement of a plant closure) should be conducted.

CP2: The RB's inspection programme should be optimised to ensure appropriate oversight of licensee activities during the transition phase

- Available inspection resources should be focused in areas of most benefit.
- Inspection programme should have sufficient flexibility to allow moving inspection resources from areas of less importance to areas that increase in importance.
- Some inspections may not be necessary if the plant is only to be operated for a short period of time (e.g. certain design basis inspections).

- The RB inspection effort should be proportional to the licensee's activities (e.g. increase or decrease level of effort of inspections – major plant modifications).
- Changes to the inspection programme should take into account inspection findings.

CP3: Inspection resources should not be reduced until the transition phase is complete

- The licensee is still responsible for the safe operation of a fully functional reactor.

CP4: The RB should establish a programme to evaluate the licensee's safety culture during the transition phase

- RB inspectors should receive adequate safety culture training.
- The RB should ensure it has sufficient expertise to assess safety culture issues.
- RB programme should develop safety culture indicators (e.g. motivation, morale, staff workload, relationship between RB and licensee).
- RB programme should include a process to analyse and trend safety culture data.
- RB programme should recognise that at multi-unit sites/licensees where at least one unit remains operational, the consequences on safety culture (e.g. resulting from job losses) may not be so important or significant.

CP5: The RB should increase oversight and inspection of the licensee's safety culture during the transition phase

- Baseline inspection data should be obtained (preferably prior to the announcement of intent to permanently cease operation).
- Immediate inspection upon announcement of NPP shutdown should occur.
- Safety culture inspections should be performed at sufficient intervals to obtain data for trending.
- Assessment scope should be sufficiently diverse to obtain an overall image of the licensee's safety culture.

CP6: The RB should inspect outstanding regulatory commitments that continue to remain applicable up to the end of the transition phase

- Licensee should identify regulatory commitments that are no longer applicable, justify why and obtain RB approval for the course of action to close the commitment.

CP7: The RB should assess and inspect the licensee's evaluation of actions to be taken in response to identified non-compliances. More specifically, the RB should provide special consideration in the following areas during the transition phase:

- What is the safety relevance or safety significance of the finding?
- How firm is the commitment to shut down the NPP?
- What are the alternative compensatory measures proposed by the licensee?
- How long does it take the licensee to make the change?
- How long will the licensee's actions be in effect before end of life?

- Will the action or change be useful beyond the transition phase?
- What are the external pressures to implement changes (e.g. public)?

CP8: During the transition phase, the RB should conduct inspections to verify that the licensee has control and understands the current configuration of systems, structures and components (SSC)

- Systems that have a safety function, that are functional or that are abandoned are defined and labelled.
- System boundaries are clearly defined (e.g. when a system is modified and part of it is abandoned).

CP9: The RB should inspect for changes to the licensee's maintenance programme to identify reductions in maintenance activities of safety related SSCs that could negatively impact the level of safety

- Which safety related SSCs are required pre shutdown and which are required post shutdown?

CP10: The RB should inspect licensee organisational changes for the transition phase

- Review the licensee's analysis of organisational changes.
- Are the changes appropriate and effective?
- Are sufficient staffing levels maintained?

CP11: The RB should increase inspections of the licensee's oversight of contractor performance during the transition phase

- High probability of less licensee staff and more contractors.
- Contractor staff is integrated into the licensee's safety culture and is trained on human performance tools and safety culture expectations.

CP12: If the licensee increases fuel handling activities, the RB should increase inspections in that area

- Fuel handling in spent fuel pool.
- Dry cask loading activities.
- Heavy load lifting.
- Additional radiation protection inspections.

CP13: If the licensee increases its effort in waste management, the RB should increase inspections in that area

- May also need additional radiation protection inspections.

CP14: The RB should ensure that the licensee has implemented a process/programme for two-way communication between licensee management and their staff

- Communications should reaffirm safety expectations and future changes at the facility.
- Ensure effective communication through diverse methods which may include verbal, website, etc.

4. TOPIC B: INSPECTION OF MODIFICATIONS

4.1 Topic introduction

The purpose of the task was to identify commendable inspection practices regarding the licensees' control of modifications, with particular attention to temporary modifications and changes to systems, structures and components (SSCs) related to obsolescence, or operational experience. The focus on temporary modifications takes account of earlier workshops already addressing permanent modifications and identifying associated commendable practices. (International WGIP-Workshop Helsinki, 23-25 May 1994, NEA/CNRA/R(94)4).

The task also considered the regulatory approach to the use of non-identical replacement parts. These types of changes are characterised by replacement of defective or obsolete equipment or components by items which appear identical in that they fit into the existing connections or components, they have the same shape, size, colour, etc., and they deliver the same role by functioning in a similar manner. However they are typically not a replacement part sourced from the Original Equipment Manufacturer (OEM), and some internal parts, material specifications, and other attributes could vary. The decision to regulate them as modifications, or replacements could impact on the degree of licensee and regulatory scrutiny.

4.2 Discussion group members

Group 3	**Group 4**
Paul Smith, United Kingdom*	Pierre Barras, Belgium*
Didier Degueldre, Belgium	Gilles Hermans, Belgium
Jara Depuydt, Belgium	Nicolas Noterman, Belgium
Dean Hipson, Canada	Hana Renova, Czech Republic
Martti Vilpas, Finland	Kim Wahlstrom, Finland
István Mészáros, Hungary*	Paul Berenguier, France
Yusuke Kasagawa, Japan*	Simone Stratmann, Germany
Marek Jastrzebski, Poland	A.P. (Arvind Paul) Garg, India*
Petr Rubtsov, Russia	Francisco José Gallardo Macia, Spain
Adnan Kozarcanin, Sweden*	

(*) WGIP members

4.3 Pre-workshop questionnaire

For preparation of the workshop, participants were invited to supply their national inspection approaches used according to the following contained in the appendix (NEA/CNRA/R(2016)2/ADD1).

4.4 Opening presentation

To provide the two discussion groups with a common basis for discussing the topic, Mr Paul Smith (UK, ONR) made a presentation summarising the different responses that he had received to the pre-workshop questionnaire that had been sent to the participants prior to the workshop itself.

The conduct of inspections for plant modifications was addressed at a previous International WGIP-workshop in Helsinki on 23-25 May 1994 (NEA/CNRA/R(94)4). Delegates at the 2016 workshop were provided with a summary of the commendable inspection practices that had been derived from the 1994 workshop. An important finding from the review of responses to the pre-workshop questionnaire was that the majority of countries adopt the same regulatory approach for temporary and permanent modifications. Hence, review and validation of previous work in this area was a key starting point for the group discussions.

Twenty countries provided responses to the pre-workshop questionnaire and a review of the answers provided the following observations:

Temporary modifications

- A number of countries have a definition for temporary modifications (Belgium, Canada, Czech Republic, Germany (one RB) Hungary, Mexico, Slovenia and Spain).
- The definition of temporary modification is not consistent:
  - time limited, typically: few weeks (Germany), 3 months (Mexico) to 1 year;
  - required for unforeseen operational or safety needs (Spain, Mexico);
  - low safety significance (Germany, Slovenia).
- The majority of countries adopt the same regulatory approach for temporary and permanent modifications.
- Some countries have less stringent requirements for temporary modifications (Belgium, Hungary, Germany (one RB), Slovenia), generally because they are of lower safety significance.
- Some countries that reported a different regulatory approach for temporary modifications noted a need to monitor compliance with time limits (Canada, Mexico, Slovenia, Sweden).
- All countries inspect temporary modifications as part of their compliance programmes.
- The majority of countries use the same inspection approach for temporary and permanent modifications. This will include change control processes and sampling of specific modifications.
- Most countries select (temporary) modifications for inspection based on safety significance.
- Inspection of (temporary) modifications may also be based on:
  - previous experience (Slovak Republic);
  - location (housekeeping) (Sweden);
  - as they occur (USA).
- A number of countries reported that the aggregation and interrelation of temporary modifications should be considered by the licensee in the safety analysis.
- There are opportunities for the RB to consider the aggregation/interaction of temporary modifications at safety review of the modification, routine inspection and periodic review.

- Quality management principles and the competence of the design organisation may be considered by the RB (Finland).
- Checks are made by the RB that temporary modifications do not interact with other SSCs (Germany).
- RB requires limits on the number and duration of temporary modifications (Sweden).
- Some countries noted that the matter is not specifically addressed or that such a check may be difficult.
- The majority of countries require RB permission for a temporary modification, depending on the safety significance, licensing basis or screening criteria.
- Generally, no specific permissions were identified for starting, extending, removing or making permanent a temporary modification.
- Temporary modifications – Examples of inspection scope:
    - Sample based on risk informed insights
    - Check modification is classified/graded correctly
    - Check that a safety evaluation has been completed
    - Check interactions assessed if several temporary modifications exist
    - Check compensatory measures are in place and assumptions correct
    - Check implementation is in accordance with safety case/technical standards/ documentation
    - Check compliance with legal requirements and licensee procedures
    - Check adequacy of documentation
    - Check commissioning, inspection and testing
    - Visually inspect temporary modification on-site
    - Check adequacy of operator aids (labels and tags)
    - Check awareness of operators of temporary modifications
    - Check if temporary modifications have caused problems or negative impact
    - Check is temporary modifications are still necessary
    - Check licensee has a system for tracking, review and removal
    - Check removal within the approved time period
    - Check any extensions to time period are justified
    - Check that number of temporary modifications is minimised.
- Temporary modifications – Examples of difficulties:
    - Process for approval not formalised
    - Temporary modifications remain in place longer than intended
    - Discrepancies in documentation or technical justification
    - Temporary modifications not identified on plant
    - Compensatory actions or controls not adhered to

- Technical standards do not meet nuclear safety requirements
- Implementation before safety evaluation completed
- Operators not aware of temporary modifications
- Temporary (weld) repairs difficult to assess for limited life
- Circumstances may be unique and therefore difficult to evaluate
- Same as for permanent modifications;

Non-identical replacement parts

- There was a wide variation in responses from countries regarding when plant changes may be treated as a replacement rather than a modification. The range of responses were as follows:
  - Safety function is unaffected
  - Original specification/design/performance requirements met
  - Same fit, form and function
  - Original specification met and manufacturer is the same
  - Original specification and qualification requirements met
  - Technical requirements met and supplier is approved
  - Component/part has been qualified
  - Component part is identical;
- Examples of RB oversight activities:
  - Inspection of engineering change/modification process
  - Inspection of maintenance
  - Inspection of quality assurance process and records
  - Inspection of compliance with qualification process
  - Inspection of safety management system.

4.5 Group discussion summary

The discussion groups identified a number of areas for in-depth discussion. As follows:

- Definition of temporary/permanent modification or temporary configuration
- Factors taken into account when considering a graded approach to temporary modifications
- The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.
- Additional inspections for temporary modifications
- The appropriate balance between process based and performance based inspections by the RB (document/desktop review verses field verification)
- Ensuring that temporary changes in plant configuration are controlled and time limited to prevent them from remaining in the field for an extended period of time;

- The oversight process that the RB can use to check that non-identical replacement parts will not affect safety
- Specific considerations on temporary modifications of software-based equipment.

Definition of temporary modification

Based on the answers from the questionnaires, there is no consistent definition of a temporary modification (or configuration change). The discussion groups agreed that temporary modifications are characterised by the following features:

- Temporary modification is a change in plant configuration, SSC's, procedures, organisation, practices,… for a limited period of time specified beforehand and justified.
- Temporary modifications shall not lead to violation of existing licence.
- It may be necessary to implement a temporary modification in response to operational requirements, as a short term solution until a permanent modification can be appropriately reviewed and implemented.
- They are preferably applicable to low safety significant changes (e.g. operational/economic requirements).
- Due to emergent issues, there may be a need for a temporary modification before a permanent repair can be implemented

Graded approach to classifying modifications

The graded approach used by licensees for classifying permanent and temporary modifications is a key factor in determining whether a submission is made by the licensee for review by the RB. The discussion groups developed a commendable practice to assist RBs with the evaluation of licensees' graded approach to the classification of modifications.

Review of the 1994 commendable inspection practices

Review of the 1994 commendable inspection practices for modifications was undertaken by the discussion groups because the majority of countries use the same inspection approach for temporary and permanent modifications. It was noted that the 1994 commendable inspection practices have an emphasis on large and complex modifications which are planned well in advance and may be authorised in stages. Whereas temporary modifications are typically associated with emergent issues and are less complex. Also, issues such as plant status and operability are more important in the case of temporary modifications. Nonetheless, the 1994 commendable inspection practices were confirmed as being valid and applicable to temporary modifications.

1994 Commendable Inspection Practices - All Modifications - Changes

All modifications should be classified by the licensee according to safety significance. This may indicate to both the licensee and the regulatory body the degree of safety assessment that is needed.

Assessment by the regulatory body may comprise of:

- applicability of design standards, safety classifications and reasons for modification
- review of licensees safety assessment, design calculations, documentation and arrangements for radiation protection, where appropriate
- risk assessment
- *licensee consideration of OpEx*
- quality assurance plans
- component qualifications and construction testing, e.g., weld examinations
- commissioning programmes and results
- limits and conditions both during commissioning and during subsequent normal operation
- maintenance and testing arrangements
- operability and plant status (particularly during commissioning)

The regulatory body authorises modifications of high safety significance before they are brought into full operation. Large and complex modifications are often authorised in stages, by separately authorising the manufacturing, construction, commissioning, and full operation phases.

The regulatory body should review the licensee's processes and procedures for controlling modifications and that it is applied correctly

The regulatory body can sample planned modifications of lower safety significance and intervene where necessary.

~~*The regulatory inspection authority monitors the plans and progress of all modifications of both major and minor safety significance, and intervenes as necessary. By this means, the regulatory body may require modifications of low safety significance to be assessed and authorised by the regulatory body before being implemented.*~~

The regulatory *body/authorised* inspection authority checks

- implementation of quality assurance programmes
- the fabrication, testing and commissioning activities including
- design, installation, assembly control and implementation
- installation procedures
- operator training activities
- changes to operating and emergency procedures
- as-built-documentation
- test and commissioning/*decommissioning* procedures
- test and commissioning results
- *compliance with legal requirements and licensee procedures*
- *visual inspection of the modification on site, if possible*

The regulatory *body/authorised* inspection authority witnesses checks at hold points specified by the regulatory body, such as hold points during manufacture, installation, and commissioning. This inspection approach may apply particularly during large and complex modifications.

Necessary changes to the existing (1994) commendable practices

Inspection of temporary modifications

The discussion groups made the following observations:

- There is a need for the RB to be more proactive when dealing with temporary modifications.
- Some inspection activities may be delegated by the RB to an inspection agency.
- The temporary modification process should not be used to by-pass the permanent modification process.
- It is important for the RB to have a balanced approach between the inspection of (document/desktop based) processes and performance (field) based inspection activities.

The discussion groups developed a number of commendable practices to assist RBs with the inspection of temporary modifications.

Non-identical replacement parts

The discussion groups noted that the variation of a non-identical replacement part, compared to the original that is permitted by RBs for a replacement to be exempt from the modifications process is not consistent. But all approaches require the safety function to be unaffected

Issues that potentially require or result in licensees using non-identical replacement parts include:

- The loss of original equipment manufacturers/suppliers.
- The introduction of fraudulent components into the supply chain.
- The potential for manufacturers/suppliers to change the specification of equipment without alerting the licensee.

Temporary software modifications

The temporary modification of software was examined by the discussion groups. It was concluded that the temporary modification of software –based equipment should be limited to changes of user configurable parameters only.

4.6 Conclusions and closing presentation

The following commendable inspection practices were developed by the discussion groups during the workshop. The results were presented to the workshop participants by Mr Paul Smith (UK, ONR).

Temporary modifications

CP1: The inspector should review licensee documentation to ensure that there is a satisfactory definition of temporary modifications and ensure that the licensee has a process in place accordingly

CP2: The inspector should verify by sampling that the licensee is following their temporary modifications process and maintaining any necessary records

CP3: The inspector should review trends in the licensee's performance in controlling temporary modifications (e.g. compliance with specified time limits)

CP4: The inspector should verify by sampling that the licensee has documented the justification before extending time limits for temporary modifications

CP5: The RB should evaluate the licensee's graded approach to classifying modifications, taking the following factors into account:

- How the approach considers SSCs
- How the approach takes account of equipment category and classification
- How the approach takes account of plant systems credited in the technical specifications
- How the approach makes use of quantified risk assessment
- How the approach takes account of complexity and the use of proven methods
- How the approach takes into account the worst case consequences of implementing the modification.

CP6: The RB should develop inspection procedures related to temporary modification

CP7: The RB should use a graded approach when selecting a sample of temporary modifications for inspection

CP8: Check that the licensee has used an approved process for the implementation of temporary modifications

CP9: Check that temporary modifications are classified/graded correctly and that a safety evaluation has been completed and documented

CP10: Check that interactions have been assessed by the licensee if several modifications exist

CP11: Check that any required compensatory measures are in place and effective

CP12: Check that documentation affected by temporary modification is appropriately marked in master documentation and controlled copies

CP13: Check the adequacy of operator aids (labels/tags/instructions)

CP14: Check that operators are aware of any temporary modifications, as appropriate, especially:

- the impact on plant operation
- safety limits and conditions of the implemented temporary modification.

CP15: Check that licensee staff pays the same attention for temporary modification as for permanent modifications (safety culture issue…)

CP16: Check that adequate maintenance, inspection and testing of temporary modifications is in place and conducted appropriately

CP17: Licensee periodically reviews the state of temporary modification taking into account the safety limits and changes in operational states

CP18: Check that the licensee has a system for tracking, review and removal of temporary modifications (Database for global overview)

CP19: Consistency between field observation and information within database

CP20: Check that temporary modifications have been removed within the approved time period (hardware and documentation) and that removal is complete

CP21: Check that plans developed by the licensee (especially outage activities) gives adequate priority to removal of temporary modification as soon as possible

CP22: Check that the number of temporary modifications in place is minimised.

Non-identical replacement parts

CP23: In order to ensure that non-identical replacement parts do not affect safety through plant obsolescence, the RB should verify implementation of an ageing/asset management process by the licensee

CP24: The RB should verify the implementation of an appropriate quality control/management programme for suppliers/vendors

CP25: Inspectors should sample check that replacement parts meet the specified safety requirements. This may be done during inspection of maintenance, modifications, QA/QC or equipment qualification

Temporary software modifications

CP26: RB inspections should include the verification that:

- Temporary modification of software-based equipment is limited to changes of user configurable parameters only.
- Validation can be done by review of logbooks or system logs to ensure the correct implementation.

5. TOPIC C: THE INSPECTORS'ROLE IN THE ENFORCEMENT PROCESS

5.1 Opening presentation

To provide the two discussion sub-groups with a common starting point for discussions, Mr Jukka Kupila made a presentation summarising the different responses he received to the pre-workshop questionnaire that has been sent to the participants prior to the workshop itself.

Recognising the fact, that enforcement is a key regulatory function and acknowledging the previous WGIP report called "Regulatory Inspection Practices to Bring About Compliance" [NEA/CNRA/R(2005)1]. This report already describes that RB have available a series of graded enforcement options from oral advice and cautions, written letters and requirements into license withdrawal and prosecution in courts.

Nineteen countries provided responses to the pre-workshop questionnaire. The review of these answers showed the following:

5.2 Questionnaire and evaluation of answers

Question 1.1
What is the starting point for the enforcement process in regulatory inspections conducted by the inspector (e.g. a finding, a non-compliance, a violation, a wilful violation, etc.)?

Not generally fixed, varies from country to country.

In most countries in principle any (significant) finding of a non-compliance, deviation or violation to procedures, licences, standards, regulations, requirements or acts etc. A higher level kind of offence like "wilful" is not necessary.

Question 1.2
What is the inspectors' role in evaluating the safety significance of the finding, non-compliance or any violation mentioned above?

In most countries the inspector is responsible for some kind of an "initial safety evaluation".

In most countries the inspectors' initial safety evaluation serves as a basis to for enforcement process by the RB.

In some countries the inspector decides by himself to start the enforcement process.

Some countries noted explicitly that the inspector has to take protection measures in case of immediate danger.

Question 2.1
With respect to the graded enforcement options of the RB listed in foreword, what is the limit of the inspectors' authority?

In some countries the inspectors' authority is limited to identifying and assessing of findings.

In some countries the inspectors' authority is limited to the lower level of enforcement options like giving advice, oral and written cautions, letters etc.

In some countries, at least in principle, there is no limit, especially in the case of imminent danger.

In most countries the enforcement process may be initiated by the inspector, but will be adopted and completed by the RB.

Question 2.2
Does the inspector have discretion to choose enforcement options?

In some countries the inspector has no discretion, mainly in those countries where the enforcement process is adopted by the RB. In some countries the inspector has discretion, mainly in those countries where the inspector's authority includes enforcement options.

Question 2.3
How is the enforcement power given to inspector? (i.e. directly by legislative power; indirectly by internal RB processes; etc.)

In most countries power is given directly by legislative power. Some countries power is given indirectly by internal RB processes, where as in couple of countries, there is no enforcement power given to inspectors.

Question 2.4
How does the inspector participate in the enforcement process of the RB once it has started?

In most countries the inspector participates in the enforcement process of the RB from beginning to the end.

In some countries the inspector role is limited to identifying and assessing of findings and reporting.

Question 2.5
Is there any written guidance for the inspectors concerning the RBs enforcement processes? Please describe briefly what kind of guidance or technical tools are available to the inspectors.

In most countries there is written guidance, internal guidance was in form of policies, procedures, manuals etc.

Question 2.6
How does the RB ensure consistency in the inspectors' behaviour in the enforcement processes?

In most countries the enforcement process is discussed with or carried out by the RB's management.

In some countries the enforcement process is detailed in the procedures or written enforcement policy or law.

Question 2.7
Are the inspectors specifically trained in the topic of enforcement?

According to national practice of enforcement.

In some countries there is a detailed enforcement process and there usually is topical training on enforcement.

If enforcement is done only by the RB's management then there is usually a more general type of training.

In some countries inspectors do not have enforcement powers so there is no training.

Question 3.1
Please describe briefly inspectors' role.

In most countries the inspector need to verify closure of the issues.

In some countries there is an inspection to verify closure of the issues.

Question 4
What issue would you like to discuss during the workshop?

Main themes were:

- Monetary penalties/fines
- Graded approach to enforcement
- Inspectors' authority
- Enforcement process
- Inspector skills and training**.**

5.3 Discussion group members

Group 5	**Group 6**
Jukka Kupila, Finland*	Julio Crespo, Spain*
Yves Van den Berghe, Belgium	An Wertelaers, Belgium
Anupama Persaud, Canada	Miroslav Jakes, Czech Republic*
Yves Guannel, France*	Sergey Khlabystov, Russia*
Patric Scheib, Germany	Sebastjan Savli, Slovenia*
Koji Takiyoshi, Japan	Karoline Gotlén, Sweden
Marcin Dabrowski, Poland*	Daniel Billeter, Switzerland
Ami Patel, USA	Stephen Saunders, United Kingdom
Tim Kobetz, IAEA*	

(*) WGIP members

5.4 Group discussion summary

Discussions were held in two subgroups, both having independent discussions with an opportunity to exchange opinions and results of their work during the workshop. Final conclusions were compiled by the two topic leads from WGIP to reflect the discussions and with an effort to harmonise conclusions. The groups identified

Commendable Practices (CP) and Observations, seen as general agreement or already established international safety standards for a RB. Discussions were open and informative with participants sharing their practices and experiences for the discussion groups.

5.5 Conclusions and closing presentation

The following conclusions emerged from the 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 with inspectors from participating countries share).

Although the discussions in the two discussion sub-groups were different, the two sub- groups agreed in following CP as a common result. The results were agreed and modified by both subgroups in a joint group meeting before the closing presentation. Closing presentation was given by Mr Jukka Kupila and following commendable practices were identified.

CP1: RB need a transparent enforcement process that is consistently implemented, based on the needs of the regulatory framework, that builds trust with the licensee and other stakeholders

CP2: Consistency in the implementation of enforcement actions should be supported by the following:

- Enforcement policy, procedures etc.
- Support by management / review panel / enforcement specialist
- Initial and continuous training on practical implementation of enforcement techniques
- Knowledge transfer among inspectors by regular meetings, seminars, workshops, electronic fora, cross-site-inspections.

CP 3: RB should have a process for addressing differing professional opinions during the enforcement process

CP 4: Inspectors should have the questioning attitude and human interaction skills to appropriately challenge licensees when imposing enforcement actions

CP 5: A memorandum of understanding with other RBs, such as occupational health and safety, should be in place where authority is outside the jurisdiction of nuclear regulatory body.

CP 6: RB should carry out a follow-up inspection on licensee's response to enforcement action to ensure continued compliance

During the final evaluation of the work of the both subgroups, some of the identified commendable practices were considered to be already something that is existing practice or requirement for RB. These issues were identified as observations. However, many of these observations are important and beneficial of the participants and were considered important to be recorded in the proceedings if this workshop. Identified observations were as follows:

1. RB should have effective enforcement tools available to carry out enforcement actions.
2. RB should have a evaluation of effectiveness of RB's enforcement actions (internal/external).
3. Although it is understood that safety is licensee's prime responsibility, inspectors should have the authority to direct actions when confronted with conditions that pose imminent danger.
4. RB should have the authority to require licensee to address emerging safety issues with implementation within appropriate time frame.
5. RB's enforcement policy should have the capability to administer monetary penalties and should be legally bounded and a well-defined formal process.
6. The impact of media attention to enforcement actions can be more significant to the licensee than the actual financial impact and it may result in increased public/stakeholder interest and/or high economic side effects.
7. RB should evaluate the timeliness of corrective actions proposed by the licensee.
8. RB should document observations and facts that lead to or have the potential to result in enforcement actions.

6. GENERAL WORKSHOP CONCLUSIONS

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. WGIP members continue to agree that: "The workshops on regulatory inspection practices held by the CNRA Working Group on Inspection Practices, continue to provide a unique opportunity for inspectors and inspection managers of NPPs to meet and share and exchange information."

The topic chapters include the conclusions and CPs that evolved from the various group discussions. CPs 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 CPs can be useful references when each country improves it inspection practices.

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 58 total participants 32 responses were received.

The evaluation form, which was similar to ones issued at previous workshops, asked questions in four areas: general - workshop objectives, workshop format, workshop topics and future workshops. Participants were asked to rate the various questions on a scale of one to five, with one being a low (poor) score and five 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

7.2 Suggested future topics

Participants were asked to provide their input on potential future topics. 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 were as follows:

- Non-identical component replacements (in more depth)
- Spare parts and non-identical replacements
- Inspection of Digital I&C installation/modifications
- Ageing management inspection
- Ageing issues and loss of supplies
- Inspection of components on new ageing mechanisms or effects of ageing
- Commercial grade dedication programmes
- Quality Assurance Programmes
- How to inspect NCSFI issues?
- Post Fukushima Daiichi Modification Inspections
- Inspection of Safety Culture
- Inspection of Human and Organisational factors
- How to inspect safety culture during transition from NPP operation to decommissioning
- Inspection for assessment of safety culture of an organisation
- How to inspect decreasing safety culture?
- Safety Culture inspections analysis and trending by the regulatory body
- Assessment/inspection of safety climate/culture
- Inspection Techniques
- Inspection Best Practices

- Knowledge transfer from experienced to new inspectors
- Inspection of Main Control Room Activities
- Inspection of new installations (during commissioning)
- Inspections limited to waste on-site
- Inspectors' role during start-up after a long outage
- Inspection of non-routine activities
- Implementation risk-oriented approach to inspections
- Design Basis Inspections
- System Design Basis Inspections (with multi-disciplinary staff)
- Long term operation inspections
- Planning issues related to inspections of various different projects
- Coherency of Inspection findings among inspectors in the same organisation
- Event reporting criteria
- Leadership building/development
- Documentation and Communication of Inspection Results
- Inspection Programme Optimisation
- Continue with transition phase
- Graded Approach Standards
- Emergency Preparedness and Response Arrangements
- Maintenance Effectiveness of Power Plants
- Fuel Handling (especially for transition phase/decommissioning)
- Risk significance of Fire Protection at NPP
- Inspection of Fire Protection
- Effectiveness of Regulatory Enforcement
- Subcontractors
- How to deal with potential safety issues limited with justified continued operation

Additional Comments Received:

General:

CNRA should facilitate the use of results in their own countries. Sometimes it is too much for a single inspector to influence the RB.

Exchange of information was in a cordial atmosphere and the participants shared their experiences on the topic.

Availability of projector in WG rooms could be useful to support the work and facilitates the consolidation of outcomes.

In transition phase Japan, Germany, Belgium, Switzerland and Canada were involved in our group. Experience from Russia was missed.

Thank you Topic Leaders!

Workshop Format:

Changes in organisation; please give information earlier; last minute changes are not helpful

Screen and compute availability for recording results.

The format of the workshop provided opportunity to focus discussions on the topic to arrive at commendable practices

More time for discussion would be helpful.

Discussion in the groups was very important---exchange of experience. It is a very good method to use flip charts to record and to use persons for recording.

Workshop Topics

Topics were relevant and discussions adequately addressed the topics.

The topics included in the second topic (temporary modifications and non-identical replacements) are not directly related. They should be treated separately (2 different groups), with people experienced in each specific topic (probably requires different backgrounds) and with time enough to deal in depth the topic on non-identical replacements.

Other Comments:

The room for common meetings was a bit inconvenient since the presentation slides could not been seen behind the audience.

Thank you very much for the organisation.

8. LIST OF PARTICIPANTS

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SPAIN

CRESPO, Julio	Consejo de Seguridad Nuclear (CSN)
GALLARDO MACIA Francisco José	Consejo de Seguridad Nuclear (CSN)

SWEDEN

GOTLEN, Karoline	Swedish Radiation Safety Authority
KOZARCANIN, Adnan	Swedish Radiation Safety Authority

SWITZERLAND

BILLETER, Daniel	Swiss Federal Nuclear Safety Inspectorate (ENSI)
FIERZ, Hans Rudolf	Swiss Federal Nuclear Safety Inspectorate (ENSI)

UNITED KINGDOM

SAUNDERS, Stephen	Office for Nuclear Regulation
SMITH, Paul	Office for Nuclear Regulation

UNITED STATES

PATEL, Ami	Nuclear Regulatory Commission
REGAN, Christopher	Nuclear Regulatory Commission

International Organisations

KOBETZ, Timothy	IAEA
NIEH, Ho	NEA
NEZUKA, Takayoshi	NEA
SALGADO, Nancy	NEA

9. PREVIOUS WGIP REPORTS

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

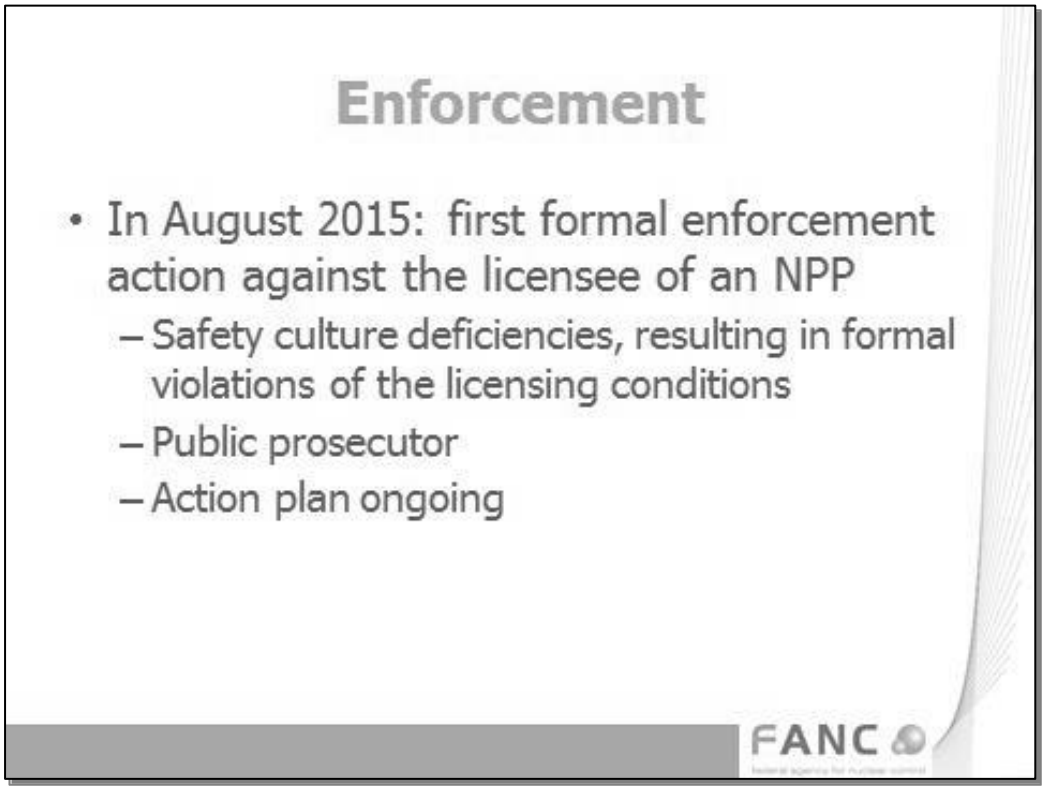
- Inspection of Emergency Arrangements [NEA/CNRA/R(2013)2]
- Inspection of Licensee – Maintenance Programme and Activities [NEA/CNRA/R(2013)1]
- Proceedings of the Eleventh International Nuclear Regulatory Inspection Workshop on Experience from the Inspection of Ageing and Equipment Qualification of Competency of Operators and of Licensee's Oversight of Contractors – Baden, Switzerland, 21-24 May 2012 [NEA/CNRA/R(2012)6]; Appendix: Compilation of Survey Responses [NEA/CNRA/R(2012)6/ADD1]
- Proceedings of the International Operating Experience on Utilisation of Operating Experience in the Regulatory Inspection Programme and of Inspection Findings in the National Operating Experience Programme and Operating Experience and Inspection Insights from the Non-conformance of Spare Parts – Helsinki, Finland, 14-16 June 2011 [NEA/CNRA/R(2012)3]; Appendix (Compilation of Survey Responses) [NEA/CNRA/R(2012)3/ADD1]
- Proceedings of the Tenth International Nuclear Regulatory Inspection Workshop on Experience from Inspecting Safety Culture, Inspection of Licensee Safety Management System and Effectiveness of Regulator Inspection Process – Amsterdam, the Netherlands, 17-19 May 2010 [NEA/CNRA/R(2010)5]; Appendix of responses [NEA/CNRA/R(2010)6]
- Inspection of Licensee's Corrective Action Programme [NEA/CNRA/R(2010)7]
- Proceedings of the Ninth International Nuclear Regulatory Inspection Workshop on Training and Qualification of Inspectors, Integration of Inspection Findings and Inspections of New Plants Under Construction, Porvoo, Finland, 1-5 June 2008 [NEA/CNRA/R(2010)1]; Appendix (Compilation of Survey Responses) NEA/CNRA/R(2010)2
- Fire Inspection Programmes [NEA/CNRA/R(2009)1]
- Proceedings of the CNRA Workshop on Inspection of Digital I&C System: Methods and Approaches, Garching, Germany, 24-26 September 2007 [NEA/CNRA/R(2008)6]
- Proceedings of the Eighth 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 – Toronto, Canada, 1-3 May 2006 [NEA/CNRA/R(2007)1]; Appendix – Compilation of Survey Responses [NEA/CNRA/R(2007)2]
- Regulatory Inspection Practices to Bring About Compliance [NEA/CNRA/R(2005)1]
- Proceedings of the Workshop on Risk-Informed Inspection, Inspection of Performance of Licensee Organisation, and Inspection Aspects of Plants Near or at End of Life – Fekete-Hegy, Hungary, 26-29 April, 2004 [NEA/CNRA/R(2005)4]; Appendix – Compilation of Survey Responses [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]

- Proceedings of the 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 – Veracruz, Mexico, 28 April-2 May 2002 [NEA/CNRA/R(2003)1]; Appendix - Compilation of Survey Responses [NEA/CNRA/R(2003)2]
- Inspection of Fuel Cycle Facilities in NEA Member Countries [NEA/CNRA/R(2003)3]
- Nuclear Regulatory Inspection of Contracted Work Survey Results [NEA/CNRA/R(2003)4]
- Proceedings of the 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, MD, USA 15-17 May 2000 [NEA/CNRA/R(2001)4]; Appendix [NEA/CNRA/R(2001)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(2001)8]; Paris, 1994 [NEA/CNRA/R(94)3]; Paris, 1997 [NEA/CNRA/R(97)3; also OECD/GD(97)140]
- Commendable Practices for Regulatory Inspection Activities [NEA/CNRA/R(2000)2]
- Regulatory Practices for the Decommissioning of Nuclear Facilities with Special Regard to Regulatory Inspection Practices [NEA/CNRA/R(99)4]
- Proceedings of the Workshop on Regulatory Inspection Practices Related to Older Operating NPPs, Risk Evaluation and Licensee Resource Commitment, Prague, Czech Republic, 8-11 June 1998 [NEA/CNRA/R(99)2]
- Comparison of the Inspection Practices in Relation to the Control Room Operator and Shift Supervisor Licences [NEA/CNRA/R(98)1]
- Inspection of Licensee Activities in Emergency Planning [NEA/CNRA/R(98)2]
- Performance Indicators and Combining Assessments to Evaluate the Safety Performance of Licensees [NEA/CNRA/R(1998)3]
- Regulatory Inspection Practices on Fuel Elements and Core Lay-out at NPPs [NEA/CNRA/R(97)4]
- Proceedings of an International Workshop on Regulatory Inspection Activities related to Inspection Planning, Plant Maintenance and Assessment of Safety – Chester, United Kingdom, 19-23 May 1996 [NEA/CNRA/R(97)1; also OECD/GD(97)62]
- Inspector Qualification Guidelines [NEA/CNRA/R(94)1]
- Conduct of Inspections for Plant Modifications, Event Investigations and Operability Decisions, Proceedings of an International WGIP-Workshop Helsinki, 23-25 May 1994 [NEA/CNRA/R(94)4 – OECD/GD(95)14]
- Proceedings of the International Workshop on Conduct of Inspections and Inspector Qualification and Training – Chattanooga, Tennessee, 31 August-3 September 1992 [NUREG/CP-0128; also NEA/CNRA/R(92)3]
- Proceedings of the CSNI Specialist Meeting on Operating Experience Relating to On-site Electronic Power Sources – London, United Kingdom, 16-18 October 1985 [No. 115, February 1996]

10. WORKSHOP OPENING PRESENTATION 1


Welcome
• Welcome to Belgium
• Welcome to Bruges
• Welcome to the WGIP workshop
FANC


FANC & BelV
• FANC
– Public service organisation
– Independent, reports to Parliament through the Minister of Security and the Interior
– Mission : "to ensure protection of workers, the population and the environment against the hazards of ionizing radiation"
• Areas of work
– Information, regulation, authorization, inspection, enforcement, emergency situations
– All users of ionizing radiation (from NPP to dentists)
– Also covers security and safeguards
FANC


Enforcement
• In August 2015: first formal enforcement action against the licensee of an NPP
– Safety culture deficiencies, resulting in formal violations of the licensing conditions
– Public prosecutor
– Action plan ongoing
FANC


This workshop
• A tool to improve
• Commendable practices
• High expectations from NEA - WGIP
FANC

Share experience

- Continuous improvement
  - Regulatory body
  - Licensee
- Detect, share and develop commendable practices
- Learn from each other
  - Crossed inspections

FANC

Our goals

- Improved safety
  - Operator = first line
  - Design safety (stress tests, PSR, Topical Peer Reviews, …)
  - Operational safety → inspections
- Our tools:
  - Verification of regulatory compliance
  - Promotion of continuous improvement
  - Enhanced effectiveness of inspections

FANC

Do not forget

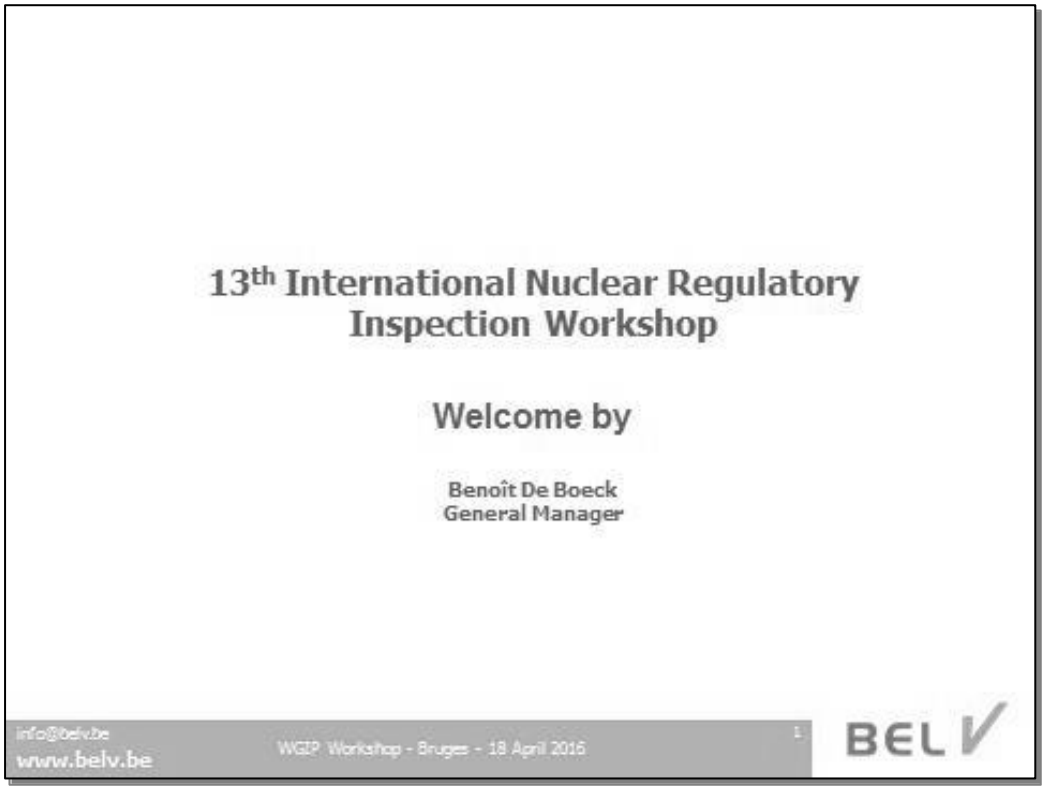
- 3 pillars of safety:
  - Technical / design
  - Organizational / process & procedure
  - Human

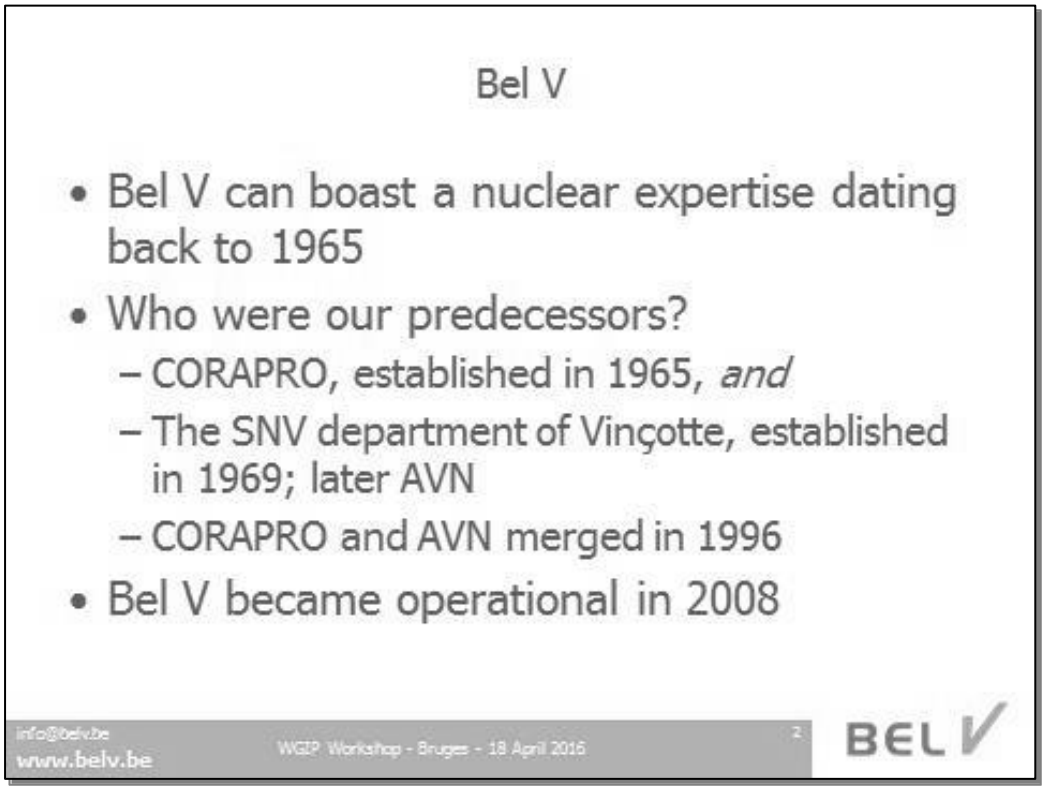
FANC

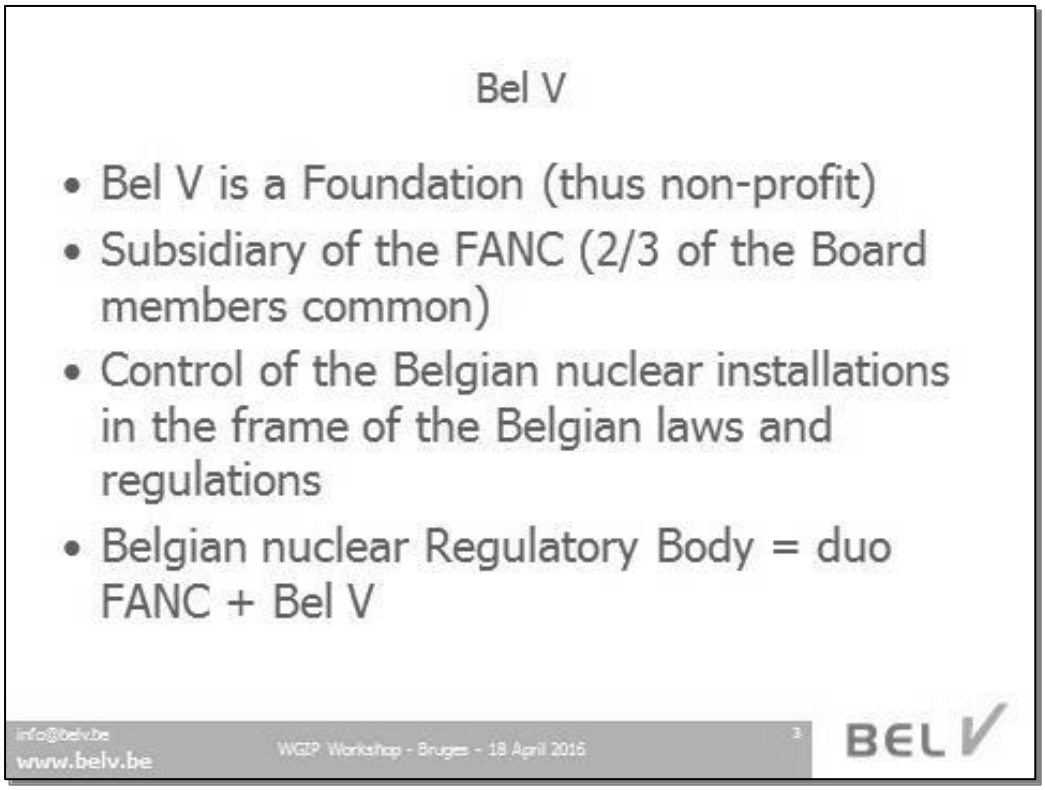
Have a productive workshop !

FANC

11. WORKSHOP OPENING PRESENTATION 2




Bel V
• Bel V can boast a nuclear expertise dating back to 1965
• Who were our predecessors?
– CORAPRO, established in 1965, *and*
– The SNV department of Vinçotte, established in 1969; later AVN
– CORAPRO and AVN merged in 1996
• Bel V became operational in 2008
info@belv.be
www.belv.be
WGIP Workshop - Bruges - 18 April 2016
2
BEL V


Bel V
• Bel V is a Foundation (thus non-profit)
• Subsidiary of the FANC (2/3 of the Board members common)
• Control of the Belgian nuclear installations in the frame of the Belgian laws and regulations
• Belgian nuclear Regulatory Body = duo FANC + Bel V
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www.belv.be
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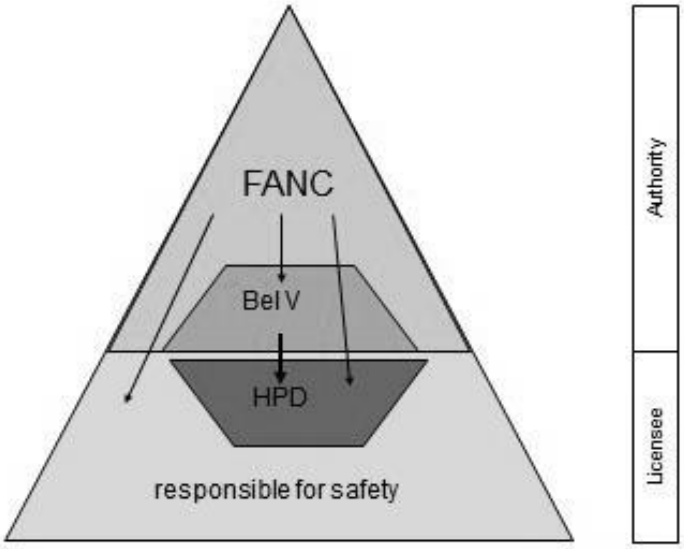
BEL V

Bel V BASIC ROLE

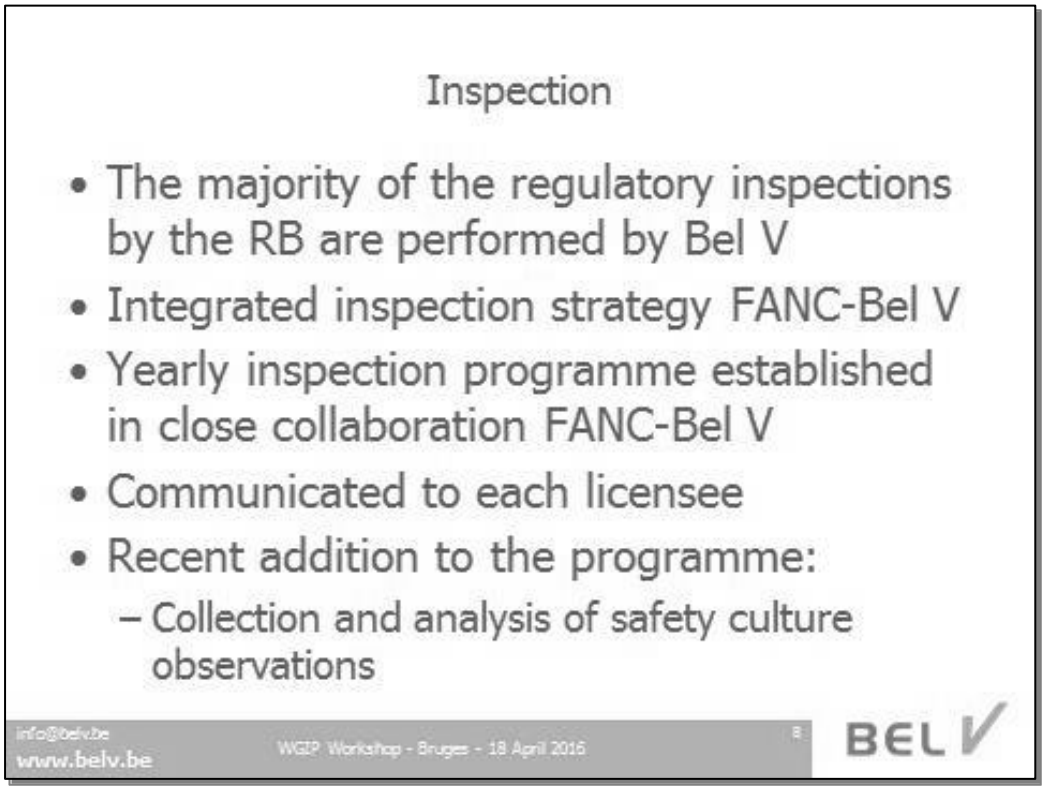
- Technical Support of the Federal Agency for Nuclear Control
  - Nuclear Safety Assessments : Safety Evaluation Reports
  - Conformity checks of new plants or modifications : issuance of permits
  - Inspections : written reports

Structure of control in Belgium



Bel V today

- 80 employees
  - 20 inspectors (generalists)
  - 45 specialists (experts in one of more disciplines)
  - 15 administrative employees


Inspection
• The majority of the regulatory inspections by the RB are performed by Bel V
• Integrated inspection strategy FANC-Bel V
• Yearly inspection programme established in close collaboration FANC-Bel V
• Communicated to each licensee
• Recent addition to the programme:
– Collection and analysis of safety culture observations
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BEL V


WGIP
• Created by CNRA 25 years ago
• Very practical group
– People performing the same job in the field
– Meetings in different countries with technical visits
– Organisation of workshops
– Creates a very useful network
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www.belv.be
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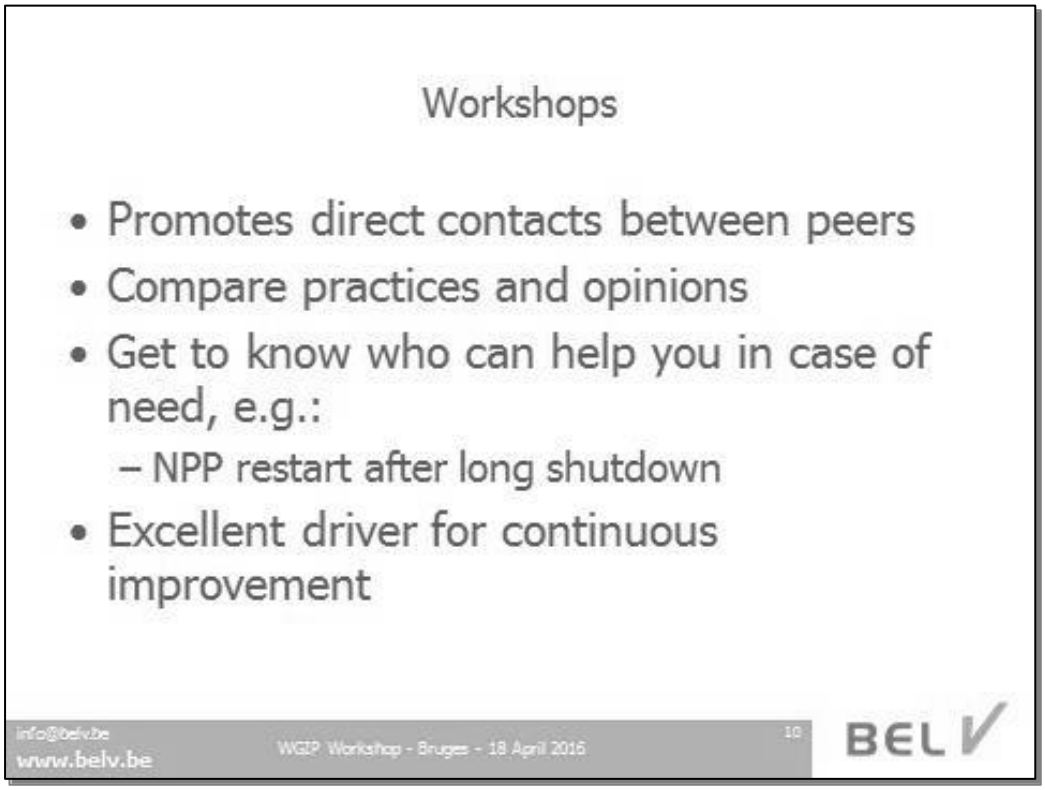
9
BEL V


Workshops
• Promotes direct contacts between peers
• Compare practices and opinions
• Get to know who can help you in case of need, e.g.:
– NPP restart after long shutdown
• Excellent driver for continuous improvement
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www.belv.be
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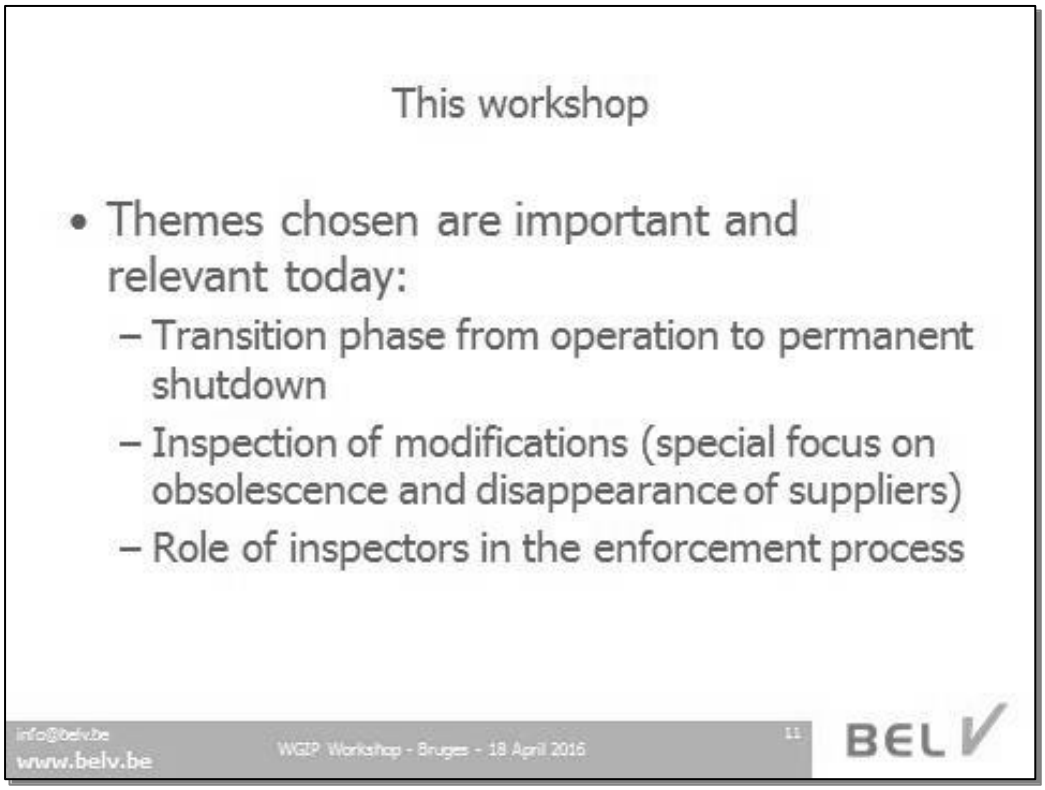
10
BEL V


This workshop
• Themes chosen are important and relevant today:
– Transition phase from operation to permanent shutdown
– Inspection of modifications (special focus on obsolescence and disappearance of suppliers)
– Role of inspectors in the enforcement process
info@belv.be
www.belv.be
WGIP Workshop - Bruges - 18 April 2016
11
BEL V

Location and setup for the workshop were chosen to foster effective and efficient work

I wish you a productive meeting

12. HOST COUNTRY PRESENTATION


SCK·CEN

SCK·CEN ACADEMY
FOR NUCLEAR SCIENCE AND TECHNOLOGY

Ethical Aspects of Radiation Protection

Gaston Meskens
Science & Technology Studies Unit, SCK·CEN (Belgium)
Centre for Ethics and Value Inquiry, University of Ghent (Belgium)
gaston.meskens@sckcen.be

13th International Nuclear Regulatory Inspection Workshop
Bruges, 20 April 2016

Ethical Aspects of Radiation Protection

intro The energy facts: controversy, power politics and distrust

1 The idea of fair energy governance

2 Dealing with risk: between knowledge and fairness

3 Fair and effective risk assessment: three reflections

4 Seeking societal trust: the challenge for science

5 The real problem (a critical theory of modernity)

6 An ethics of care for our modern coexistence

7 An ethics of care for radiological protection

intro The energy facts: controversy, power politics and distrust
The quest for climate justice

intro | The energy facts: controversy, power politics and distrust
Old technologies, new risks

intro | The energy facts: controversy, power politics and distrust
Energy as a tool for power politics

SOURCES: East European Gas Analysis, The National Gas Union of Ukraine

RICH CLABAUGH/STAFF

intro | The energy facts: controversy, power politics and distrust
The subsidies issue (fossil fuels)

businessGreen
Sustainable thinking

HOME NEWS ENERGY POLICY MANAGEMENT TECHNOLOGY IN

European Investment Bank criticised for 'hypocrisy' of fossil fuel lending

The European Union has made €5bn of fossil fuel loans through its financial arm despite carbon reduction targets for members

By Damian Carrington, the Guardian | 09 Dec 2011 | 0 Comments

Send Print Comment

The world's biggest lender to energy and climate action projects almost doubled the funds given to fossil fuels between 2007 and 2010, a new report (PDF) published on Thursday reveals.

intro | The energy facts: controversy, power politics and distrust
The subsidies issue (nuclear)

Inconvenient news from the Financial Times (3 August 2012)

Cost and safety fears make gas, wind and solar more attractive, say **Pilita Clark**, **Rebecca Bream** and **Guy Chazan**

Wind taken out of nuclear power's sails

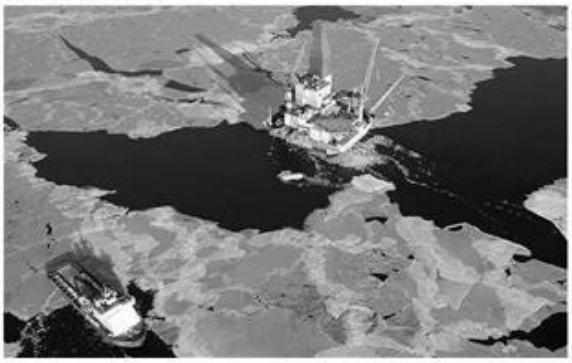
It is one thing for a green pressure group to claim nuclear power is too expensive, but quite another when the charge comes from the head of an atomic industry pioneer such as General Electric.

earlier claims that new reactors could be built without state subsidies now look wide of the mark.

intro | The energy facts: controversy, power politics and distrust
Fossil fuel use stretching: the exploration of fragile territories

The Telegraph
24 May 2015

Arctic drilling is inevitable: if we don't find oil in the ice, then Russia will



intro | The energy facts: controversy, power politics and distrust
Fossil fuel use stretching: the fracking controversy

Progress and Controversy Arrive With New Rules for Fracking on Public Lands

by Abraham Lustgarten
ProPublica, March 20, 2015, 6:11 p.m.

Anti-fracking demonstrators protesting on September 23, 2014 in New York City. (Bryan Thomas/Getty Images)

intro

The energy facts: controversy, power politics and distrust
Uranium mining pollution and power politics

theguardian

UK world politics sport football opinion culture business lifestyle fashion environment

home › opinion columnists

Environment
Comment is free

Extracting a disaster

The effects of uranium mining are disastrous. To minimise the risks, the nuclear supply chain needs independent auditing

David Thorpe

The increased sourcing of raw uranium that will arise from nuclear new build is an ethical and environmental nightmare currently being ignored by the government.

The World Nuclear Association (WNA), the trade body for companies that make up 90% of the industry, admits that in "emerging uranium producing countries" there is frequently no adequate environmental health and safety legislation, let alone monitoring. It is considerately proposing a Charter of Ethics containing principles of uranium stewardship for its members to follow. But this is a self policing voluntary arrangement. Similarly, the International Atomic Energy Agency's safety guide to the Management of Radioactive Waste from the Mining and Milling of Ores (pdf) are not legally binding on operators.

intro

The energy facts: controversy, power politics and distrust
Post-accident power politics and public distrust

RT News

'TEPCO covered up the truth about Fukushima disaster'

Published time: October 28, 2014 15:31

AFP Photo / Pool / Kimimasa Mayama

intro | The energy facts: controversy, power politics and distrust
Post-accident power politics and public distrust

https://nuclearhistory.wordpress.com/2012/page/26/

intro | The energy facts: controversy, power politics and distrust
Controversies over nuclear energy and nuclear weapons remain intermixed

intro	The energy facts: controversy, power politics and distrust Todays society has settled in a comfort of polarisation over the nuclear issue

- Reasoning on the acceptability of nuclear is 'complex', but since the beginning,
  - opinion makers have been divided into two camps
  - opinion makers have been using the same arguments pro and contra

Today the debate is no longer a ratio↔emo debate, but a ratio↔ratio debate

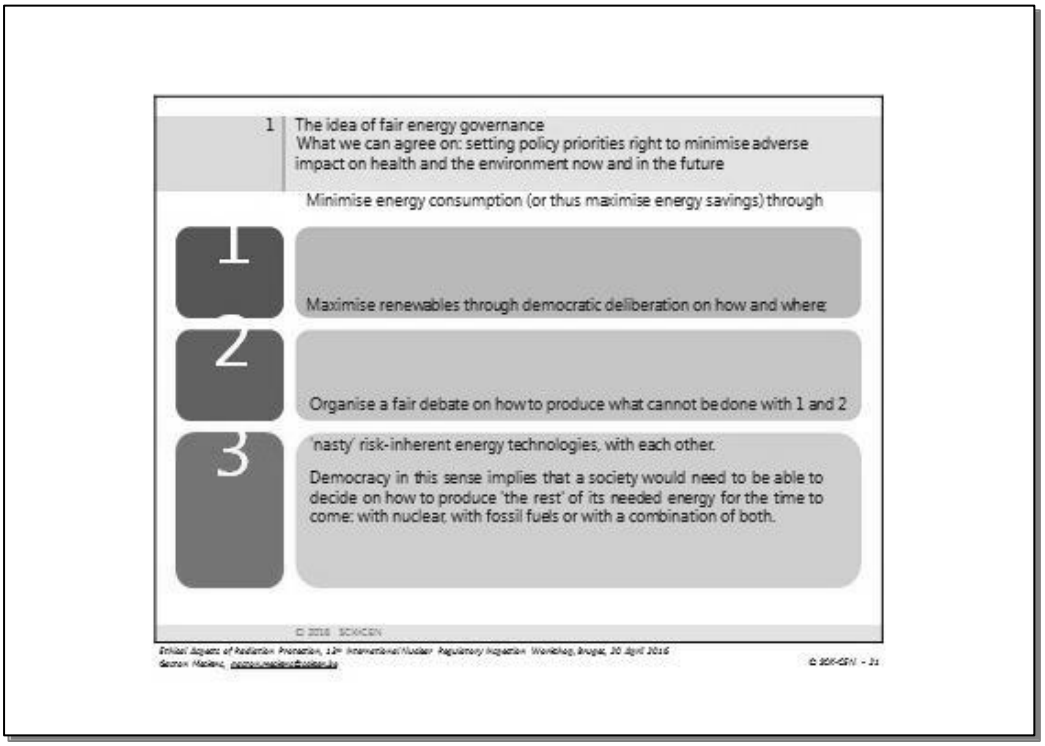
science & value based arguments ↔ science & value based arguments

- These camps are now turned into non-overlapping comfort zones, maintained by strategic and often populist simplifications of arguments pro/contra
- As in a joint conspiracy, both make no effort to convince each other, but focus on 'the general public'

the pro-camp tries to convince it ↔ the contra camp claims to represent it

The result is a **polarisation**, not (only) in the public debate, but one that is deeply rooted in the structures of politics, science and civil society

1	The idea of fair energy governance Energy governance is a 'complex social problem' with risk as its central concern


1
The idea of fair energy governance
What we can agree on: setting policy priorities right to minimise adverse impact on health and the environment now and in the future
Minimise energy consumption (or thus maximise energy savings) through
1
2
3
Maximise renewables through democratic deliberation on how and where
Organise a fair debate on how to produce what cannot be done with 1 and 2
'nasty' risk-inherent energy technologies, with each other.
Democracy in this sense implies that a society would need to be able to decide on how to produce 'the rest' of its needed energy for the time to come: with nuclear, with fossil fuels or with a combination of both.
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Ethical Aspects of Radiation Protection, 12th International Nuclear Regulatory Inspection Workshop, Brugge, 20 April 2016
Geraan Haskins, geraan.haskins@sckcen.be
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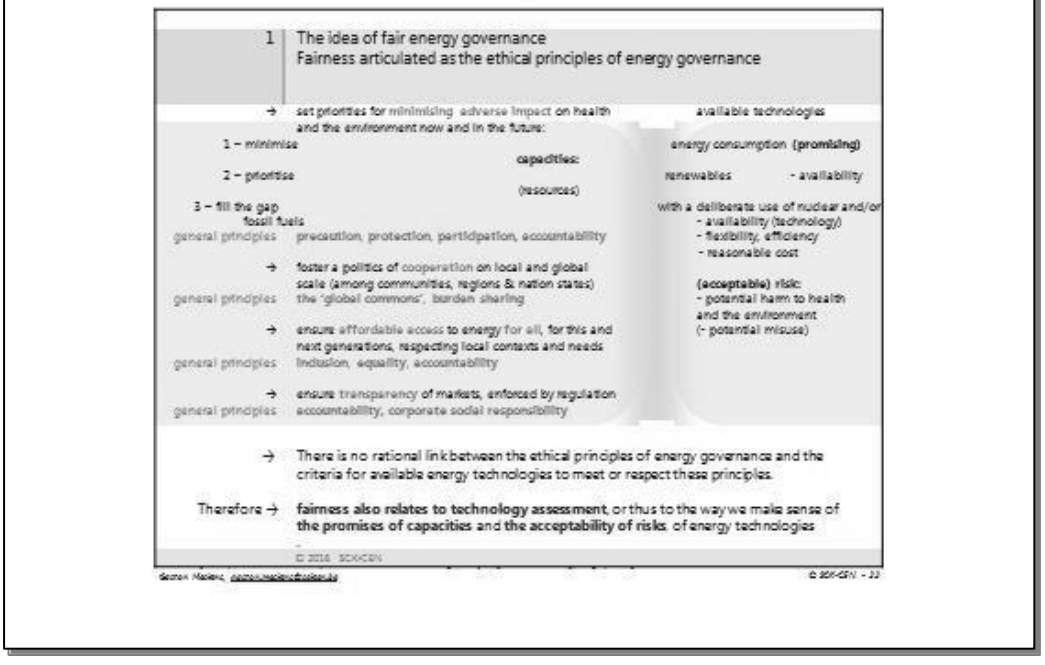
1
The idea of fair energy governance
Fairness articulated as the ethical principles of energy governance
→ set priorities for minimising adverse impact on health and the environment now and in the future:
1 – minimise
2 – prioritise
3 – fill the gap
capacities:
(resources)
renewables
fossil fuels
energy consumption (promising)
- availability
with a deliberate use of nuclear and/or
- availability (technology)
- flexibility, efficiency
- reasonable cost
general principles precaution, protection, participation, accountability
→ foster a politics of cooperation on local and global scale (among communities, regions & nation states)
general principles the 'global commons', burden sharing
→ ensure affordable access to energy for all, for this and next generations, respecting local contexts and needs
general principles inclusion, equality, accountability
→ ensure transparency of markets, enforced by regulation
general principles accountability, corporate social responsibility
available technologies
(acceptable) risk:
- potential harm to health and the environment
(- potential misuse)
→ There is no rational link between the ethical principles of energy governance and the criteria for available energy technologies to meet or respect these principles.
Therefore → fairness also relates to technology assessment, or thus to the way we make sense of the promises of capacities and the acceptability of risks of energy technologies
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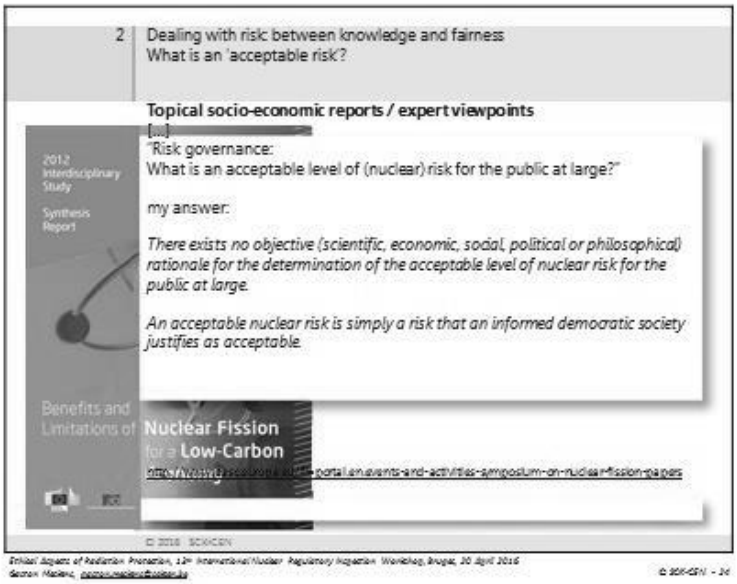
2
Dealing with risk between knowledge and fairness
What is an 'acceptable risk'?
Topical socio-economic reports / expert viewpoints
[...]
"Risk governance:
What is an acceptable level of (nuclear) risk for the public at large?"
my answer:
There exists no objective (scientific, economic, social, political or philosophical) rationale for the determination of the acceptable level of nuclear risk for the public at large.
An acceptable nuclear risk is simply a risk that an informed democratic society justifies as acceptable.
2012 Interdisciplinary Study
Synthesis Report
Benefits and Limitations of Nuclear Fission for a Low-Carbon
portal.en.events-and-activities-symposium-on-nuclear-fission-papers
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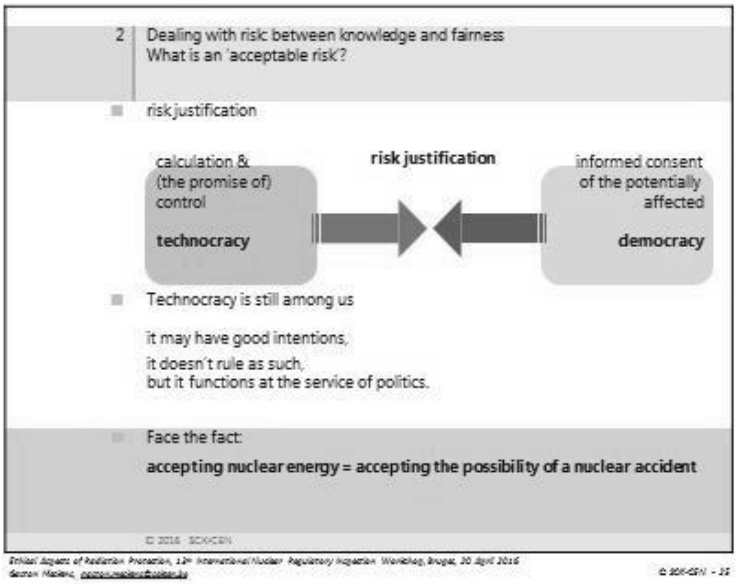
2
Dealing with risk between knowledge and fairness
What is an 'acceptable risk'?
risk justification
calculation & (the promise of) control
technocracy
risk justification
informed consent of the potentially affected
democracy
Technocracy is still among us
it may have good intentions,
it doesn't rule as such,
but it functions at the service of politics.
Face the fact:
accepting nuclear energy = accepting the possibility of a nuclear accident
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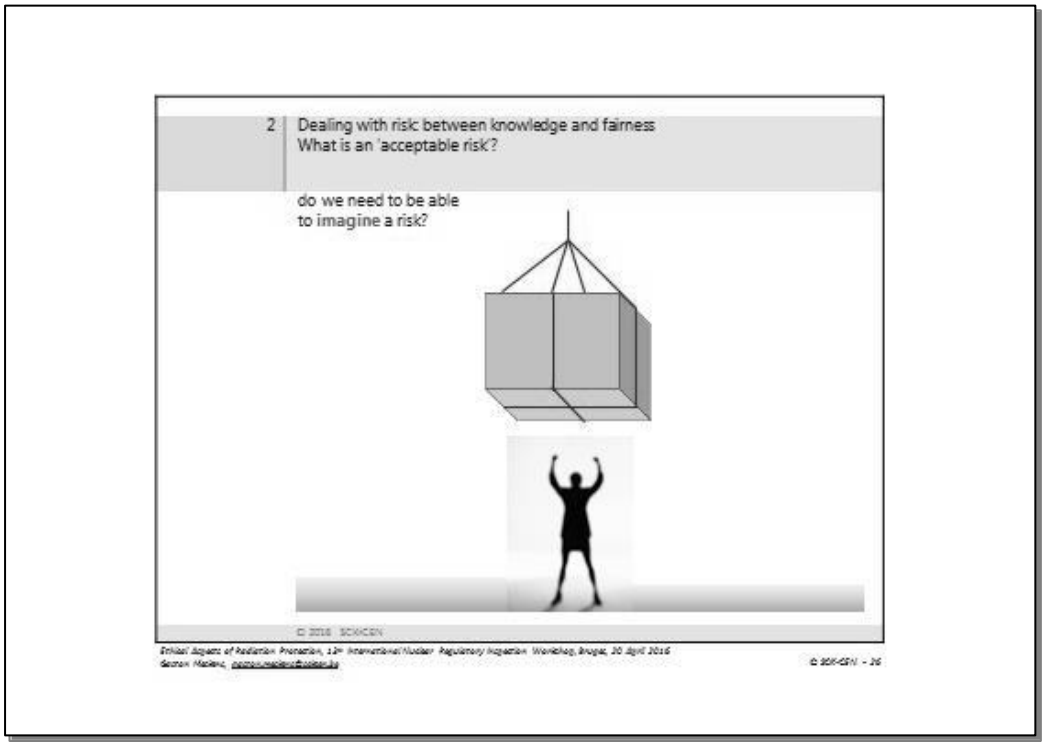
2
Dealing with risk between knowledge and fairness
What is an 'acceptable risk'?
do we need to be able
to imagine a risk?
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Geraint Hockey, geraint.hockey@sckcen.be
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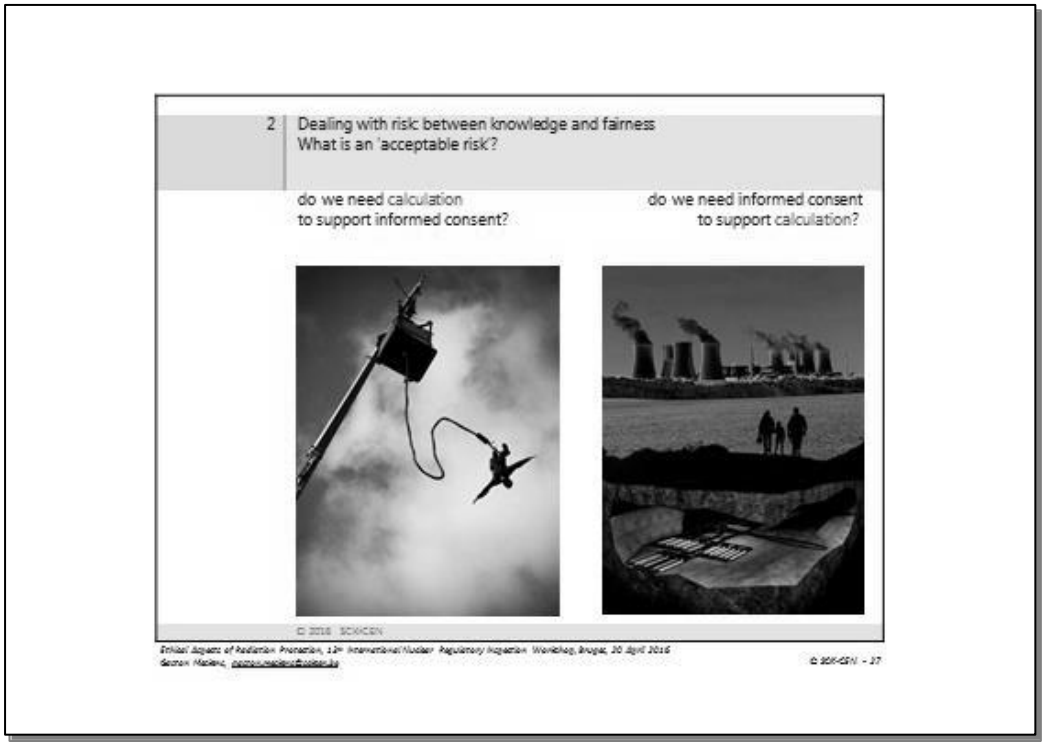
2
Dealing with risk between knowledge and fairness
What is an 'acceptable risk'?
do we need calculation
to support informed consent?
do we need informed consent
to support calculation?
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Geraint Hockey, geraint.hockey@sckcen.be
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2 Dealing with risk between knowledge and fairness
What is an 'acceptable risk'?

do we need calculation to support informed consent?

do we need informed consent to support calculation?

2 Dealing with risk between knowledge and fairness
Elements of a rational approach to risk justification

knowledge: causality in the natural/technical system
knowledge about the outcome / knowledge about the likelihood

	knowledge on outcome: moderate	knowledge on outcome: poor
knowledge on likelihood: moderate	risk	ambiguity ignorance
knowledge on likelihood: poor	uncertainty	

control: risk avoidance / reduction / protection
alternatives

fairness: possibility of a 'fair' distribution of benefits and burdens
informed consent / possibility to avoid the risk

2 Dealing with risk between knowledge and fairness
Elements of a rational approach to risk justification

A short review of two cases of dealing with risk

with the aim to develop a meaninful rationale on the relation between knowledge and fairness

2 Dealing with risk between knowledge and fairness
Case 1: the San Francisco Earthquake

1906

2 Dealing with risk: between knowledge and fairness
Case 1: the San Francisco Earthquake

1906

EXTRA THE DAILY NEWS EXTRA

HUNDREDS DEAD!

Fire Follows Earthquake, Laying Downtown Section in Ruins--City Seems Doomed For Lack of Water

KNOWN DEAD AT MECHANICS' PAVILION

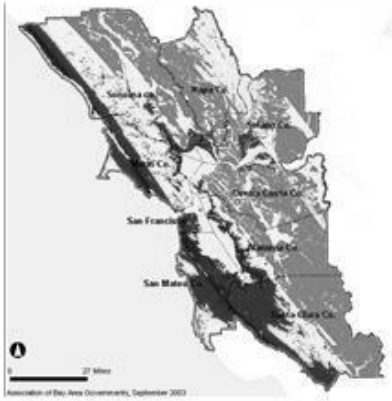
Max Fenner, policeman, killed in collapse Essex Hotel.
Niece of Detective Dillon, killed in collapse, 6th and Shipley.
Unidentified woman, killed at 18 7th st.
Two unknown men, brought in dead.

OTHER DEAD

Five killed, 2 injured, in collapse of building at 239 Geary.
Frank Coralk, buried beneath basement floor of burning building 8th and Mission. Heard crying "For God's sake, help me."
Seven firemen killed in collapse of brick power house. Valencia

2 Dealing with risk: between knowledge and fairness
Case 1: the San Francisco Earthquake

now



2 Dealing with risk: between knowledge and fairness
Case 1: the San Francisco Earthquake

2006 Research report 'When the big one strikes again':

- "SF 1906 earthquake was biggest natural disaster in the US before Katrina"
- "Seismologic study claims that a new earthquake in the area is unavoidable"
- "Damage would be bigger and # deaths would be higher compared to 1906 due to higher population density"

- The 2006 study did not trigger a 'great escape', neither protests of concerned citizens. Life went on and still goes on.

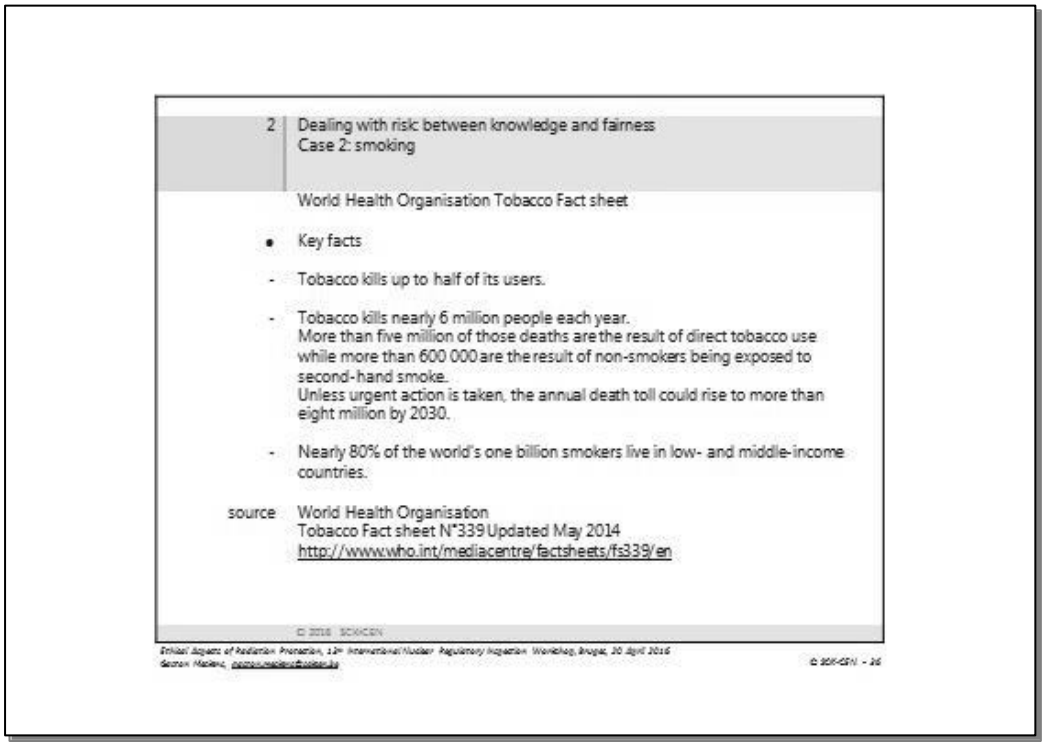
2 Dealing with risk: between knowledge and fairness
Case 1: the San Francisco Earthquake

- The SF population lives in a state of 'real' risk, however, people 'accept' the risk because

(knowledge) there is a 'transparent' cause-effect relation
- the 'outcome' of the cause – effect relation is clear and unambiguous
- the 'likelihood' is seen only as a probabilistic uncertainty

(control) there is no 'technical' possibility to reduce the risk
there exist 'technical' possibilities for protection

(fairness) there is a simple and fair distribution of benefits and burdens
- every citizen has the same benefit ('living in SF') and the same risk (the earthquake)
- and is free to leave the city


2 Dealing with risk between knowledge and fairness
Case 2: smoking
World Health Organisation Tobacco Fact sheet
• Key facts
- Tobacco kills up to half of its users.
- Tobacco kills nearly 6 million people each year.
More than five million of those deaths are the result of direct tobacco use while more than 600 000 are the result of non-smokers being exposed to second-hand smoke.
Unless urgent action is taken, the annual death toll could rise to more than eight million by 2030.
- Nearly 80% of the world's one billion smokers live in low- and middle-income countries.
source World Health Organisation
Tobacco Fact sheet N°339 Updated May 2014
http://www.who.int/mediacentre/factsheets/fs339/en
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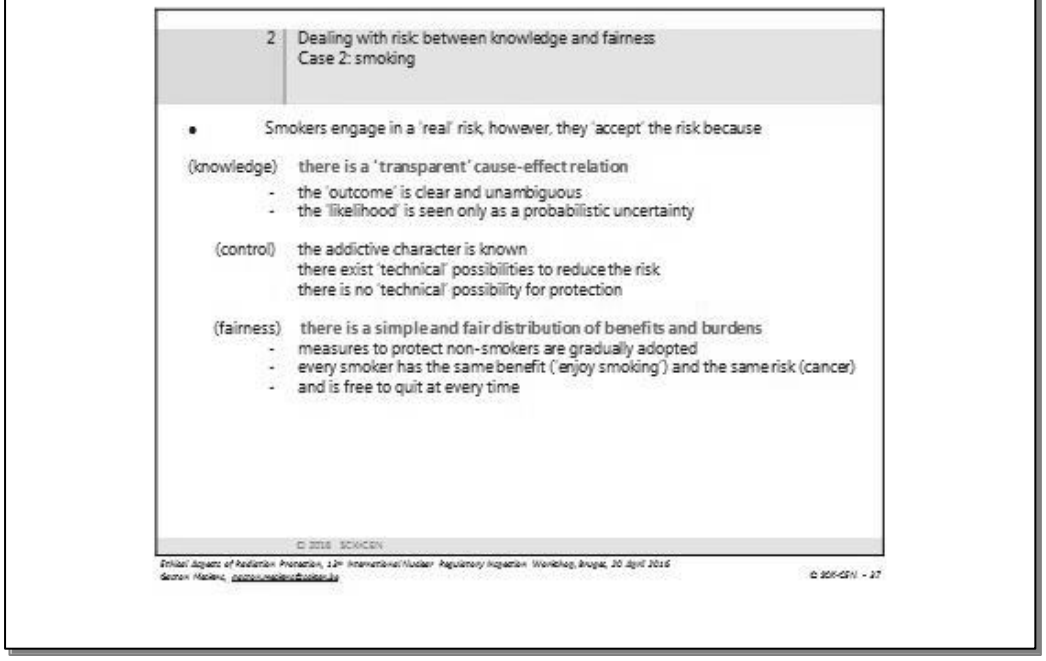
2 Dealing with risk between knowledge and fairness
Case 2: smoking
• Smokers engage in a 'real' risk, however, they 'accept' the risk because
(knowledge) there is a 'transparent' cause-effect relation
- the 'outcome' is clear and unambiguous
- the 'likelihood' is seen only as a probabilistic uncertainty
(control) the addictive character is known
there exist 'technical' possibilities to reduce the risk
there is no 'technical' possibility for protection
(fairness) there is a simple and fair distribution of benefits and burdens
- measures to protect non-smokers are gradually adopted
- every smoker has the same benefit ('enjoy smoking') and the same risk (cancer)
- and is free to quit at every time
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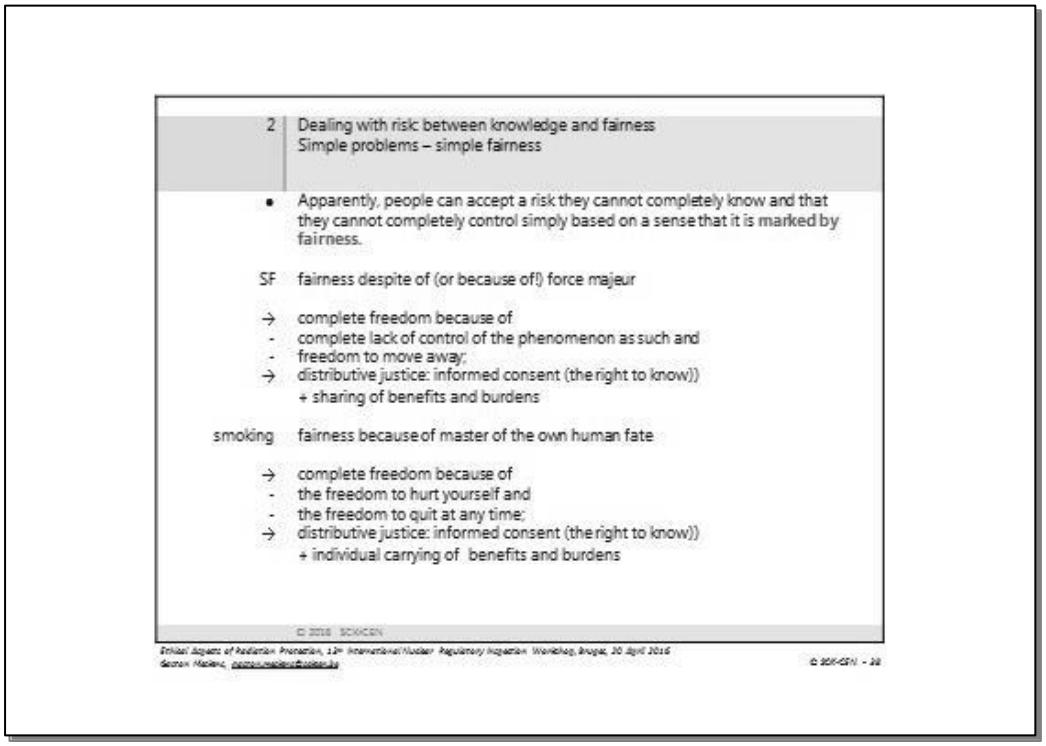
2 Dealing with risk: between knowledge and fairness
Simple problems – simple fairness
• Apparently, people can accept a risk they cannot completely know and that they cannot completely control simply based on a sense that it is marked by fairness.
SF fairness despite of (or because of!) force majeur
→ complete freedom because of
- complete lack of control of the phenomenon as such and
- freedom to move away;
→ distributive justice: informed consent (the right to know))
+ sharing of benefits and burdens
smoking fairness because of master of the own human fate
→ complete freedom because of
- the freedom to hurt yourself and
- the freedom to quit at any time;
→ distributive justice: informed consent (the right to know))
+ individual carrying of benefits and burdens
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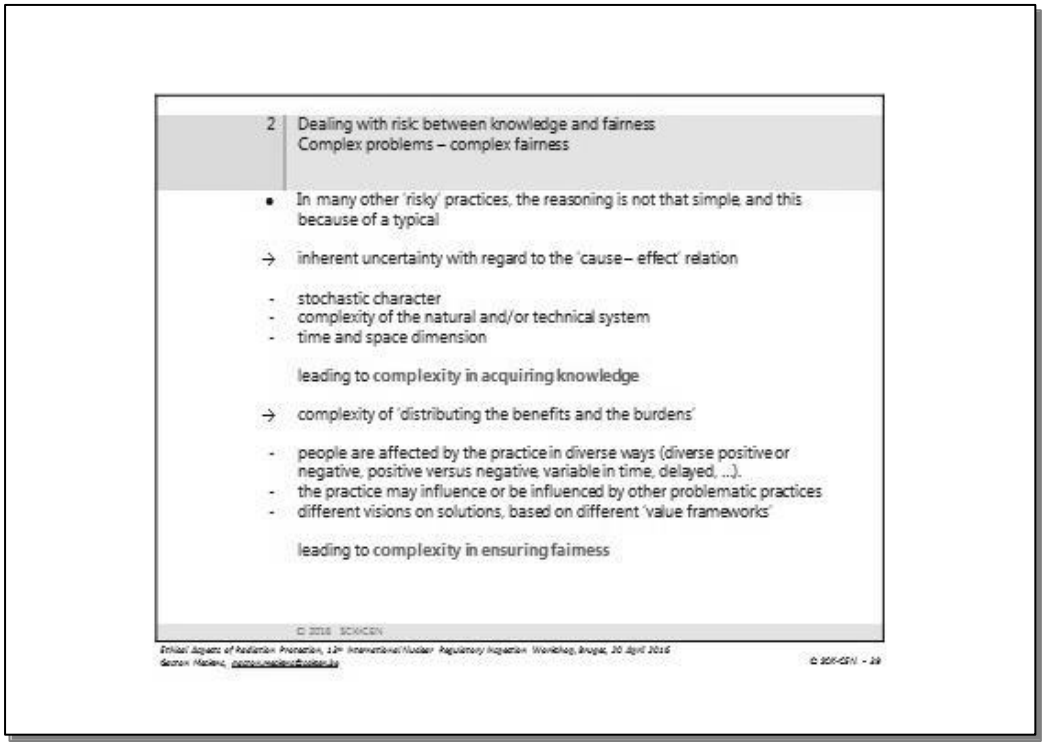
2 Dealing with risk: between knowledge and fairness
Complex problems – complex fairness
• In many other 'risky' practices, the reasoning is not that simple, and this because of a typical
→ inherent uncertainty with regard to the 'cause – effect' relation
- stochastic character
- complexity of the natural and/or technical system
- time and space dimension
leading to complexity in acquiring knowledge
→ complexity of 'distributing the benefits and the burdens'
- people are affected by the practice in diverse ways (diverse positive or negative, positive versus negative, variable in time, delayed, ...).
- the practice may influence or be influenced by other problematic practices
- different visions on solutions, based on different 'value frameworks'
leading to complexity in ensuring fairness
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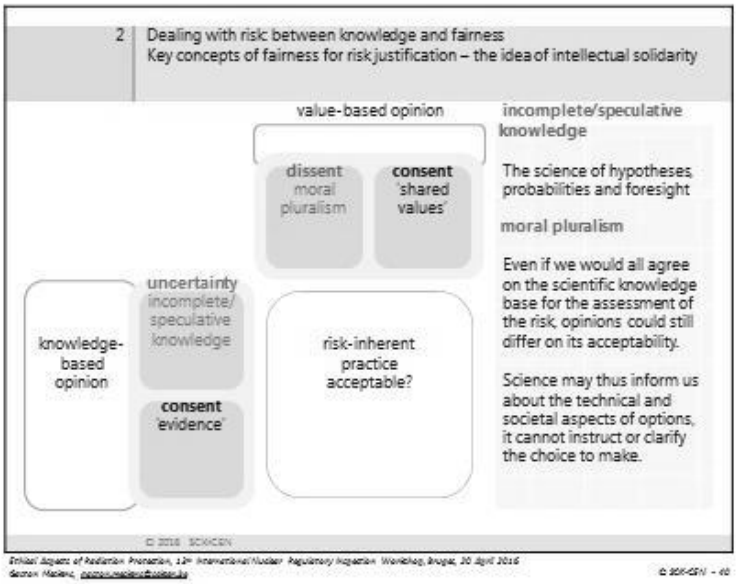
2
Dealing with risk between knowledge and fairness
Key concepts of fairness for risk justification – the idea of intellectual solidarity
value-based opinion
dissent
moral pluralism
consent
'shared values'
incomplete/speculative knowledge
The science of hypotheses, probabilities and foresight
moral pluralism
Even if we would all agree on the scientific knowledge base for the assessment of the risk, opinions could still differ on its acceptability.
Science may thus inform us about the technical and societal aspects of options, it cannot instruct or clarify the choice to make.
uncertainty
incomplete/speculative knowledge
knowledge-based opinion
consent
'evidence'
risk-inherent practice acceptable?
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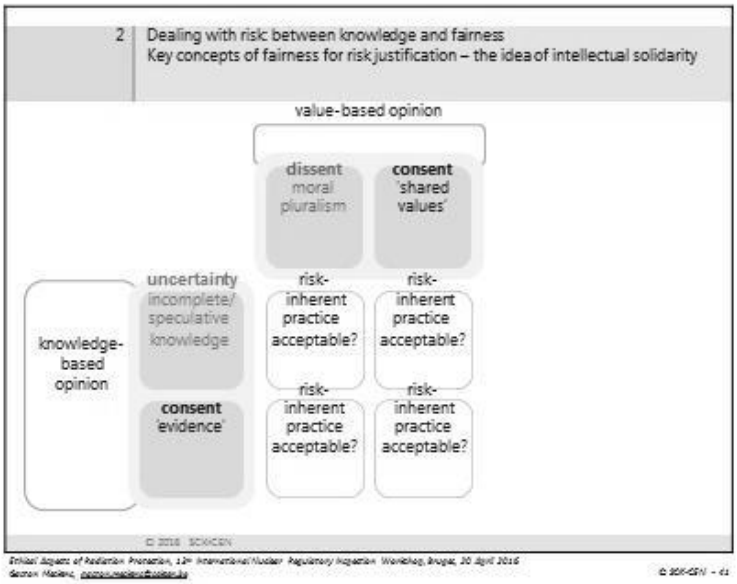
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'evidence'
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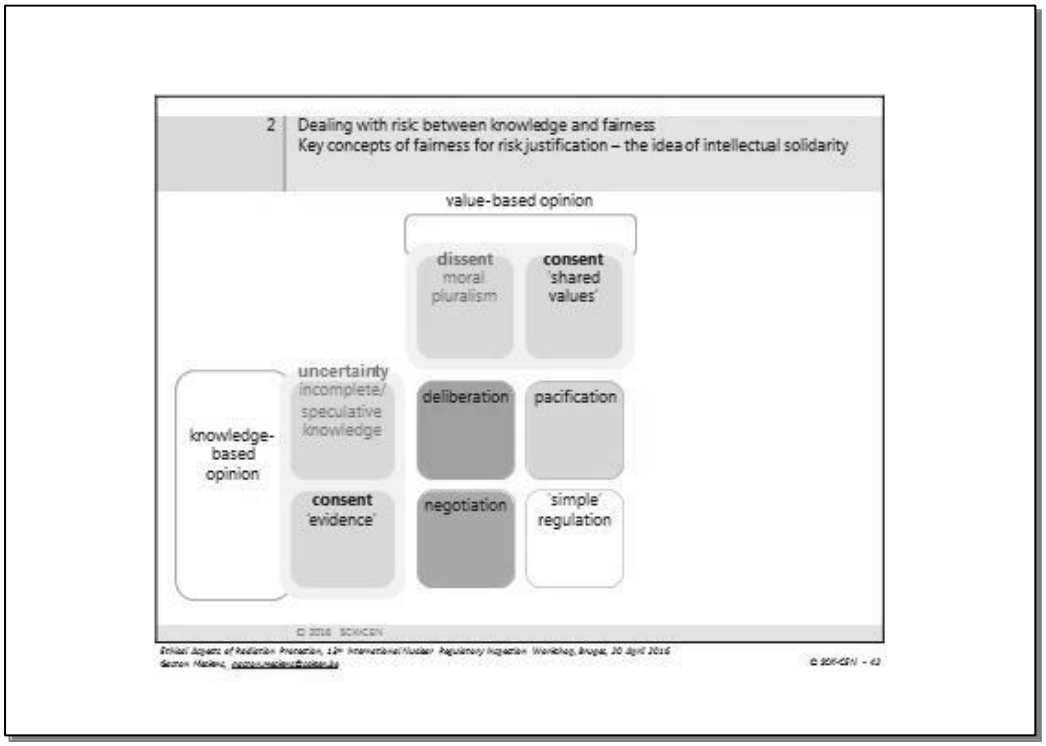
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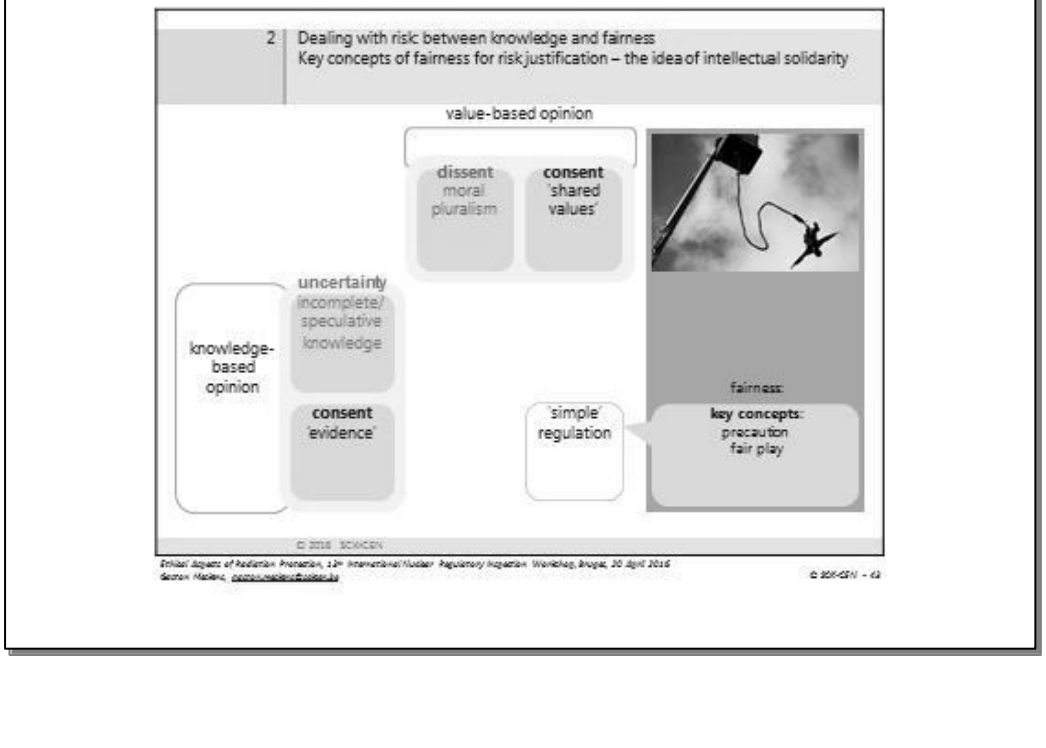
uncertainty
incomplete/ speculative knowledge
knowledge-based opinion
deliberation
pacification
consent
'evidence'
negotiation
'simple' regulation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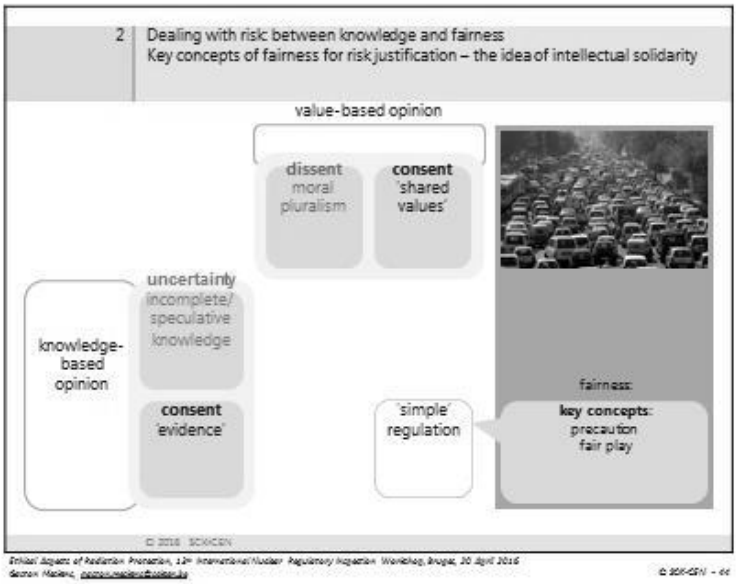
uncertainty
incomplete/ speculative knowledge
knowledge-based opinion
consent
'evidence'
'simple' regulation
fairness:
key concepts:
precaution
fair play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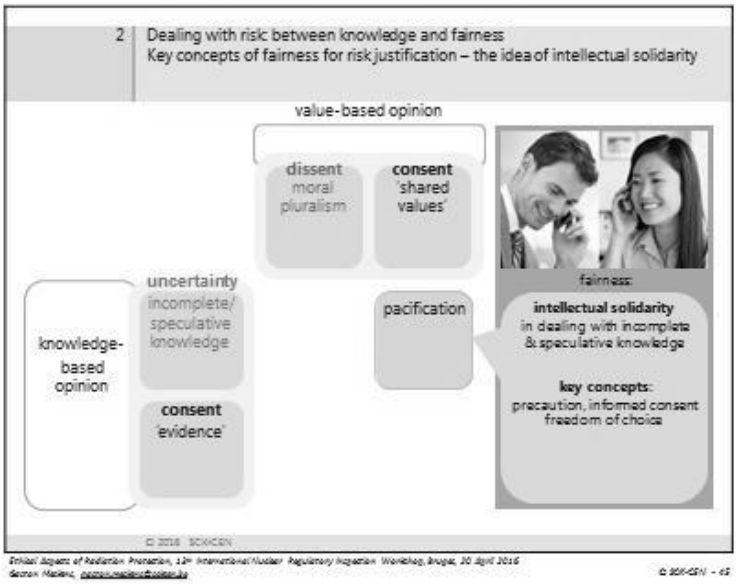
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consent
'evidence'
pacification
fairness:
intellectual solidarity
in dealing with incomplete
& speculative knowledge
key concepts:
precaution, informed consent
freedom of choice
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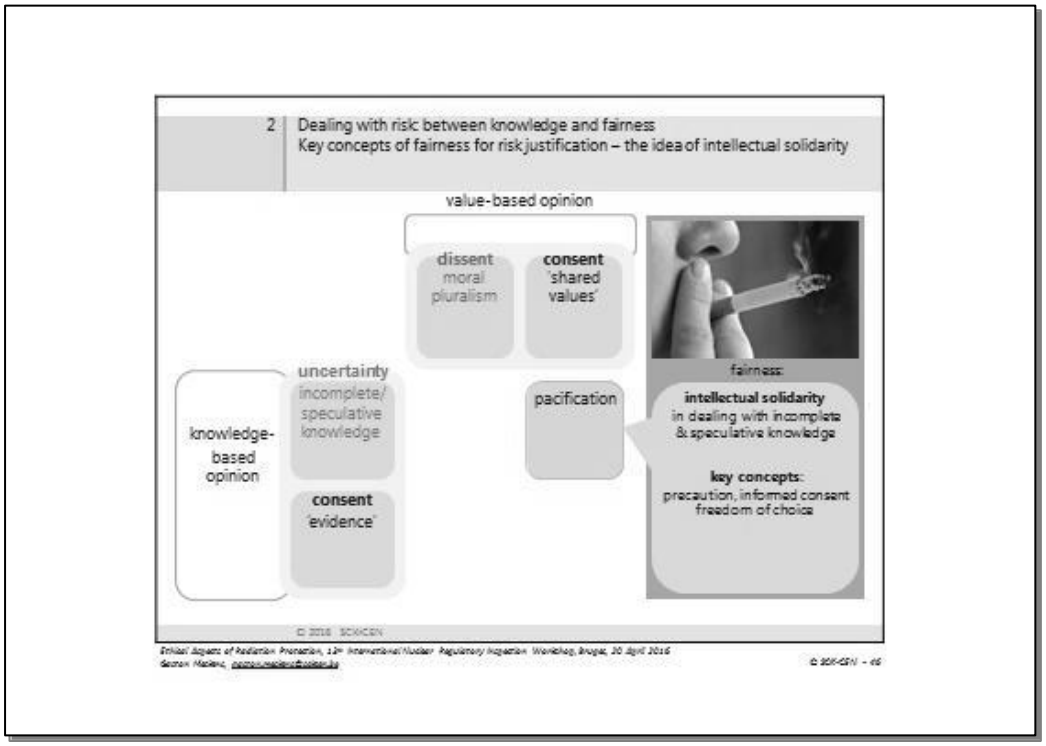
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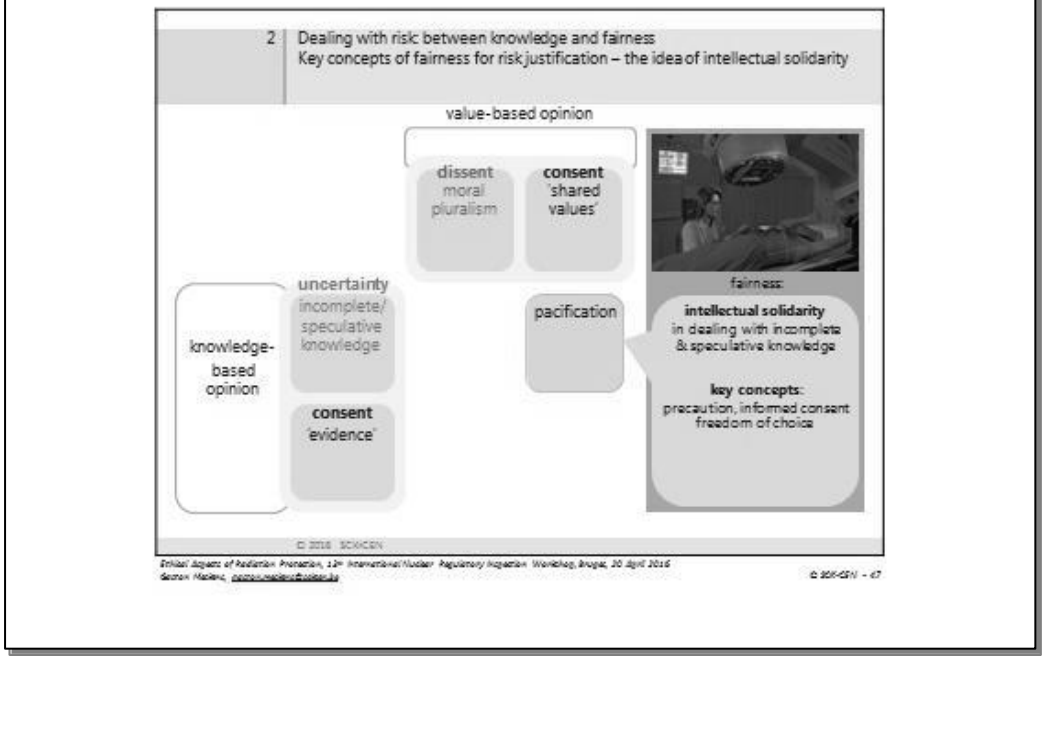
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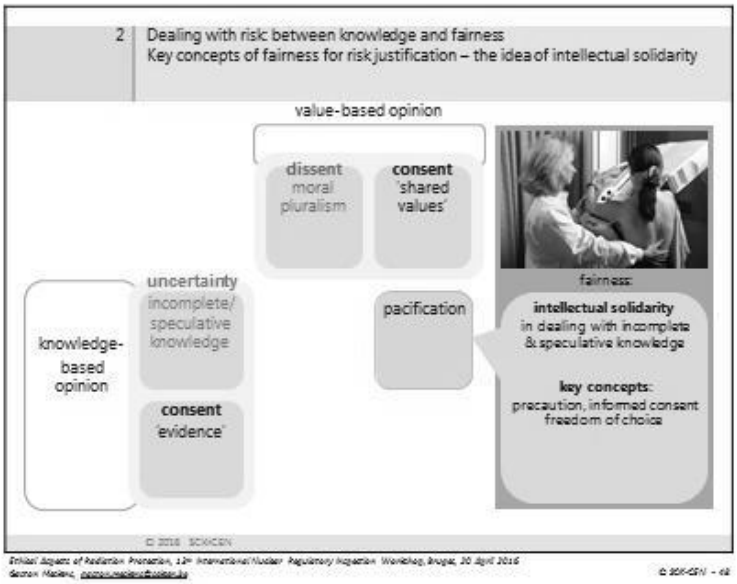
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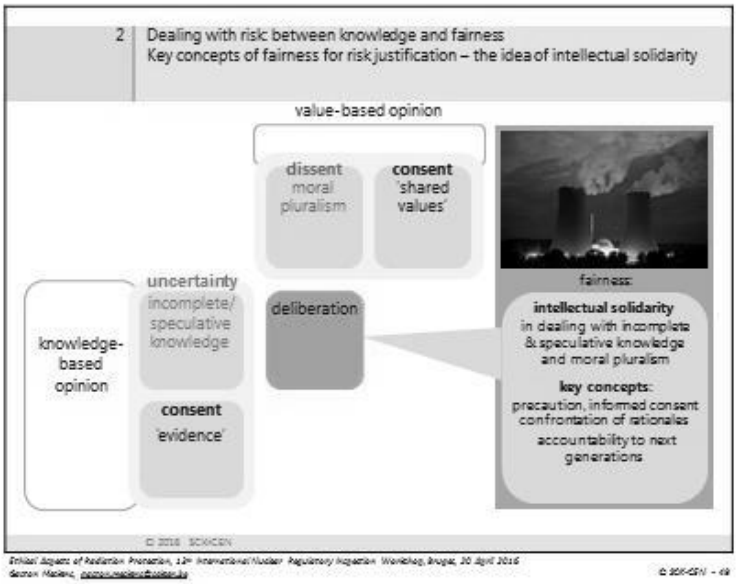
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'evidence'
deliberation
fairness:
intellectual solidarity
in dealing with incomplete & speculative knowledge and moral pluralism
key concepts:
precaution, informed consent
confrontation of rationales
accountability to next generations
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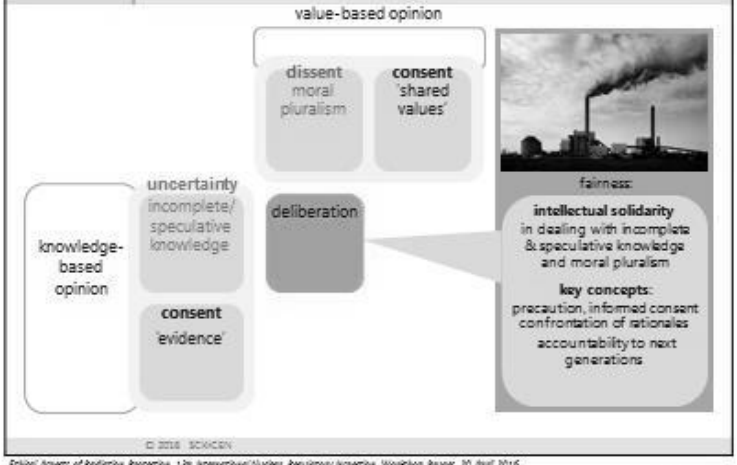
2 Dealing with risk: between knowledge and fairness
Key concepts of fairness for risk justification – the idea of intellectual solidarity



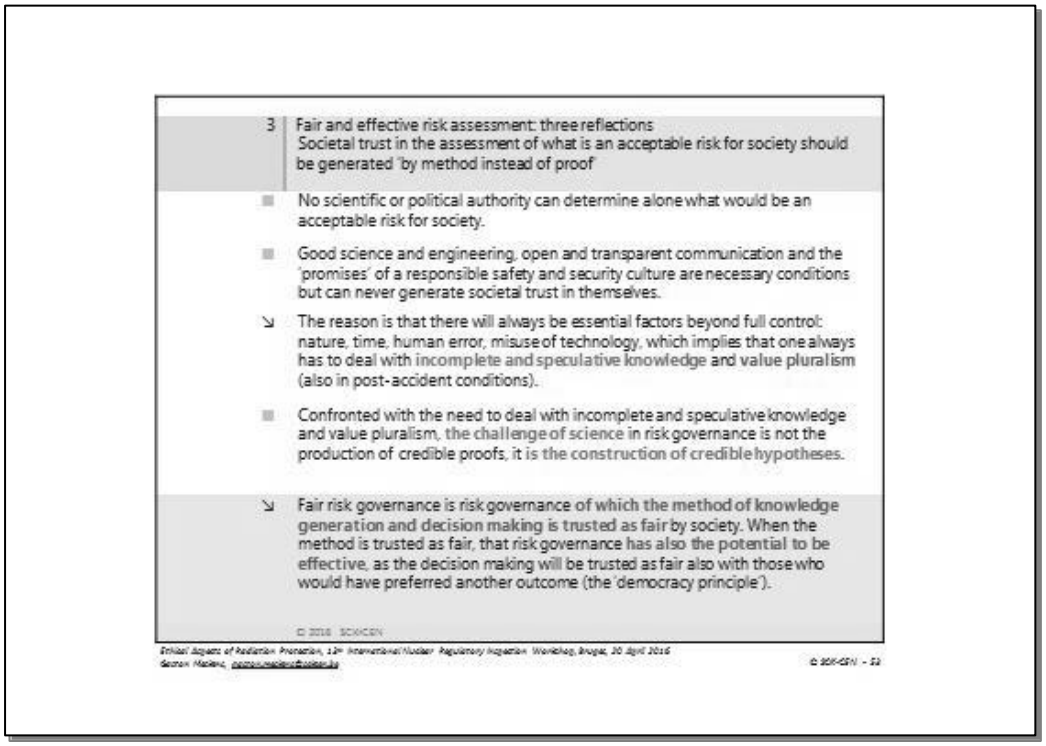
3 Fair and effective risk assessment: three reflections
The assessment of what is an acceptable risk for society is not a matter of science; it is a matter of justice

- A risk is not a mathematical formula; it is a potential harm that
  → you cannot completely know and
  → you cannot fully control
- Acceptable risk?
  People will accept a risk they cannot completely know and that they cannot fully control simply when they trust that its justification is marked by fairness.

Fairness: the possibility of self-determination ensured by 'the right to be responsible'

risk for society	the right to co-decide ↑	from a joint decision follows ↓
	the right to be responsible	→ **the right to be protected**
risk taken by an individual	↓ the freedom to hurt yourself	

- For any health risk that comes with technological, industrial or medical practices and that has a wider impact on society, 'the right to be responsible' equals 'the right to co-decide'. Enabling this right is a principle of justice


3 Fair and effective risk assessment: three reflections
Societal trust in the assessment of what is an acceptable risk for society should be generated 'by method instead of proof'
No scientific or political authority can determine alone what would be an acceptable risk for society.
Good science and engineering, open and transparent communication and the 'promises' of a responsible safety and security culture are necessary conditions but can never generate societal trust in themselves.
The reason is that there will always be essential factors beyond full control: nature, time, human error, misuse of technology, which implies that one always has to deal with incomplete and speculative knowledge and value pluralism (also in post-accident conditions).
Confronted with the need to deal with incomplete and speculative knowledge and value pluralism, the challenge of science in risk governance is not the production of credible proofs, it is the construction of credible hypotheses.
Fair risk governance is risk governance of which the method of knowledge generation and decision making is trusted as fair by society. When the method is trusted as fair, that risk governance has also the potential to be effective, as the decision making will be trusted as fair also with those who would have preferred another outcome (the 'democracy principle').
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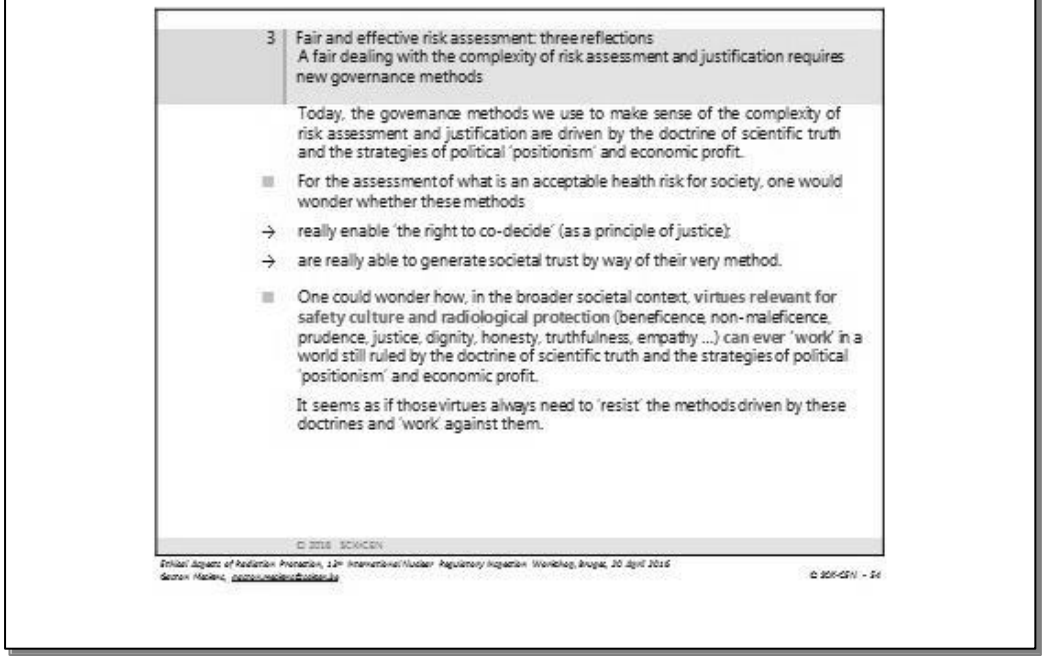
3 Fair and effective risk assessment: three reflections
A fair dealing with the complexity of risk assessment and justification requires new governance methods
Today, the governance methods we use to make sense of the complexity of risk assessment and justification are driven by the doctrine of scientific truth and the strategies of political 'positionism' and economic profit.
For the assessment of what is an acceptable health risk for society, one would wonder whether these methods
→ really enable 'the right to co-decide' (as a principle of justice);
→ are really able to generate societal trust by way of their very method.
One could wonder how, in the broader societal context, virtues relevant for safety culture and radiological protection (beneficence, non-maleficence, prudence, justice, dignity, honesty, truthfulness, empathy ...) can ever 'work' in a world still ruled by the doctrine of scientific truth and the strategies of political 'positionism' and economic profit.
It seems as if those virtues always need to 'resist' the methods driven by these doctrines and 'work' against them.
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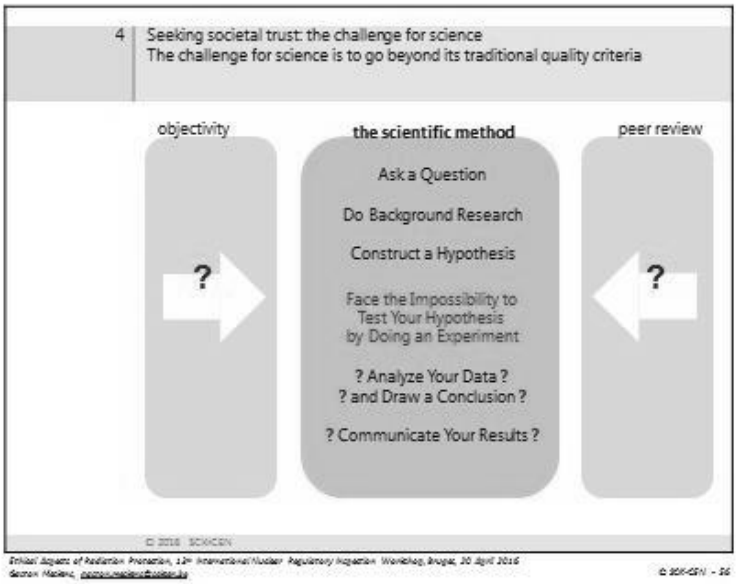
4
Seeking societal trust: the challenge for science
The challenge for science is to go beyond its traditional quality criteria
objectivity
the scientific method
peer review
Ask a Question
Do Background Research
Construct a Hypothesis
Face the Impossibility to Test Your Hypothesis by Doing an Experiment
? Analyze Your Data ?
? and Draw a Conclusion ?
? Communicate Your Results ?
?
?
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4
Seeking societal trust: the challenge for science
The Nuclear Expert at a press conference
disbelief
scepsis
belief
concern
fear
hope
facts
evidence
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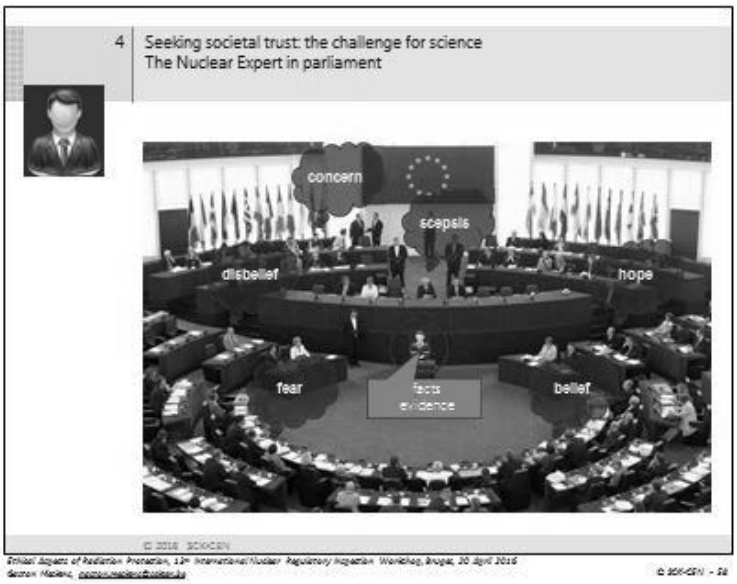
4
Seeking societal trust: the challenge for science
The Nuclear Expert in parliament
concern
scepsis
disbelief
hope
fear
facts
evidence
belief
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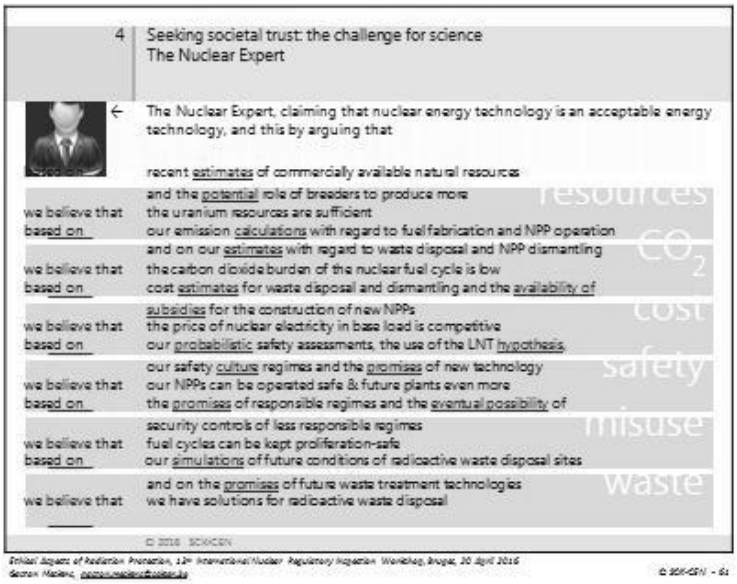
4
Seeking societal trust: the challenge for science
The Nuclear Expert
The Nuclear Expert, claiming that nuclear energy technology is an acceptable energy technology, and this by arguing that
based on
recent estimates of commercially available natural resources
we believe that
based on
and the potential role of breeders to produce more
the uranium resources are sufficient
our emission calculations with regard to fuel fabrication and NPP operation
we believe that
based on
and on our estimates with regard to waste disposal and NPP dismantling
the carbon dioxide burden of the nuclear fuel cycle is low
cost estimates for waste disposal and dismantling and the availability of
we believe that
based on
subsidies for the construction of new NPPs
the price of nuclear electricity in base load is competitive
our probabilistic safety assessments, the use of the LNT hypothesis
we believe that
based on
our safety culture regimes and the promises of new technology
our NPPs can be operated safe & future plants even more
the promises of responsible regimes and the eventual possibility of
we believe that
based on
security controls of less responsible regimes
fuel cycles can be kept proliferation-safe
our simulations of future conditions of radioactive waste disposal sites
we believe that
and on the promises of future waste treatment technologies
we have solutions for radioactive waste disposal
resources
CO_2
cost
safety
misuse
waste
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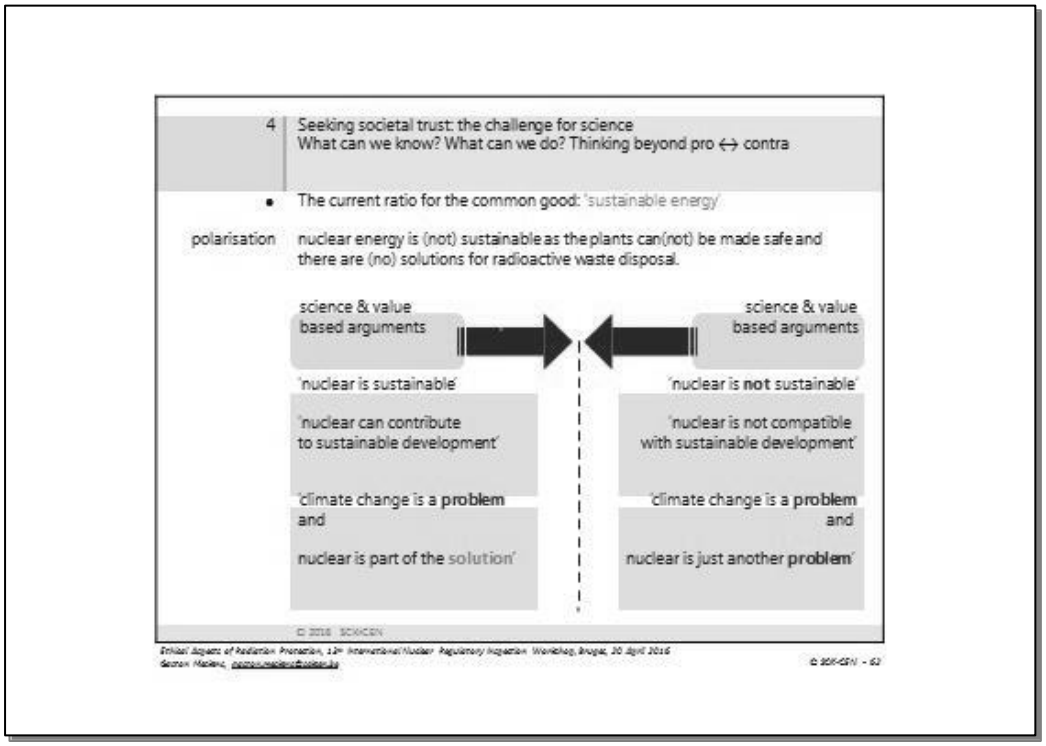
4
Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
The current ratio for the common good: 'sustainable energy'
polarisation
nuclear energy is (not) sustainable as the plants can(not) be made safe and there are (no) solutions for radioactive waste disposal.
science & value based arguments
science & value based arguments
'nuclear is sustainable'
'nuclear can contribute to sustainable development'
'climate change is a problem and
nuclear is part of the solution'
'nuclear is not sustainable'
'nuclear is not compatible with sustainable development'
'climate change is a problem and
nuclear is just another problem'
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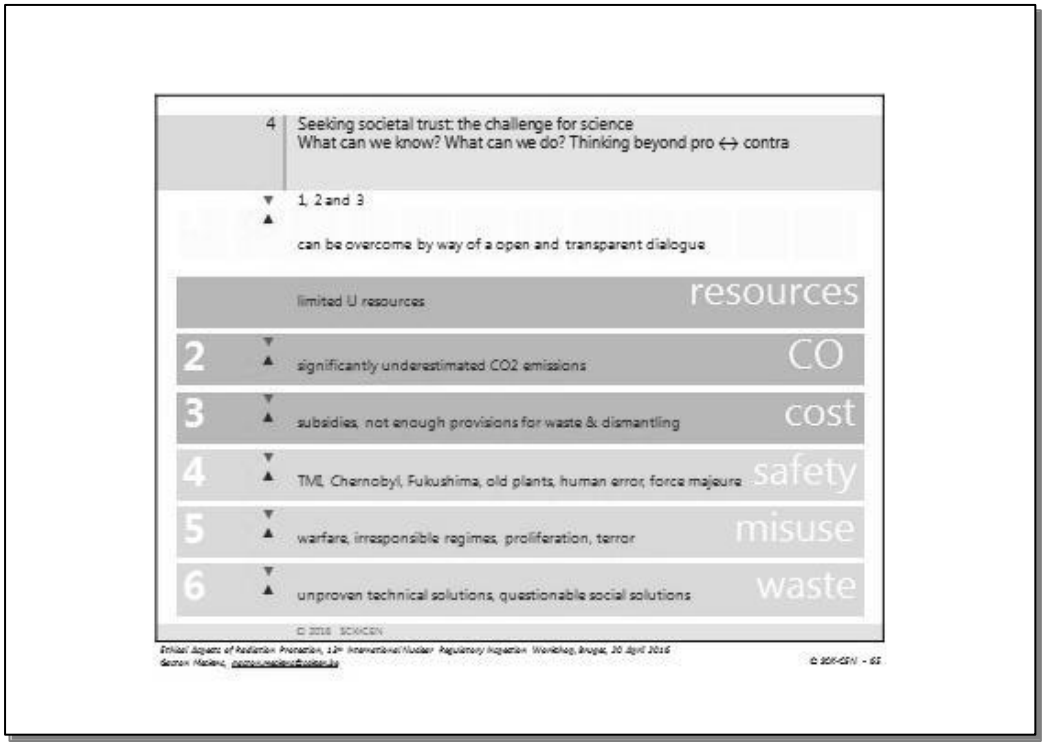
4
Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
1, 2 and 3
can be overcome by way of a open and transparent dialogue
limited U resources
resources
2
significantly underestimated CO2 emissions
CO
3
subsidies, not enough provisions for waste & dismantling
cost
4
TMI, Chernobyl, Fukushima, old plants, human error, force majeure
safety
5
warfare, irresponsible regimes, proliferation, terror
misuse
6
unproven technical solutions, questionable social solutions
waste
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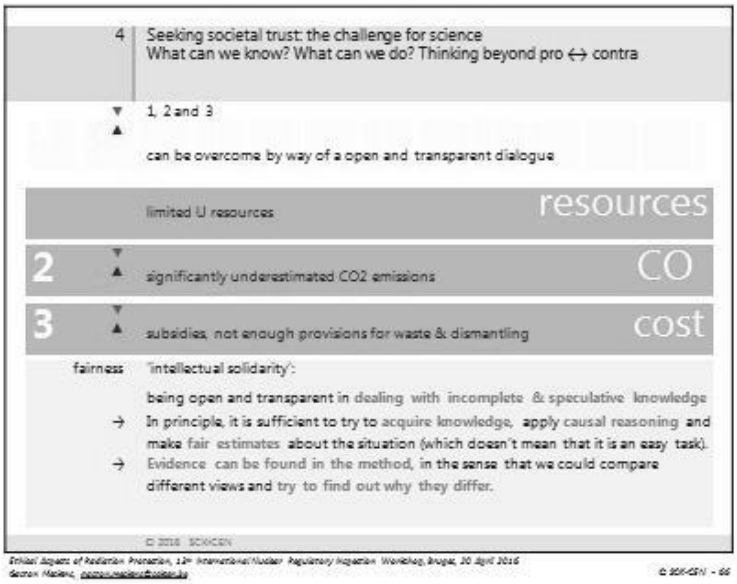
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Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
1, 2 and 3
can be overcome by way of a open and transparant dialogue
limited U resources
resources
2
significantly underestimated CO2 emissions
CO
3
subsidies, not enough provisions for waste & dismantling
cost
fairness
'intellectual solidarity':
being open and transparant in dealing with incomplete & speculative knowledge
→ In principle, it is sufficient to try to acquire knowledge, apply causal reasoning and make fair estimates about the situation (which doesn't mean that it is an easy task).
→ Evidence can be found in the method, in the sense that we could compare different views and try to find out why they differ.
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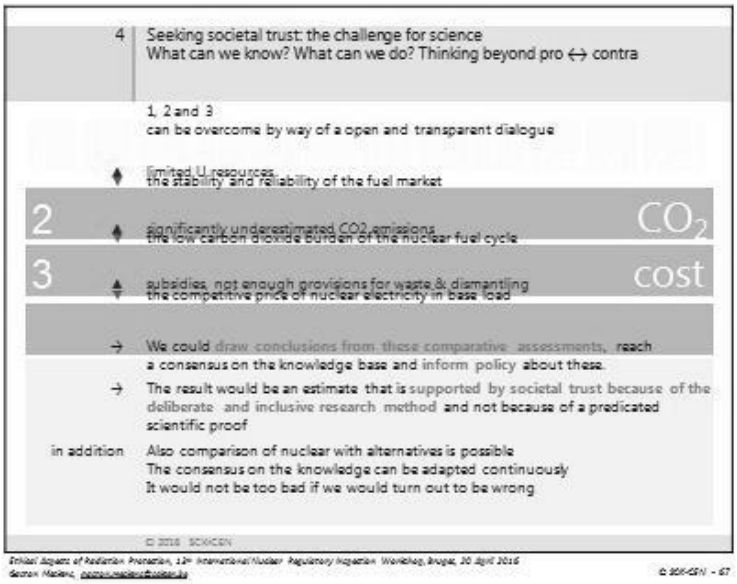
4
Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
1, 2 and 3
can be overcome by way of a open and transparant dialogue
limited U resources
the stability and reliability of the fuel market
2
significantly underestimated CO2 emissions
the low carbon dioxide burden of the nuclear fuel cycle
CO2
3
subsidies, not enough provisions for waste & dismantling
the competitive price of nuclear electricity in base load
cost
→ We could draw conclusions from these comparative assessments, reach a consensus on the knowledge base and inform policy about these.
→ The result would be an estimate that is supported by societal trust because of the deliberate and inclusive research method and not because of a predicated scientific proof
in addition
Also comparison of nuclear with alternatives is possible
The consensus on the knowledge can be adapted continuously
It would not be too bad if we would turn out to be wrong
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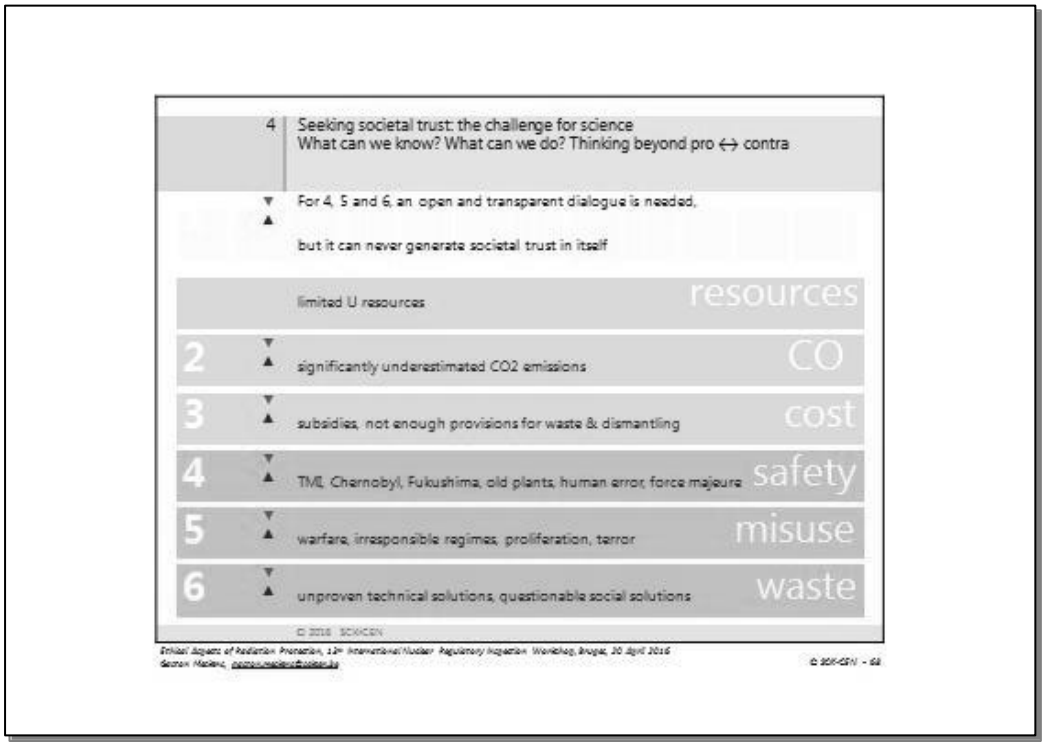
4
Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
For 4, 5 and 6, an open and transparent dialogue is needed,
but it can never generate societal trust in itself
limited U resources
resources
2
significantly underestimated CO2 emissions
CO
3
subsidies, not enough provisions for waste & dismantling
cost
4
TMI, Chernobyl, Fukushima, old plants, human error, force majeure
safety
5
warfare, irresponsible regimes, proliferation, terror
misuse
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unproven technical solutions, questionable social solutions
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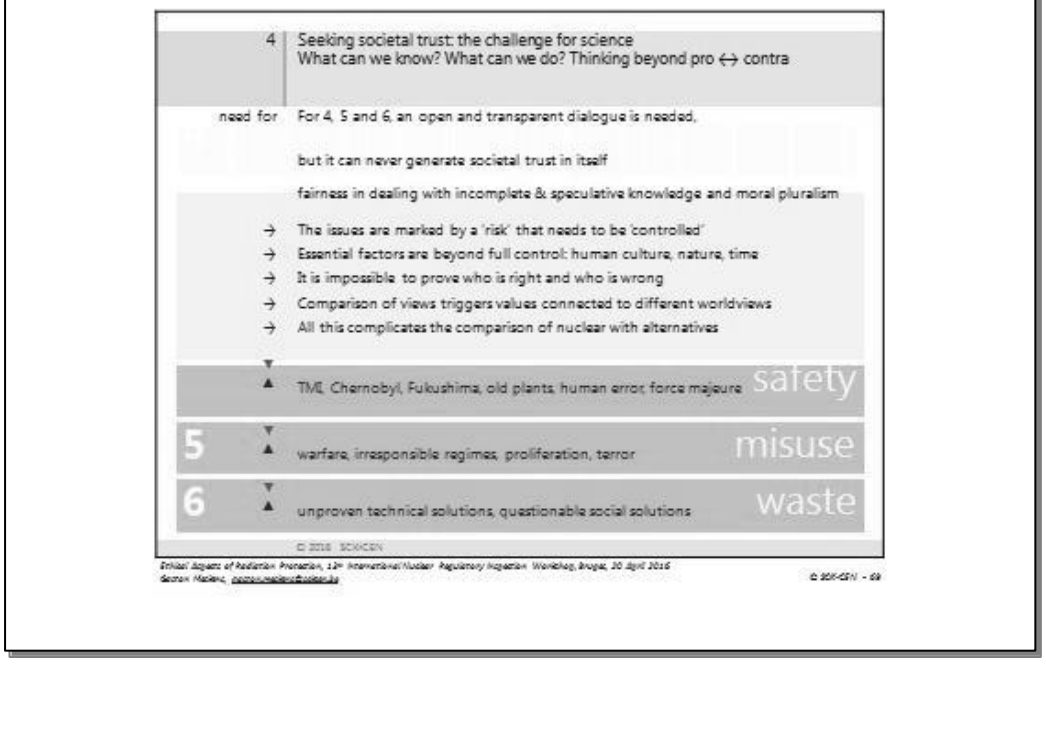
4
Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra
need for
For 4, 5 and 6, an open and transparent dialogue is needed,
but it can never generate societal trust in itself
fairness in dealing with incomplete & speculative knowledge and moral pluralism
→ The issues are marked by a 'risk' that needs to be 'controlled'
→ Essential factors are beyond full control: human culture, nature, time
→ It is impossible to prove who is right and who is wrong
→ Comparison of views triggers values connected to different worldviews
→ All this complicates the comparison of nuclear with alternatives
TMI, Chernobyl, Fukushima, old plants, human error, force majeure
safety
5
warfare, irresponsible regimes, proliferation, terror
misuse
6
unproven technical solutions, questionable social solutions
waste
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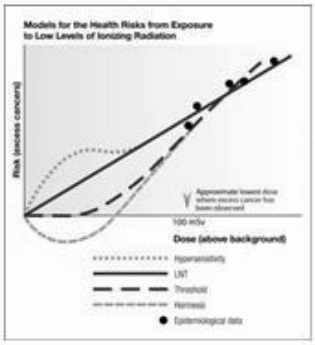
4 Seeking societal trust: the challenge for science
What can we know? What can we do? Thinking beyond pro ↔ contra

When looking for evidence, wanting to explain the facts...
one has to admit that, for the listed issues

evidence can only be found in the method	the stability and reliability of the fuel market limited U resources	resources
	the low carbon dioxide burden of the nuclear fuel cycle significantly underestimated CO2 emissions	CO_2
	the competitive price of nuclear electricity in base load subsidies, not enough provisions for waste & dismantling	cost
there is no evidence	good NPP safety records of modern & 'safer' future plants TMI, Chernobyl, Fukushima, old plants, human error, force majeure	safety
	fuel cycles can be made proliferation-safe warfare, irresponsible regimes, proliferation, terror	misuse
	available solutions for radioactive waste disposal unproven technical solutions, questionable social solutions	waste

4 Seeking societal trust: the challenge for science
Post-nuclear accident situations in need of intellectual solidarity – Fukushima

The issue of the so-called '100 mSv threshold' is an issue in urgent need of formal public intellectual confrontation between all responsible and concerned parties.



There is major support for the vision that no such threshold exists and that one needs to maintain the linear relation between radiation dose and risk (LNT) based on the precautionary principle.

Who shall take the initiative to launch and organise this confrontation?

source:
Canadian Nuclear Safety Commission
http://nuclearsafety.gc.ca/eng/resources/health/linear-non-threshold-model/index.cfm

4 Seeking societal trust: the challenge for science
Our current knowledge on low radiation dose effects

1. We have evidence of health effects below 100 mSv, which means that we can say for sure that the 100 mSv threshold hypothesis is false;
2. Accumulating evidence tends to favour a proportionate relationship at low doses between radiation dose and cancer risk, but there is no definitive conclusion.

   This insight supports the idea that the Linear Non-Threshold hypothesis that was first introduced based on the precautionary principle is the right hypothesis to maintain;
3. We have scientific discussions going on with regard to possible concrete health effects of low doses in concrete situations (such as the scientific discussion on the INWORKS study and the scientific discussion on possible thyroid cancer with children in Fukushima).

   As long as serious scientific discussions are taking place, we have to acknowledge that there is no definite scientific conclusion on the actual manifestation and predictability of these concrete health effects in these concrete situations.

4 Seeking societal trust: the challenge for science
Post-nuclear accident situations in need of intellectual solidarity – Chernobyl

[World Press photo 2006]

http://www.greenpeace.org/International/press/releases/greenpeace-wins-world-press-ph


4
Seeking societal trust: the challenge for science
The challenge for science is the construction of credible hypotheses
Confronted with the need to deal with incomplete and speculative knowledge and value pluralism, the challenge of science in risk governance is not the production of credible proofs, it is the construction of credible hypotheses.
↘ The challenge is there as well
with respect to the issue of justification of risk-inherent energy technologies in energy governance
as with respect to issues of protection, restoration and compensation in crisis situations.
In the general interest of rendering hypotheses with credibility and following the principle of 'trust by method instead of proof' in risk governance,
science has no choice but to involve society in general and the (potentially) affected in particular in producing its hypotheses.
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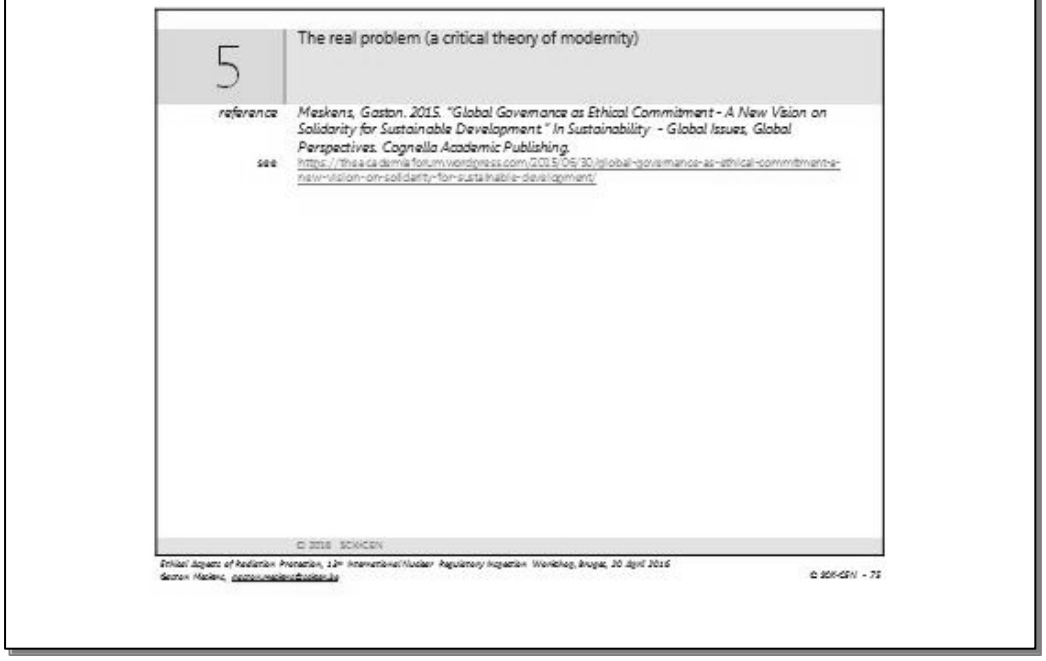
5
The real problem (a critical theory of modernity)
reference
Meskens, Gaston. 2015. "Global Governance as Ethical Commitment - A New Vision on Solidarity for Sustainable Development." In Sustainability - Global Issues, Global Perspectives. Cognella Academic Publishing.
see
https://theacademicforum.wordpress.com/2015/09/30/global-governance-as-ethical-commitment-a-new-vision-on-solidarity-for-sustainable-development/
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5 The real problem (a critical theory of modernity)
The social problems we face today are ultimately complex

5 The real problem (a critical theory of modernity)
Characteristics of a complex social problem

1.	diversified impact	Individuals and/or groups are affected by the problem in diverse ways (diverse positive or negative, positive versus negative, variable in time, delayed, ...).
2.	interdependence	The problem is caused and/or influenced by multiple factors (social, economic, technical, natural) and relates itself to other problems. Interdependence can change in time. The context of concern becomes global.
3.	organisational complexity	Due to the character of diversified impact and interdependence, problems need to be tackled 'together' in a coherent and 'holistic' approach.
4.	relative responsibilities	Due to the character of diversified impact and interdependence and the organisational complexity, responsibility cannot be assigned to one specific actor. Responsibilities are relative in two ways: **(1)mutual**: the possibility for one actor to take responsibility can depend on the responsibility of another actor; **(2)collective**: our collective responsibility is relative in the sense that we need to hand over control to a next 'collective' (a new government, the next generations).


5 The real problem (a critical theory of modernity)
Characteristics of a complex social problem
1. diversified impact
2. interdependence
3. organisational complexity
4. relative responsibilities
5. knowledge problem
Analysing and 'controlling' the problem (diversified impact, interdependence and the organisational complexity) is complicated by uncertainty due to incomplete, speculative or contradictory knowledge.
6. evaluation problem
Evaluation of diversified impact, interdependence and the organisational complexity and of subsequent relative responsibilities is complicated due to
(1)the knowledge problem;
(2) different visions based on different worldviews;
(3)the fact that metavalues (equality, sustainability) cannot be unambiguously translated to practical responsibilities.
7. authority problem
The authority of actors who evaluate and judge the problem and rationalise their interests and responsibilities is relative, which gives other actors the opportunity to question the credibility of the judgement and the legitimacy of the authority.
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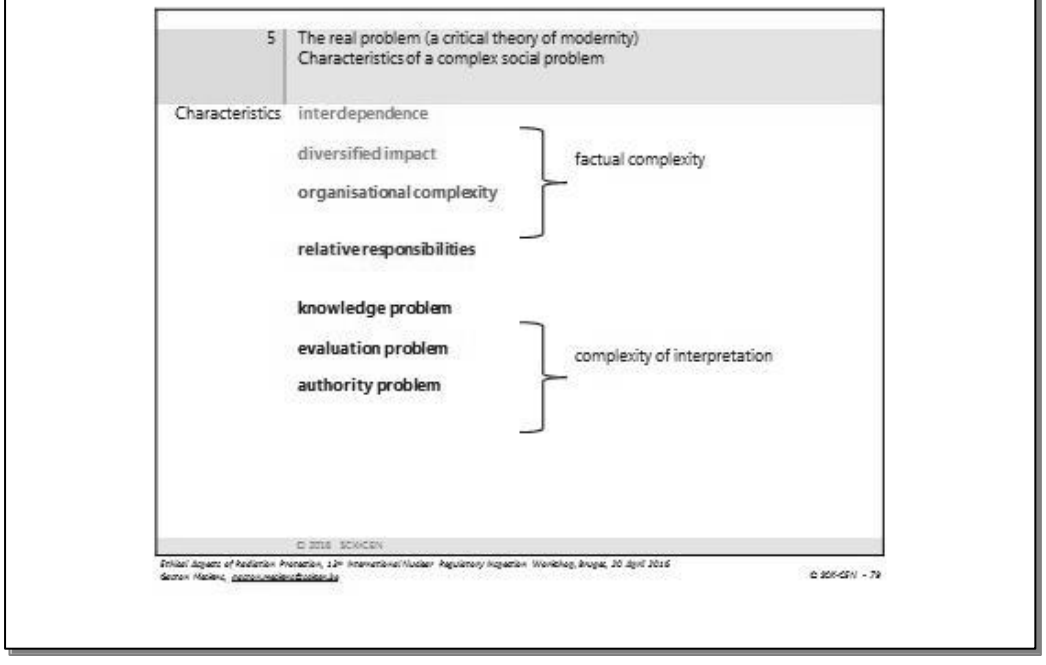
5 The real problem (a critical theory of modernity)
Characteristics of a complex social problem
Characteristics
interdependence
diversified impact
organisational complexity
factual complexity
relative responsibilities
knowledge problem
evaluation problem
authority problem
complexity of interpretation
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5 The real problem (a critical theory of modernity)
The real problem: obsolete but strategically maintained governing methods that hinder the possibility of intellectual solidarity

- Today, we have four so-called 'governing methods' concerned with the organisation of our society: representative democracy, the liberal market, science and education.

  Representative democracy, the liberal market and science are 'modern' because they can be seen as results of 'modernity as an emancipation process'

- Typical for modernity is the fact that these governing methods do not question the legitimacy of their authority, as what they do is tested by some form of 'internal control' (their 'internal logic'):

  'representative democracy'
  as the search for compromise through organised conflict of opinion between parties representing specific ideologies, and enclosed within the nation state,

  'the free and competitive market'
  as the self-corrective system of competition that automatically annihilates unsuccesful commercial projects and that serves as the motor for innovation,

  'objective science'
  in its reliance upon the scientific method and self-control through peer review.

5 The real problem (a critical theory of modernity)
The real problem: obsolete but strategically maintained governing methods that hinder the possibility of intellectual solidarity

Taking this complexity serious the idea is that the trad[illegible] methods of international politics, representative democracy, the market and science are no longer able to grasp the complexity of [illegible] social problems

6 | An ethics of care for our modern coexistence
Ethics: judging in absence of evidence

Ethics: As moral agents

being concerned with questions and concepts of 'what ought to be'
↘ right and wrong conduct
↘ rights and responsibilities

in absence of 'evidence' that would facilitate straightforward judgement, consensus and consequent action.

↘ 'what ought to be' a good society, a fair society
to act responsibly
being good, leading a good life

↘ missing evidence a convincing scientific proof
a democratically constituted law

a universal principle to guide moral evaluation or action

6 | An ethics of care for our modern coexistence
Normative ethical theories

→ seeking reference in 'universally applicable principles'
(Kantian) deontology, consequentialism (utilitarianism)

danger risk of overlooking the particular of specific situations

→ seeking reference in evaluating particular situations
'particularism'

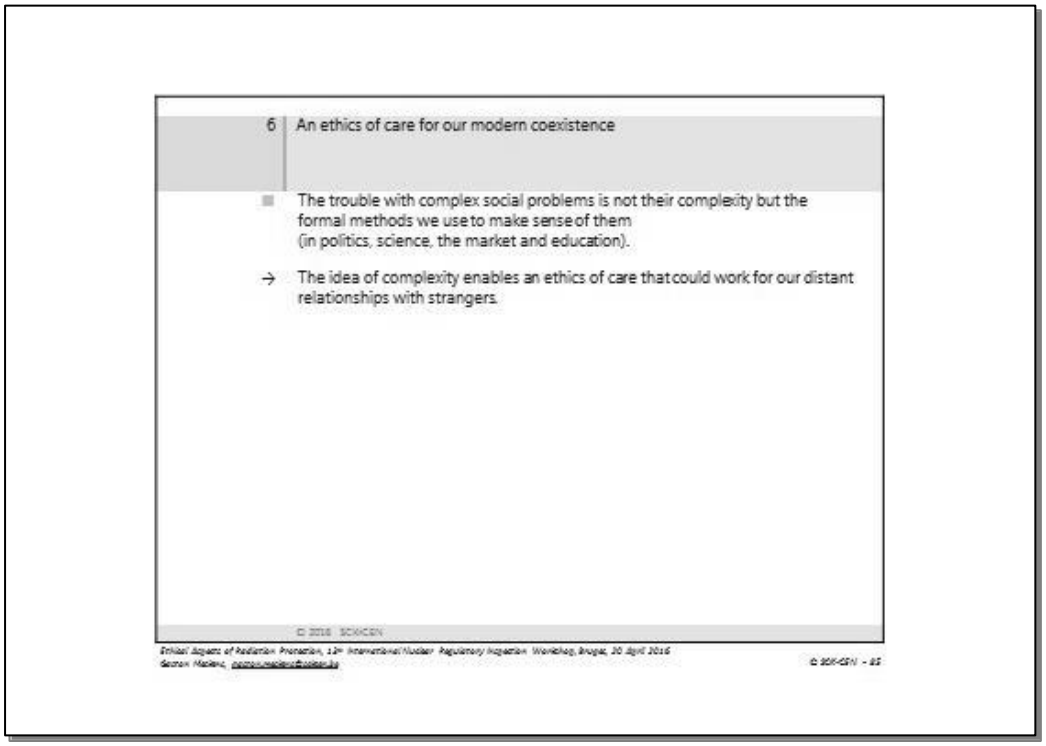
danger risk of self-protective relativism (cultural, social, political)

→ seeking reference in virtues ('being good')
virtue ethics (Aristoteles)

problem virtues do not (always) unambiguously translate into concrete action

→ seeking reference in the care for human relationships
ethics of care

problem works for close relations with known people; unclear how it could work for distant relations with strangers


6
An ethics of care for our modern coexistence
The trouble with complex social problems is not their complexity but the formal methods we use to make sense of them (in politics, science, the market and education).
→ The idea of complexity enables an ethics of care that could work for our distant relationships with strangers.
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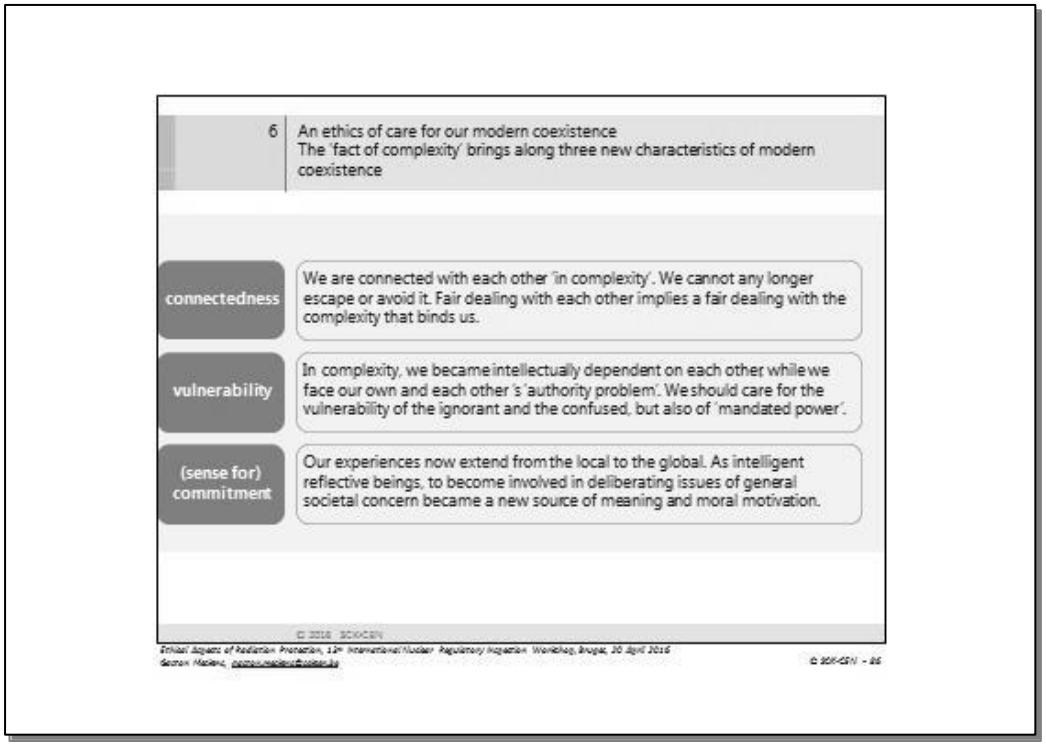
6
An ethics of care for our modern coexistence
The 'fact of complexity' brings along three new characteristics of modern coexistence
connectedness
We are connected with each other 'in complexity'. We cannot any longer escape or avoid it. Fair dealing with each other implies a fair dealing with the complexity that binds us.
vulnerability
In complexity, we became intellectually dependent on each other while we face our own and each other's 'authority problem'. We should care for the vulnerability of the ignorant and the confused, but also of 'mandated power'.
(sense for) commitment
Our experiences now extend from the local to the global. As intelligent reflective beings, to become involved in deliberating issues of general societal concern became a new source of meaning and moral motivation.
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6 An ethics of care for our modern coexistence
The 'fact of complexity' brings along three new characteristics of modern coexistence

connectedness

vulnerability

(sense for) commitment

6 An ethics of care for our modern coexistence
The new characteristics of coexistence imply the need to be intellectual solidary in the way we make sense of complexity for social organisation

	intellectual solidarity as an ethical commitment
connectedness	the joint preparedness to enable and participate in intellectual confrontation with respect to the ratids we use to defend our interests, hopes, hypotheses, believes and concerns to relativise our uncertainties and doubts
vulnerability	the joint preparedness to acknowledge each other 's authority problem & the vulnerability of the next generations
(sense for) commitment	the joint preparedness to enable and support 'intellectual emancipation' of others with the aim to provide every human being with the possibility to develop a (self-)critical sense and to be a (self-)critical actor in society

↘ Today, we don't live in a world inspired by intellectual solidarity, but we have the capacity to foster it and to put it in practice.

6 An ethics of care for our modern coexistence
A sense for intellectual solidarity implies one common virtue for everyone concerned

→ with respect to **reflexivity as an ethical attitude (an ethical 'experience')** the own position, interests, hopes, hypotheses, believes and concerns, and this in any formal role or social position (as scientist, engineer, politician, manager, citizen, civil society representative, activist ...).

Adopting this attitude requires reflexivity as an intellectual skill → **seeing the bigger picture and yourself in it** ← with your interests, hopes, hypotheses, believes and concerns

6 An ethics of care for our modern coexistence
A sense for intellectual solidarity implies one common virtue for everyone concerned

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Adopting this attitude requires reflexivity as an intellectual skill

with your interests, hopes, hypotheses, believes and concerns

Caspar David Friedrich
"Wanderer above the Sea of Fog"
1818

6 An ethics of care for our modern coexistence
A sense for intellectual solidarity implies one common virtue for everyone concerned

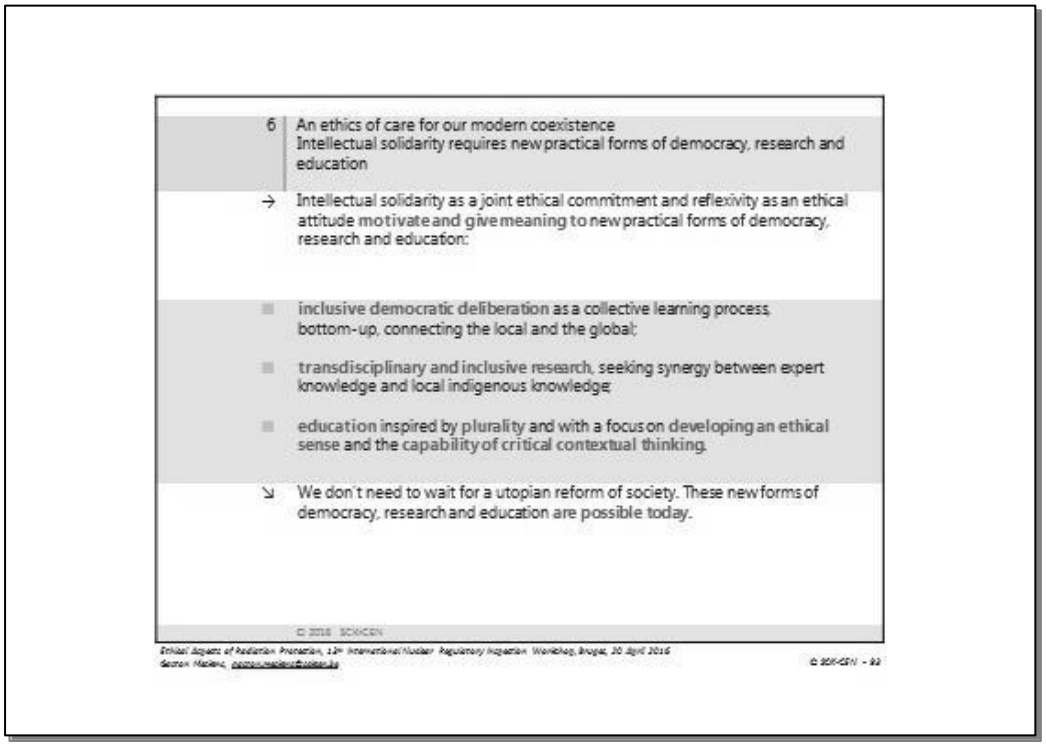
→ with respect to: reflexivity as an ethical attitude (an ethical 'experience')
the own position, interests, hopes, hypotheses, believes and concerns, and this in any formal role or social position (as scientist, engineer, politician, manager, citizen, civil society representative, activist, ...).

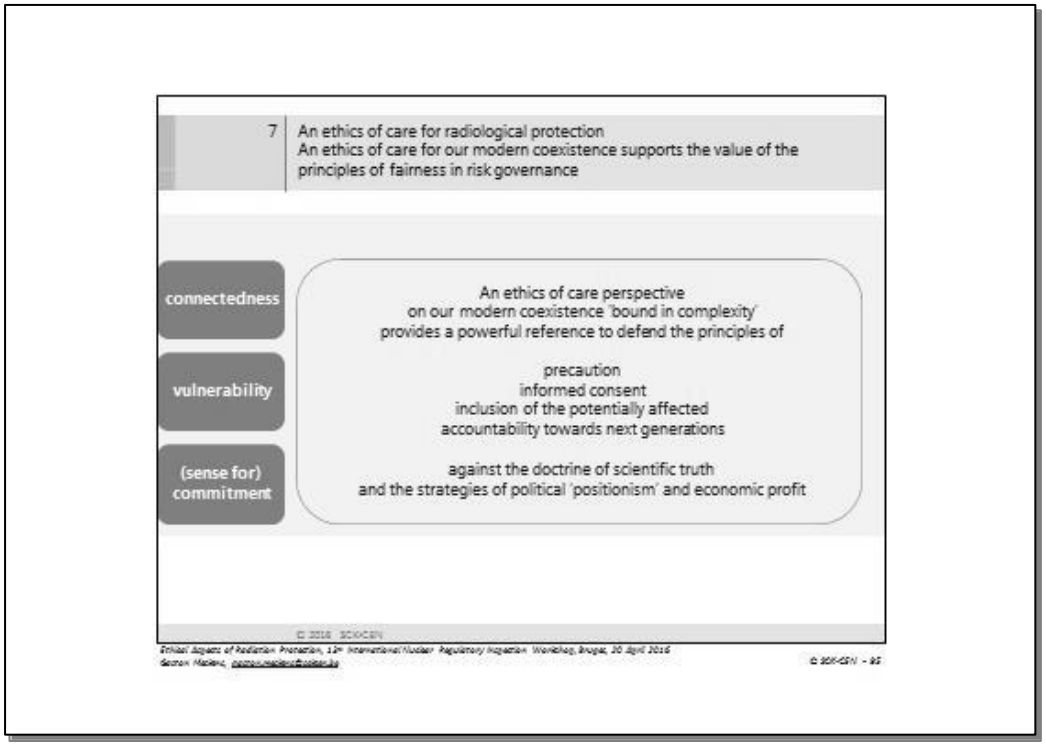
seeing
the bigger picture
and yourself in it

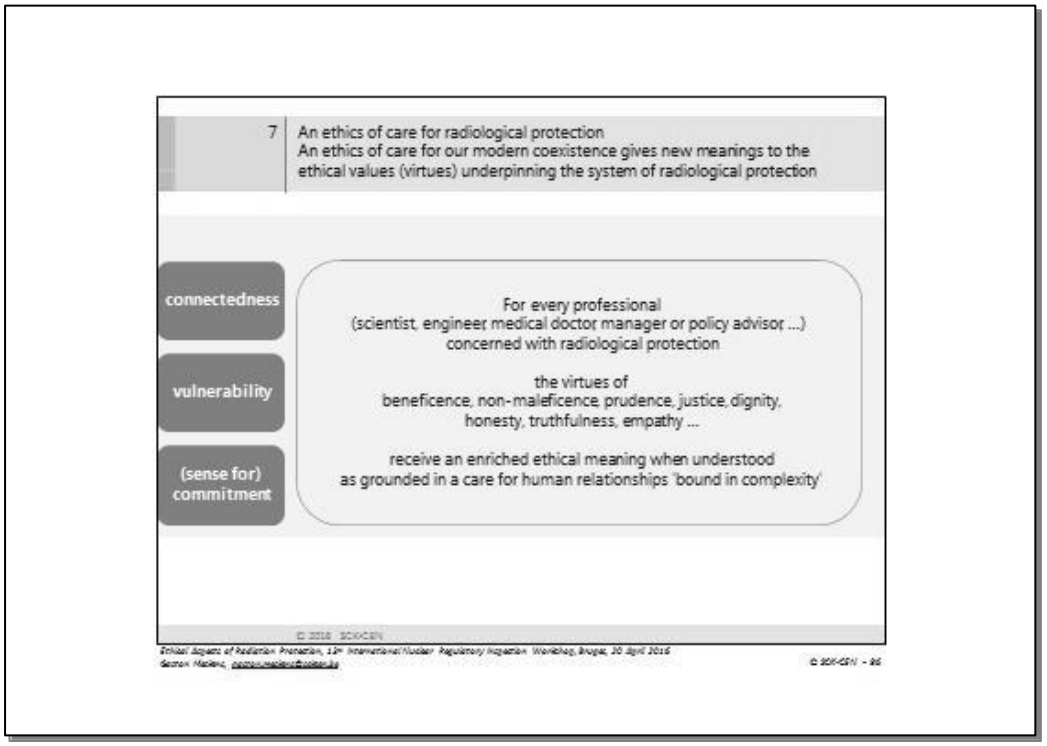
man looking for food in a dump (foto exhibit at the UN World Summit on Sustainable Development, Rio de Janeiro, 2012)

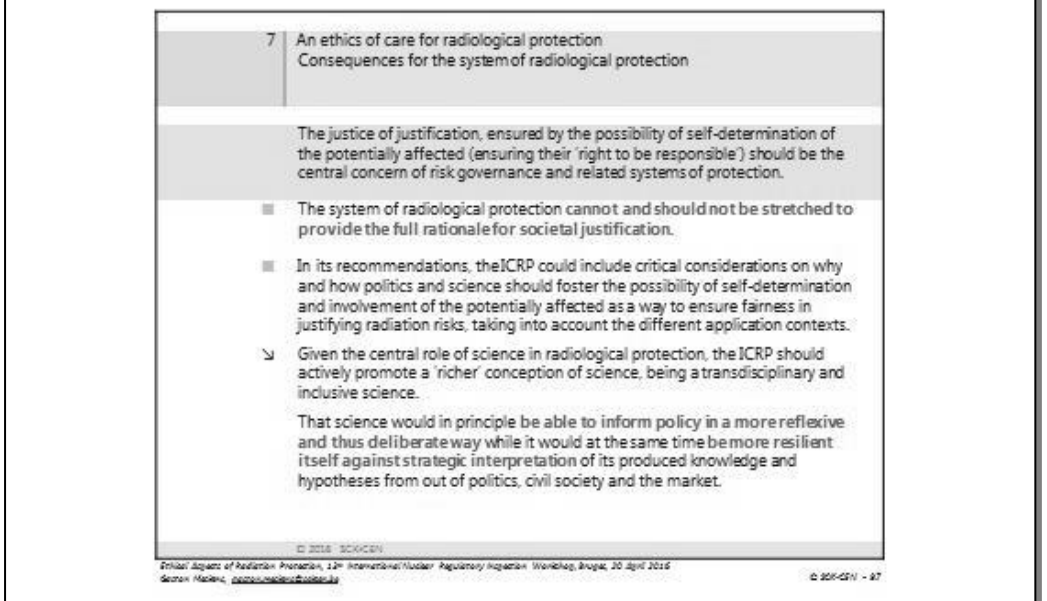
6 An ethics of care for our modern coexistence
Trust by method as overall quality criterion

- An 'ethics of care' to deal with the complexity of social organisation has societal trust as its overall quality criterion.
- ↘ Not the trust that the outcome of deliberation will be the 'correct one', but that this method is the best we can use given the complexity of the problem.
- The 'democracy principle':
  being able to accept an unpreferred outcome of decision making based on the knowledge that the method of decision making was 'fair'.
- What method of decision making has the potential to be judged as fair by everyone in consensus?
- ↘ traditional criteria: transparency, openness, inclusiveness
- ↘ in order for the method to be able to generate trust with its intended character of fairness, it should be 'reflexive' in itself.
  In practice, this means that every decision making process should be accompagnied by a deliberation on the form of that process itself.

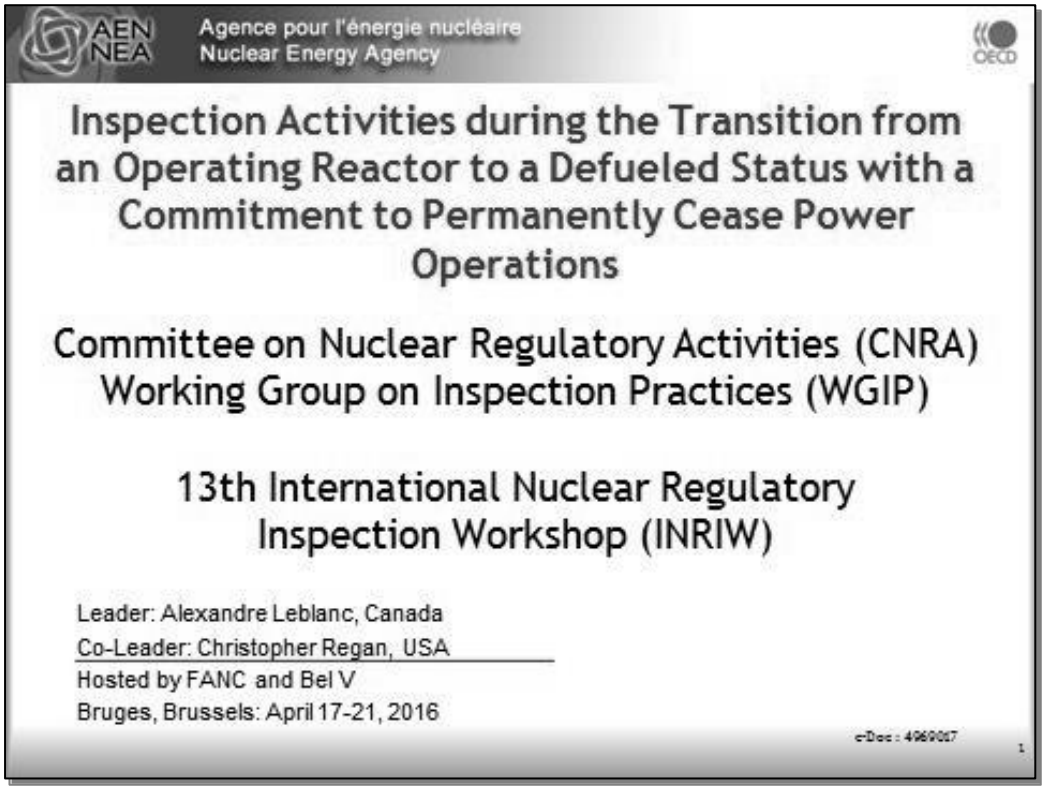

6
An ethics of care for our modern coexistence
Intellectual solidarity requires new practical forms of democracy, research and education
→
Intellectual solidarity as a joint ethical commitment and reflexivity as an ethical attitude motivate and give meaning to new practical forms of democracy, research and education:
inclusive democratic deliberation as a collective learning process, bottom-up, connecting the local and the global;
transdisciplinary and inclusive research, seeking synergy between expert knowledge and local indigenous knowledge;
education inspired by plurality and with a focus on developing an ethical sense and the capability of critical contextual thinking.
↘
We don't need to wait for a utopian reform of society. These new forms of democracy, research and education are possible today.

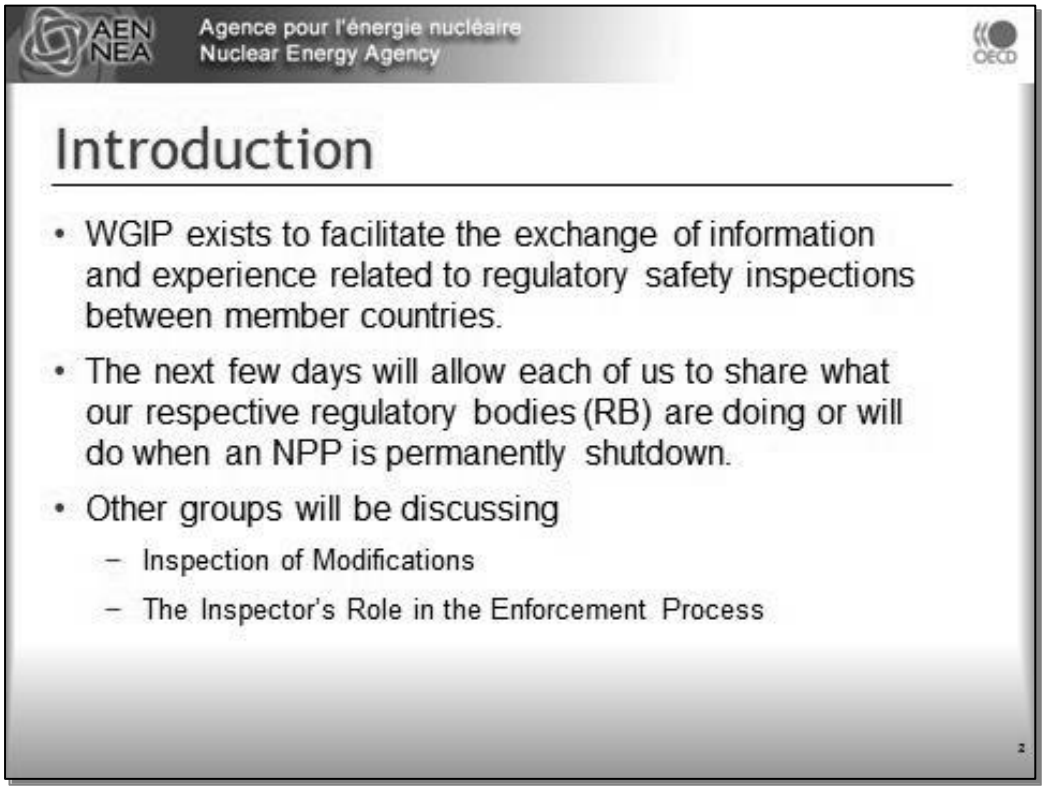

7
An ethics of care for radiological protection
An ethics of care for our modern coexistence supports the value of the principles of fairness in risk governance
connectedness
vulnerability
(sense for) commitment
An ethics of care perspective
on our modern coexistence 'bound in complexity'
provides a powerful reference to defend the principles of
precaution
informed consent
inclusion of the potentially affected
accountability towards next generations
against the doctrine of scientific truth
and the strategies of political 'positionism' and economic profit

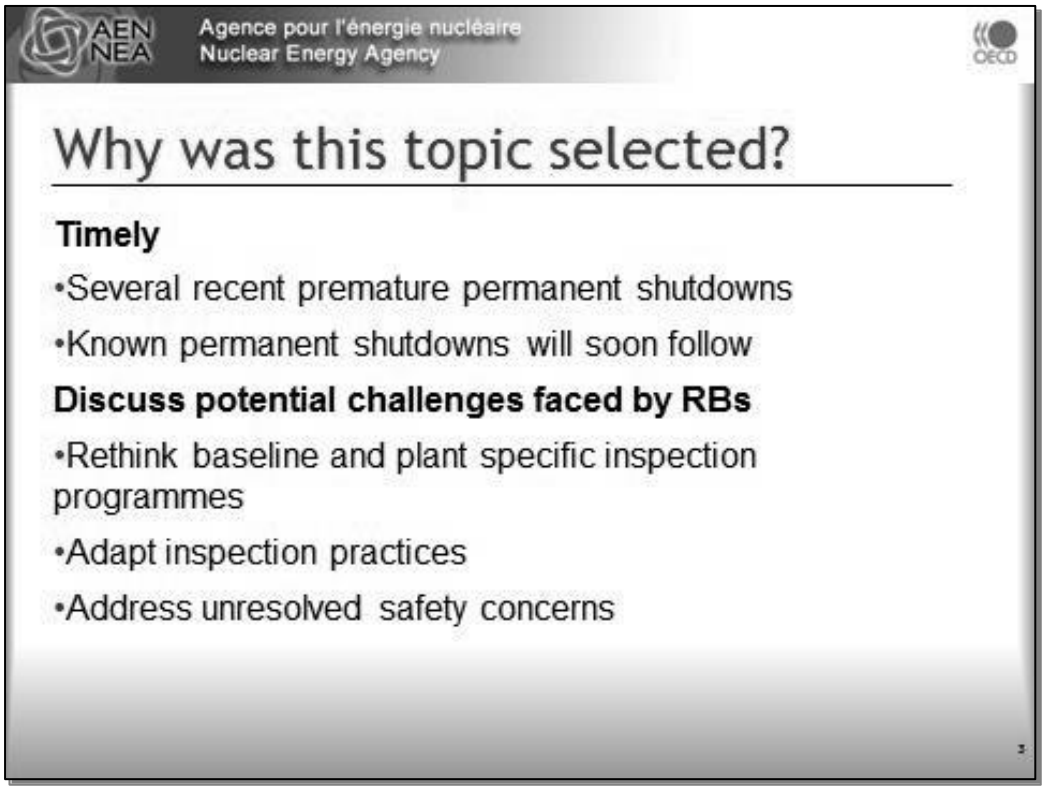

7
An ethics of care for radiological protection
An ethics of care for our modern coexistence gives new meanings to the ethical values (virtues) underpinning the system of radiological protection
connectedness
vulnerability
(sense for) commitment
For every professional
(scientist, engineer, medical doctor, manager or policy advisor ...)
concerned with radiological protection
the virtues of
beneficence, non-maleficence, prudence, justice, dignity, honesty, truthfulness, empathy ...
receive an enriched ethical meaning when understood
as grounded in a care for human relationships 'bound in complexity'

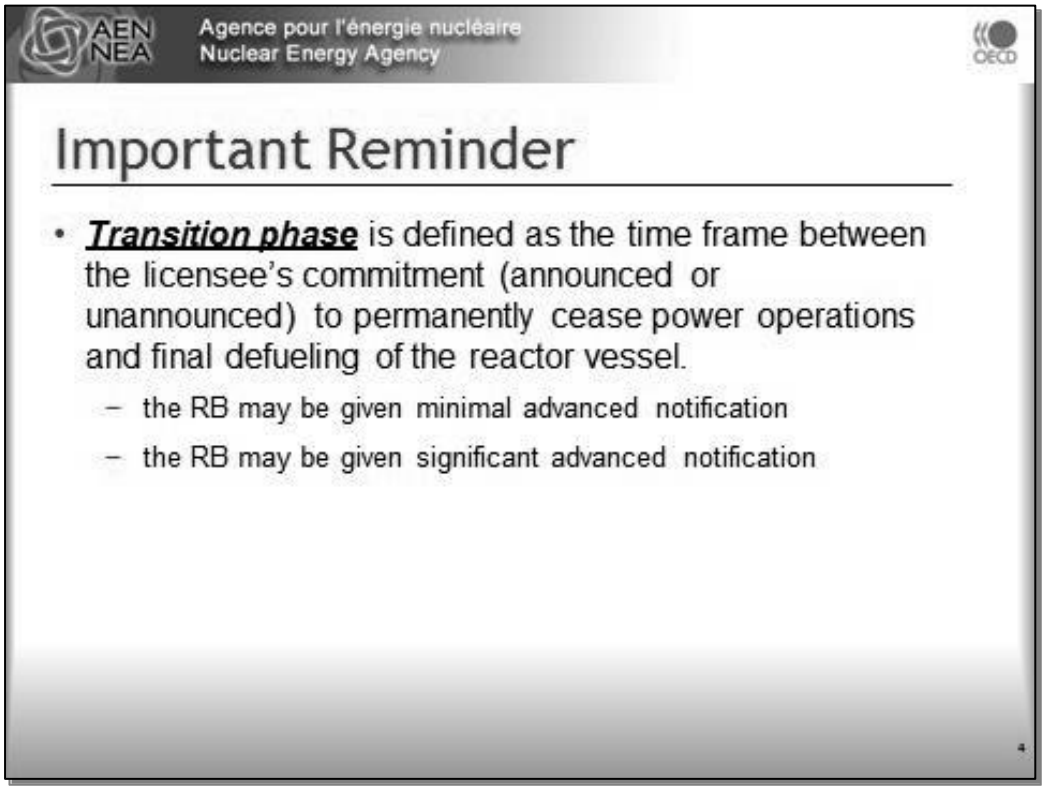

7
An ethics of care for radiological protection
Consequences for the system of radiological protection
The justice of justification, ensured by the possibility of self-determination of the potentially affected (ensuring their 'right to be responsible') should be the central concern of risk governance and related systems of protection.
The system of radiological protection cannot and should not be stretched to provide the full rationale for societal justification.
In its recommendations, the ICRP could include critical considerations on why and how politics and science should foster the possibility of self-determination and involvement of the potentially affected as a way to ensure fairness in justifying radiation risks, taking into account the different application contexts.
Given the central role of science in radiological protection, the ICRP should actively promote a 'richer' conception of science, being a transdisciplinary and inclusive science.
That science would in principle be able to inform policy in a more reflexive and thus deliberate way while it would at the same time be more resilient itself against strategic interpretation of its produced knowledge and hypotheses from out of politics, civil society and the market.

13. TOPIC A: OPENING PRESENTATION




Agence pour l'énergie nucléaire
Nuclear Energy Agency
Introduction
• WGIP exists to facilitate the exchange of information and experience related to regulatory safety inspections between member countries.
• The next few days will allow each of us to share what our respective regulatory bodies (RB) are doing or will do when an NPP is permanently shutdown.
• Other groups will be discussing
– Inspection of Modifications
– The Inspector's Role in the Enforcement Process
2


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Why was this topic selected?
Timely
•Several recent premature permanent shutdowns
•Known permanent shutdowns will soon follow
Discuss potential challenges faced by RBs
•Rethink baseline and plant specific inspection programmes
•Adapt inspection practices
•Address unresolved safety concerns
3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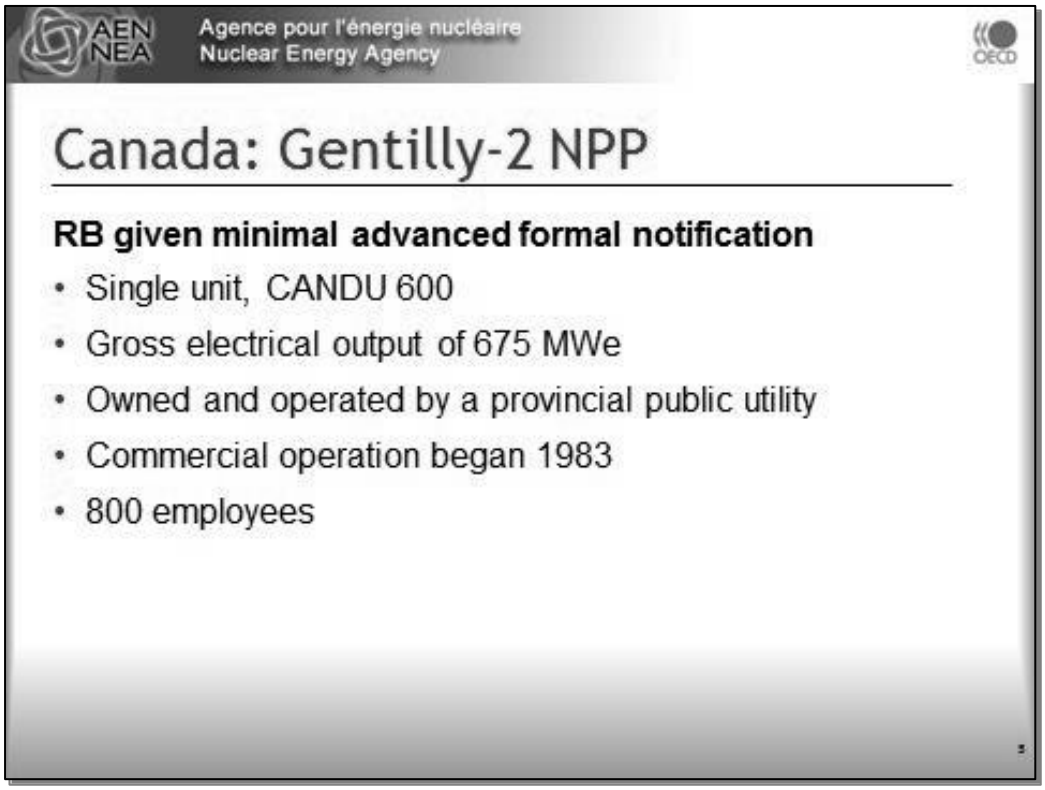
Nuclear Energy Agency
Important Reminder
• Transition phase is defined as the time frame between the licensee's commitment (announced or unannounced) to permanently cease power operations and final defueling of the reactor vessel.
– the RB may be given minimal advanced notification
– the RB may be given significant advanced notification


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Canada: Gentilly-2 NPP
RB given minimal advanced formal notification
• Single unit, CANDU 600
• Gross electrical output of 675 MWe
• Owned and operated by a provincial public utility
• Commercial operation began 1983
• 800 employees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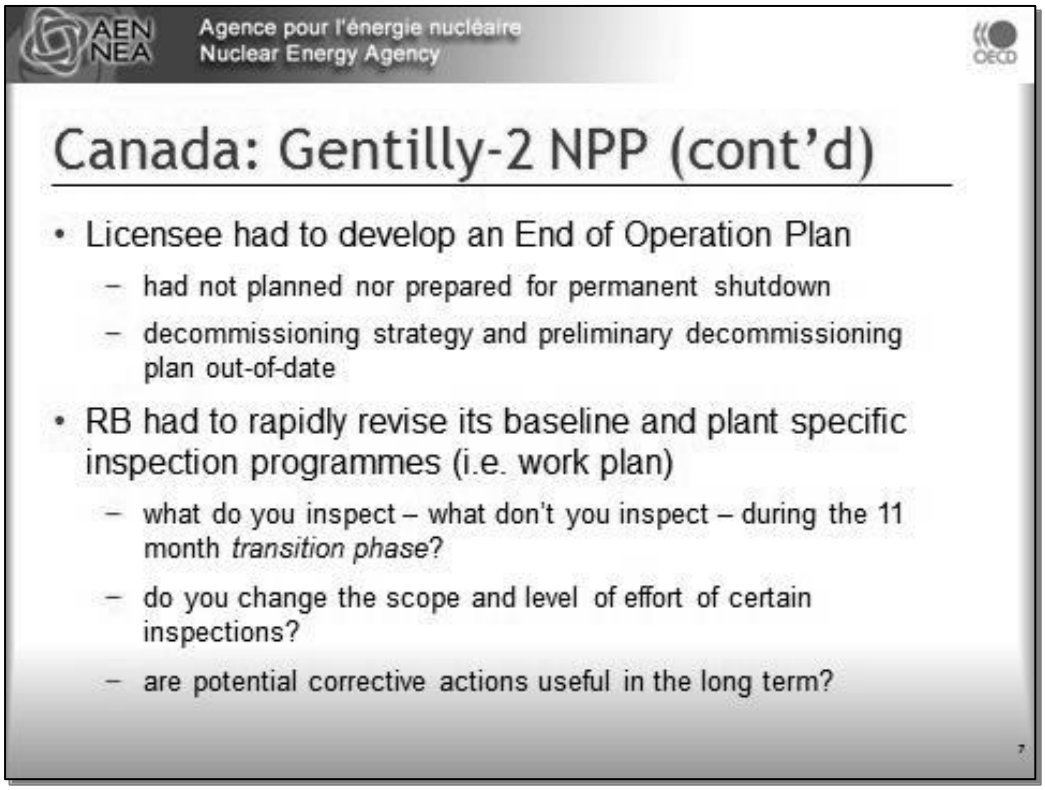
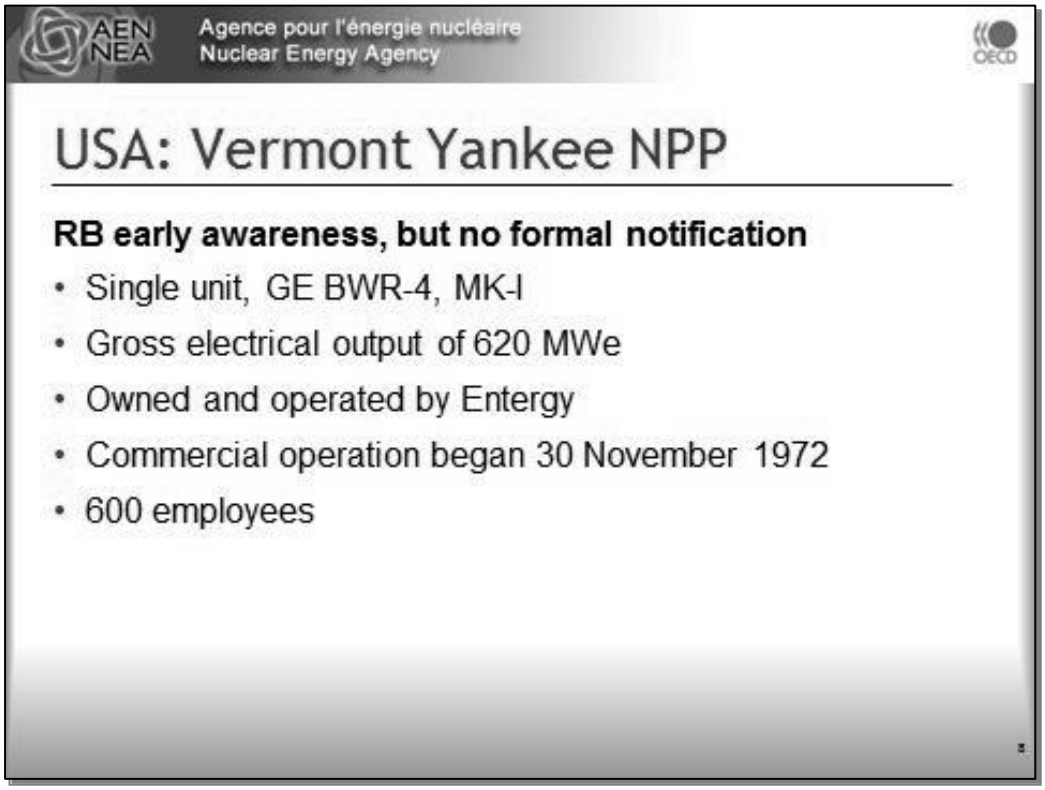
Canada: Gentilly-2 NPP (cont'd)
Timeline
• From 2000 to 2012, licensee spent $1 billion CAD on engineering and procurement
• 04 September 2012, new provincial government elected
• 20 September 2012, closure of Gentilly-2 announced
• 29 December 2012, NPP shuts down
• 03 September 2013, reactor core defueled


Agence pour l'énergie nucléaire
Nuclear Energy Agency
Canada: Gentilly-2 NPP (cont'd)
• Licensee had to develop an End of Operation Plan
– had not planned nor prepared for permanent shutdown
– decommissioning strategy and preliminary decommissioning plan out-of-date
• RB had to rapidly revise its baseline and plant specific inspection programmes (i.e. work plan)
– what do you inspect – what don't you inspect – during the 11 month *transition phase*?
– do you change the scope and level of effort of certain inspections?
– are potential corrective actions useful in the long term?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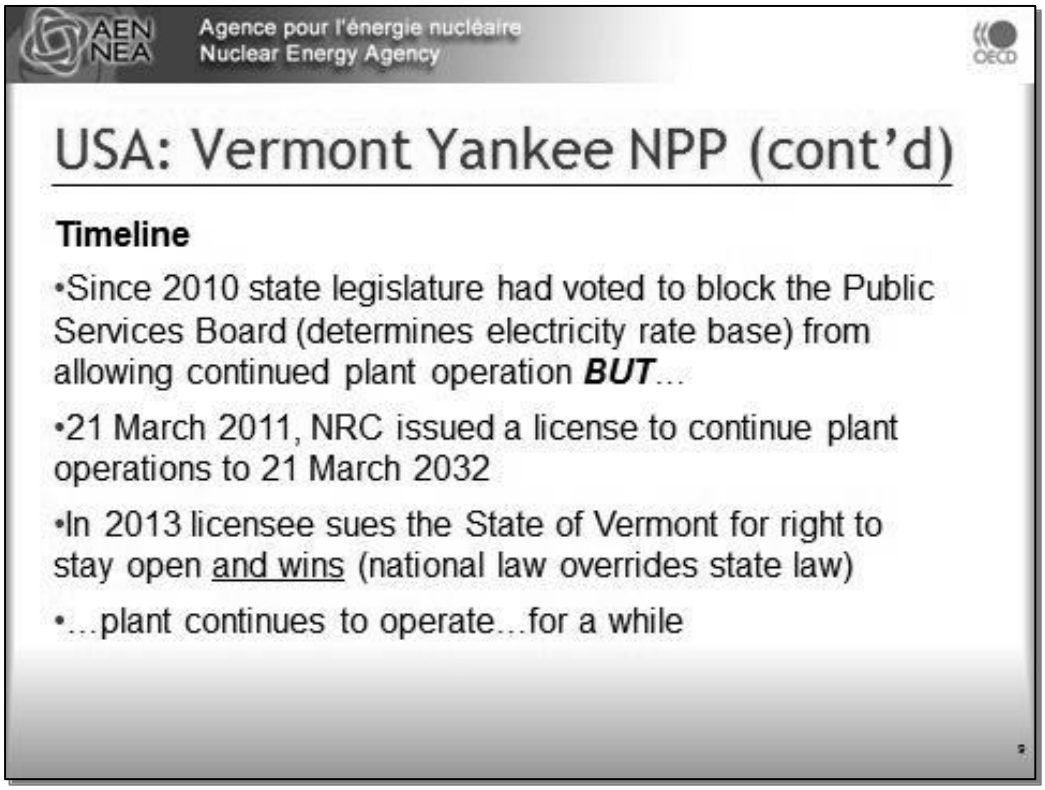
Nuclear Energy Agency
USA: Vermont Yankee NPP
RB early awareness, but no formal notification
• Single unit, GE BWR-4, MK-I
• Gross electrical output of 620 MWe
• Owned and operated by Entergy
• Commercial operation began 30 November 1972
• 600 employees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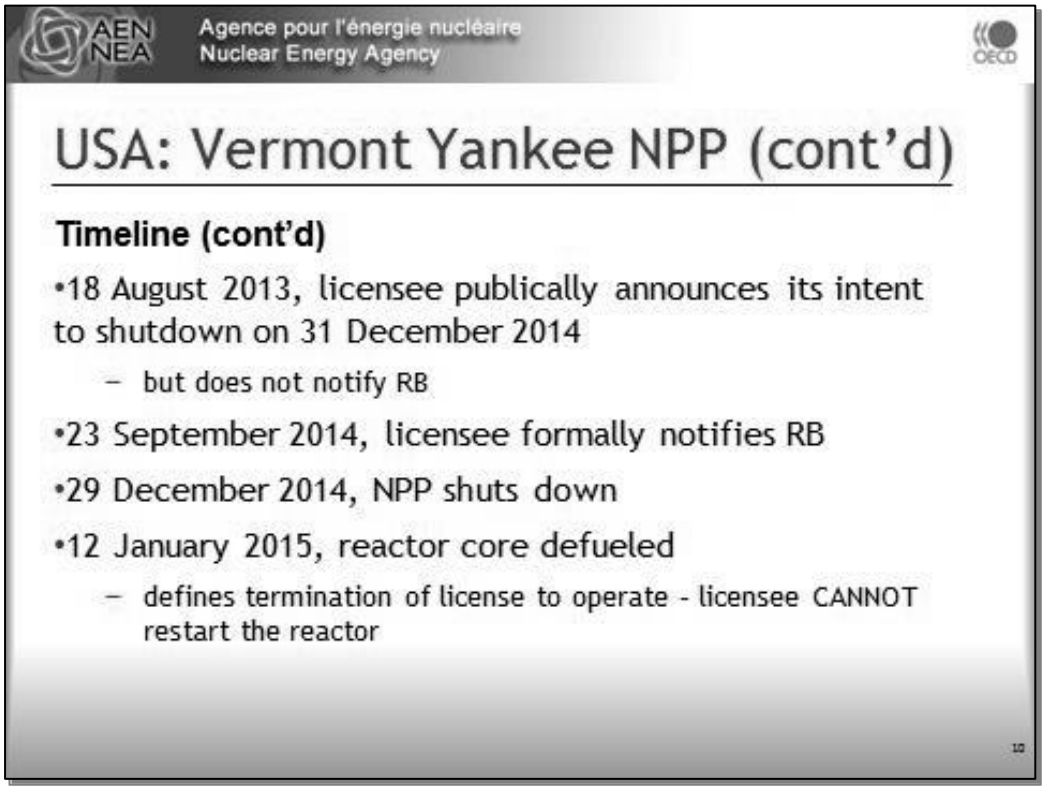
USA: Vermont Yankee NPP (cont'd)
Timeline
•Since 2010 state legislature had voted to block the Public Services Board (determines electricity rate base) from allowing continued plant operation BUT…
•21 March 2011, NRC issued a license to continue plant operations to 21 March 2032
•In 2013 licensee sues the State of Vermont for right to stay open and wins (national law overrides state law)
•…plant continues to operate…for a while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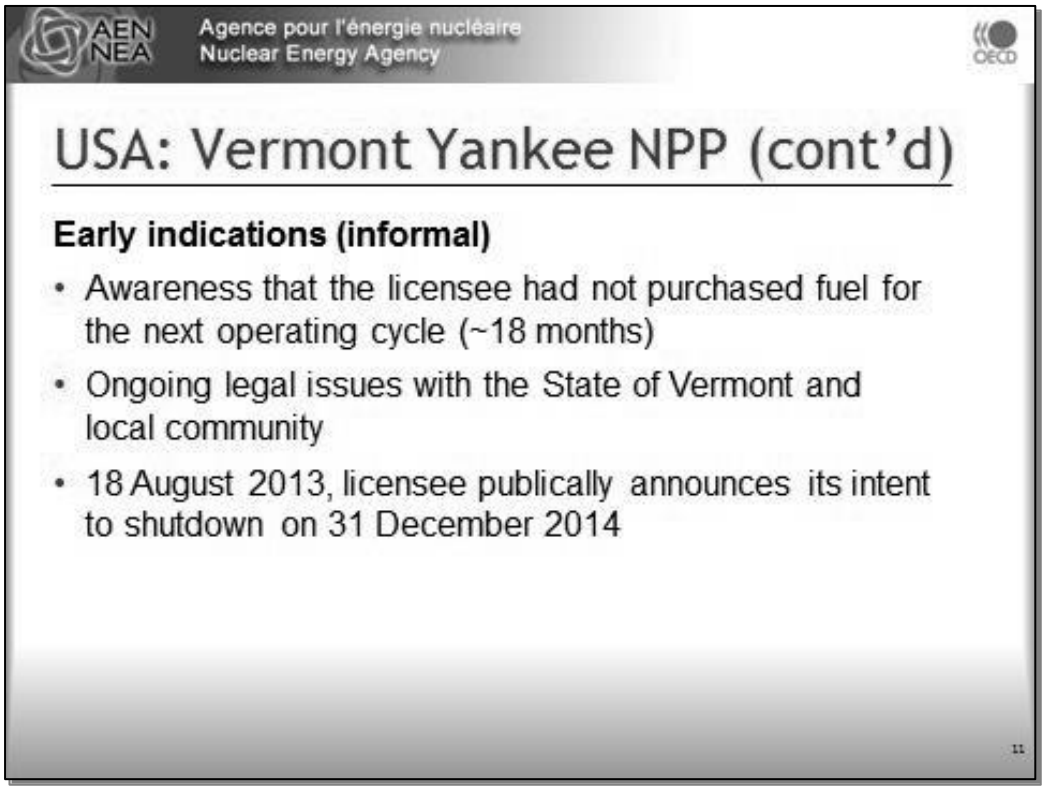
USA: Vermont Yankee NPP (cont'd)
Timeline (cont'd)
•18 August 2013, licensee publically announces its intent to shutdown on 31 December 2014
– but does not notify RB
•23 September 2014, licensee formally notifies RB
•29 December 2014, NPP shuts down
•12 January 2015, reactor core defueled
– defines termination of license to operate - licensee CANNOT restart the reactor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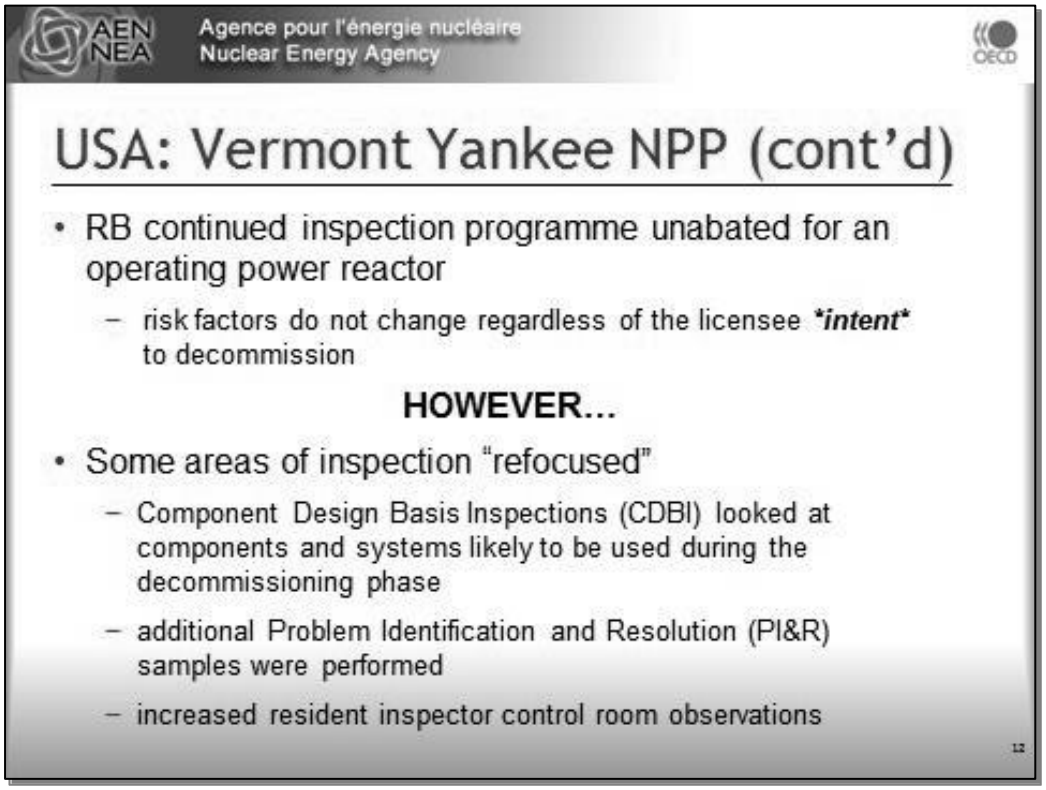
Nuclear Energy Agency
USA: Vermont Yankee NPP (cont'd)
Early indications (informal)
• Awareness that the licensee had not purchased fuel for the next operating cycle (~18 months)
• Ongoing legal issues with the State of Vermont and local community
• 18 August 2013, licensee publically announces its intent to shutdown on 31 December 2014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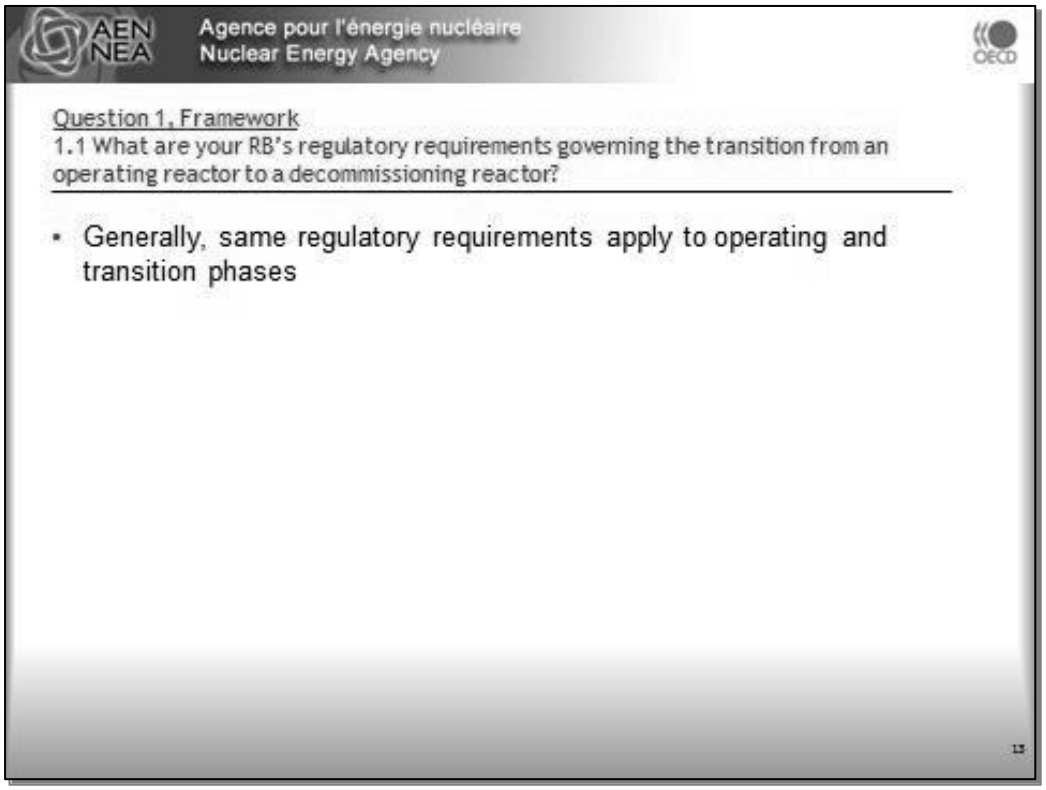
USA: Vermont Yankee NPP (cont'd)
• RB continued inspection programme unabated for an operating power reactor
– risk factors do not change regardless of the licensee *'intent'* to decommission
HOWEVER…
• Some areas of inspection "refocused"
– Component Design Basis Inspections (CDBI) looked at components and systems likely to be used during the decommissioning phase
– additional Problem Identification and Resolution (PI&R) samples were performed
– increased resident inspector control room observations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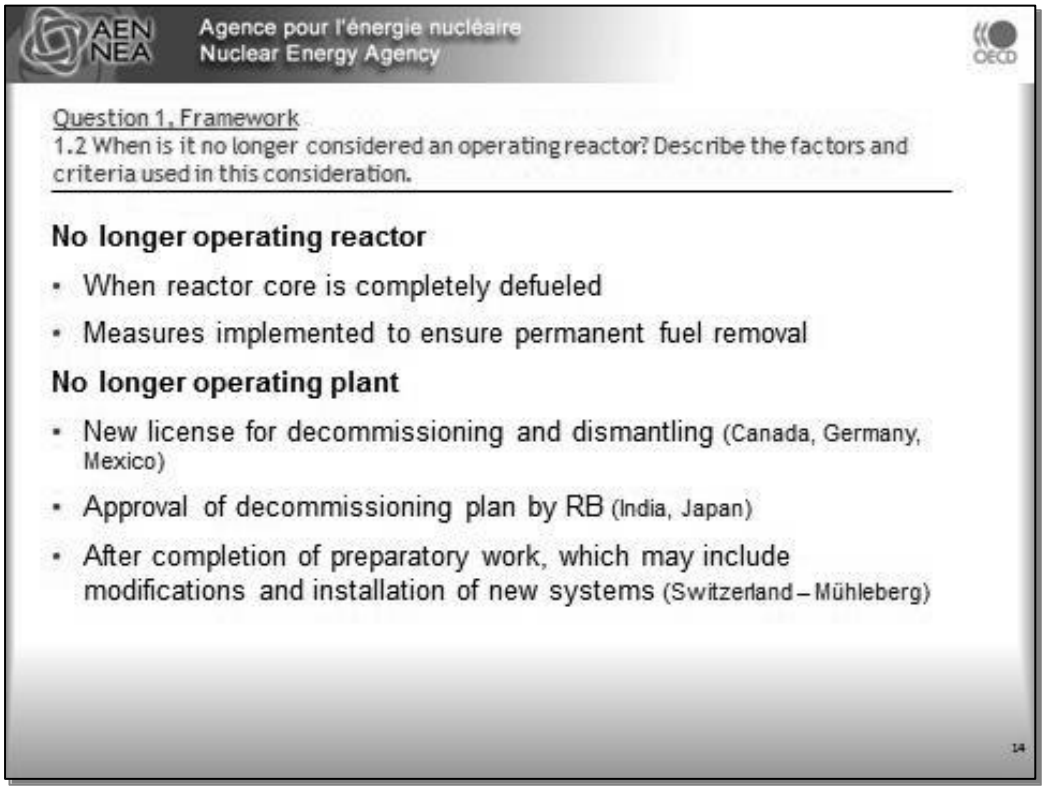
Question 1, Framework
1.1 What are your RB's regulatory requirements governing the transition from an operating reactor to a decommissioning reactor?
• Generally, same regulatory requirements apply to operating and transition phases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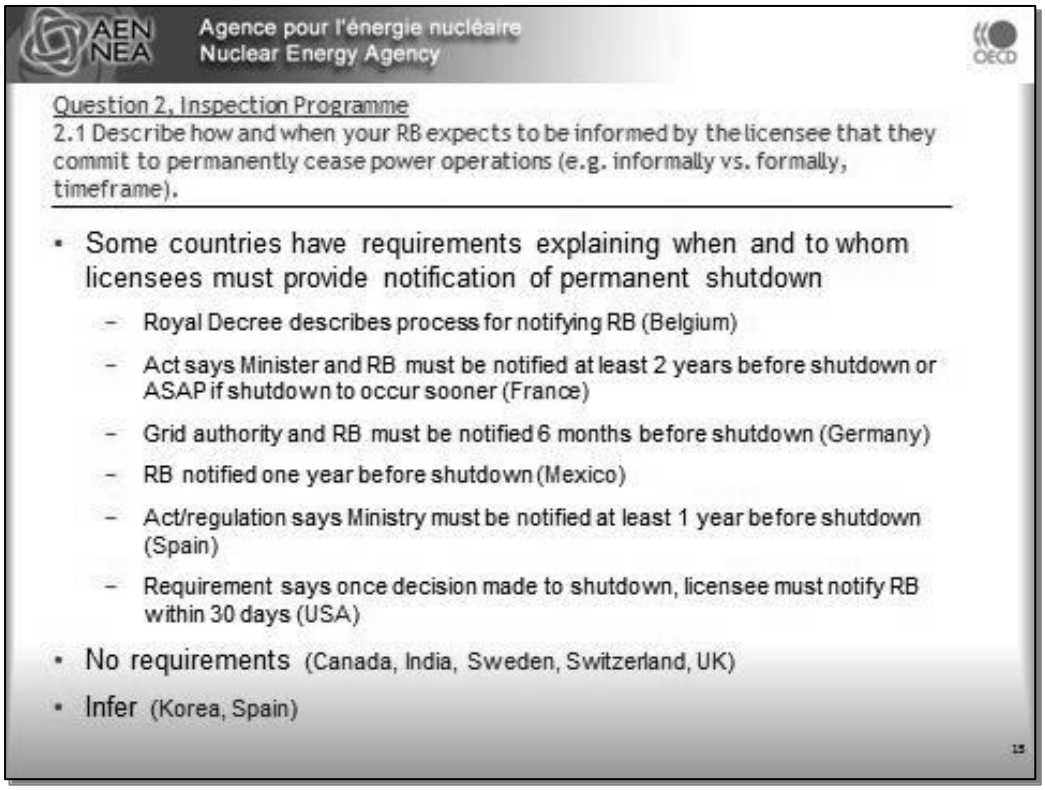
Question 1, Framework
1.2 When is it no longer considered an operating reactor? Describe the factors and criteria used in this consideration.
No longer operating reactor
• When reactor core is completely defueled
• Measures implemented to ensure permanent fuel removal
No longer operating plant
• New license for decommissioning and dismantling (Canada, Germany, Mexico)
• Approval of decommissioning plan by RB (India, Japan)
• After completion of preparatory work, which may include modifications and installation of new systems (Switzerland – Mühleberg)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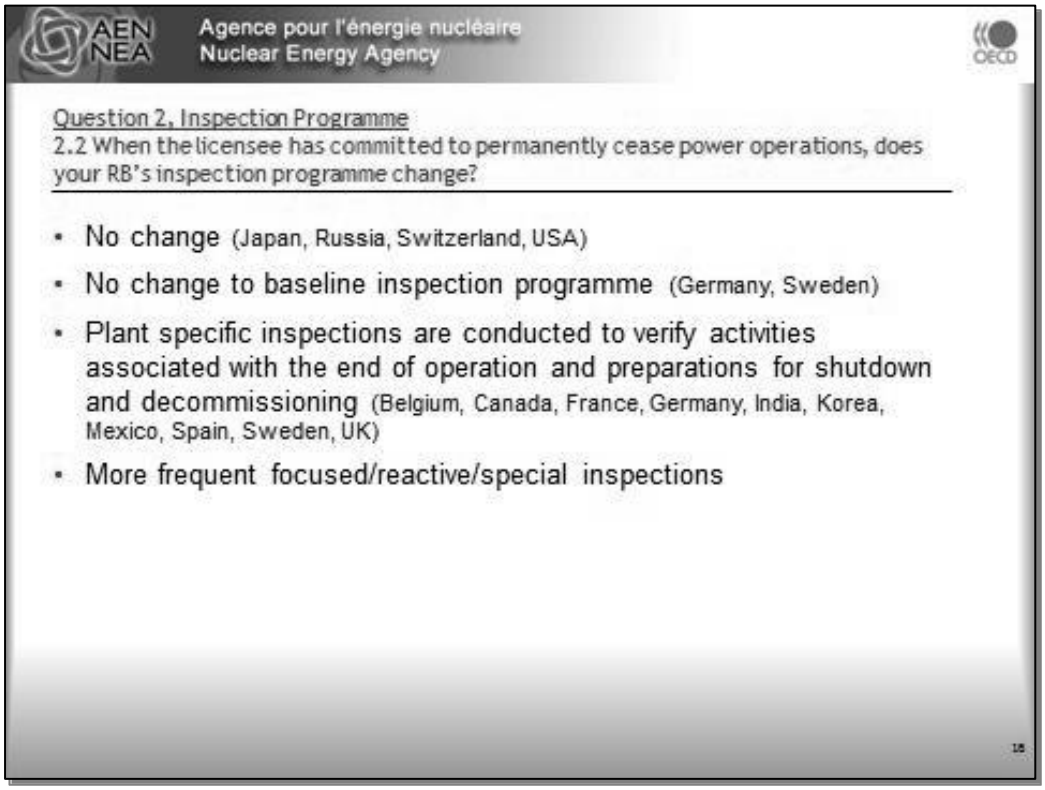
Question 2, Inspection Programme
2.1 Describe how and when your RB expects to be informed by the licensee that they commit to permanently cease power operations (e.g. informally vs. formally, timeframe).
• Some countries have requirements explaining when and to whom licensees must provide notification of permanent shutdown
– Royal Decree describes process for notifying RB (Belgium)
– Act says Minister and RB must be notified at least 2 years before shutdown or ASAP if shutdown to occur sooner (France)
– Grid authority and RB must be notified 6 months before shutdown (Germany)
– RB notified one year before shutdown (Mexico)
– Act/regulation says Ministry must be notified at least 1 year before shutdown (Spain)
– Requirement says once decision made to shutdown, licensee must notify RB within 30 days (USA)
• No requirements (Canada, India, Sweden, Switzerland, UK)
• Infer (Korea, Spain)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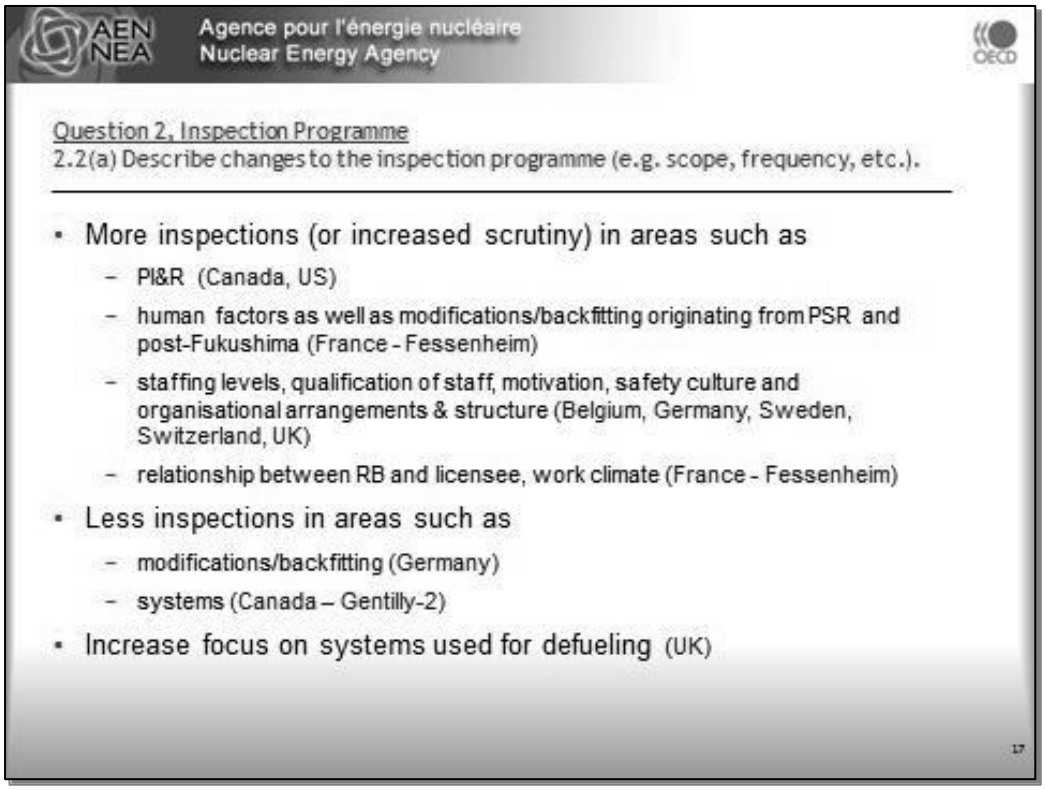
Question 2, Inspection Programme
2.2 When the licensee has committed to permanently cease power operations, does your RB's inspection programme change?
• No change (Japan, Russia, Switzerland, USA)
• No change to baseline inspection programme (Germany, Sweden)
• Plant specific inspections are conducted to verify activities associated with the end of operation and preparations for shutdown and decommissioning (Belgium, Canada, France, Germany, India, Korea, Mexico, Spain, Sweden, UK)
• More frequent focused/reactive/special inspections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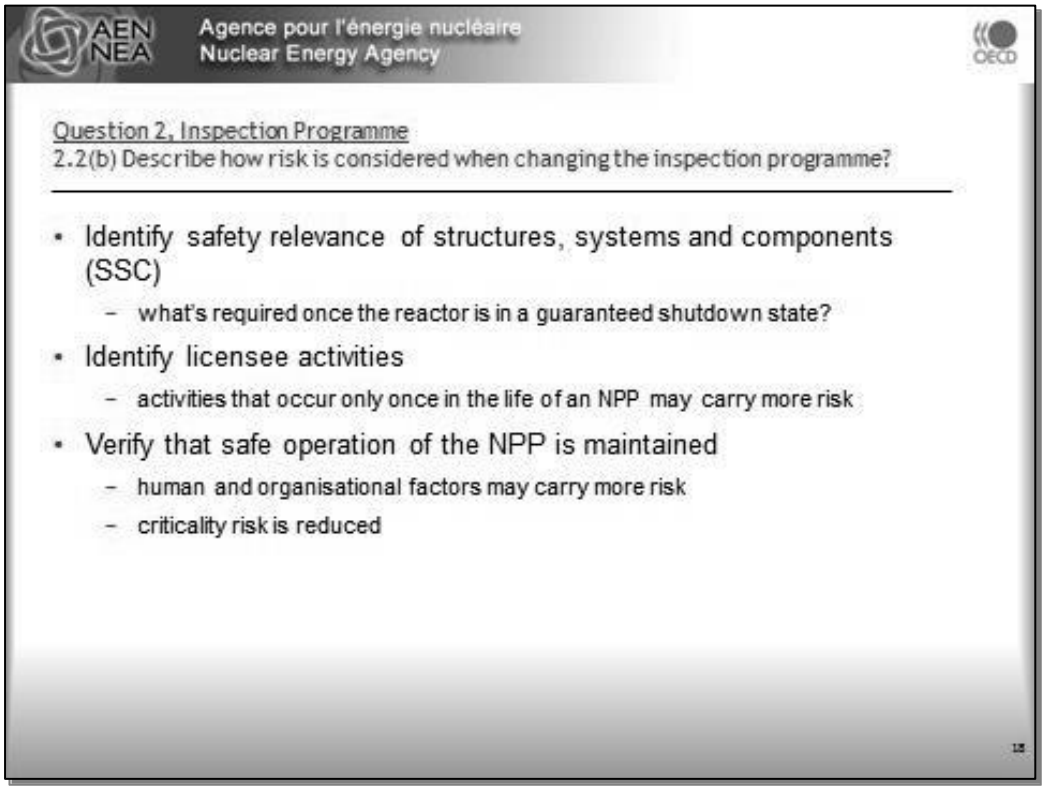
Question 2, Inspection Programme
2.2(a) Describe changes to the inspection programme (e.g. scope, frequency, etc.).
• More inspections (or increased scrutiny) in areas such as
– PI&R (Canada, US)
– human factors as well as modifications/backfitting originating from PSR and post-Fukushima (France - Fessenheim)
– staffing levels, qualification of staff, motivation, safety culture and organisational arrangements & structure (Belgium, Germany, Sweden, Switzerland, UK)
– relationship between RB and licensee, work climate (France - Fessenheim)
• Less inspections in areas such as
– modifications/backfitting (Germany)
– systems (Canada – Gentilly-2)
• Increase focus on systems used for defueling (UK)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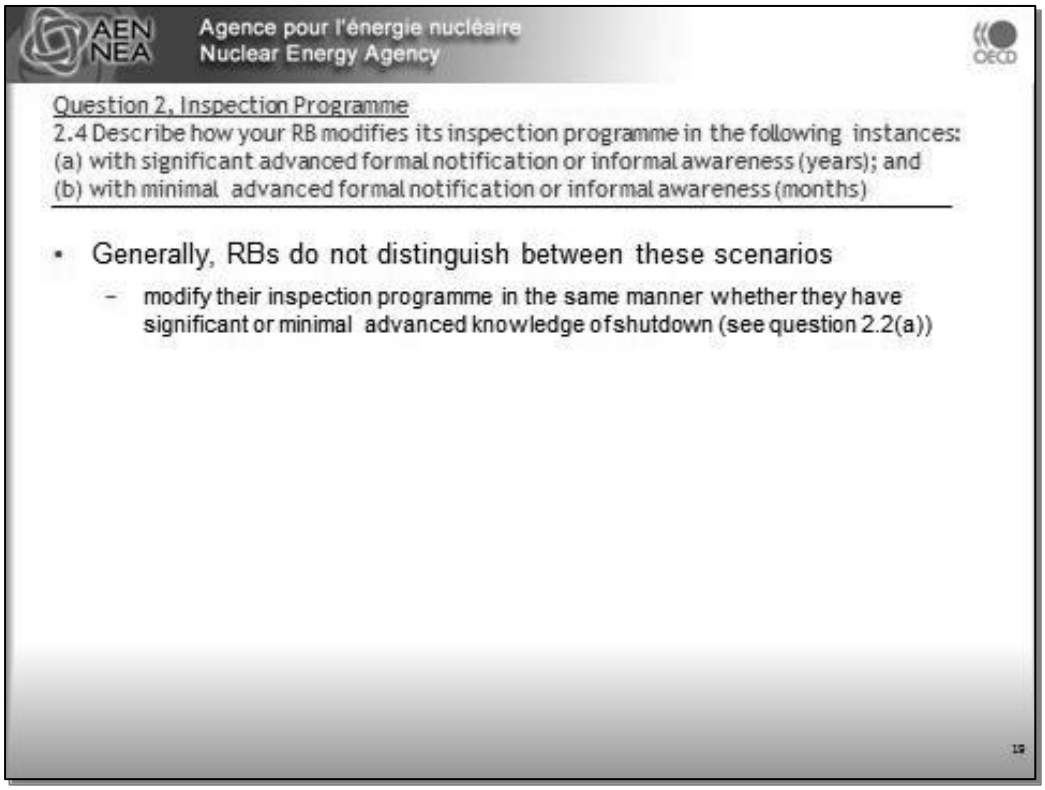
Question 2, Inspection Programme
2.2(b) Describe how risk is considered when changing the inspection programme?
• Identify safety relevance of structures, systems and components (SSC)
– what's required once the reactor is in a guaranteed shutdown state?
• Identify licensee activities
– activities that occur only once in the life of an NPP may carry more risk
• Verify that safe operation of the NPP is maintained
– human and organisational factors may carry more risk
– criticality risk is reduced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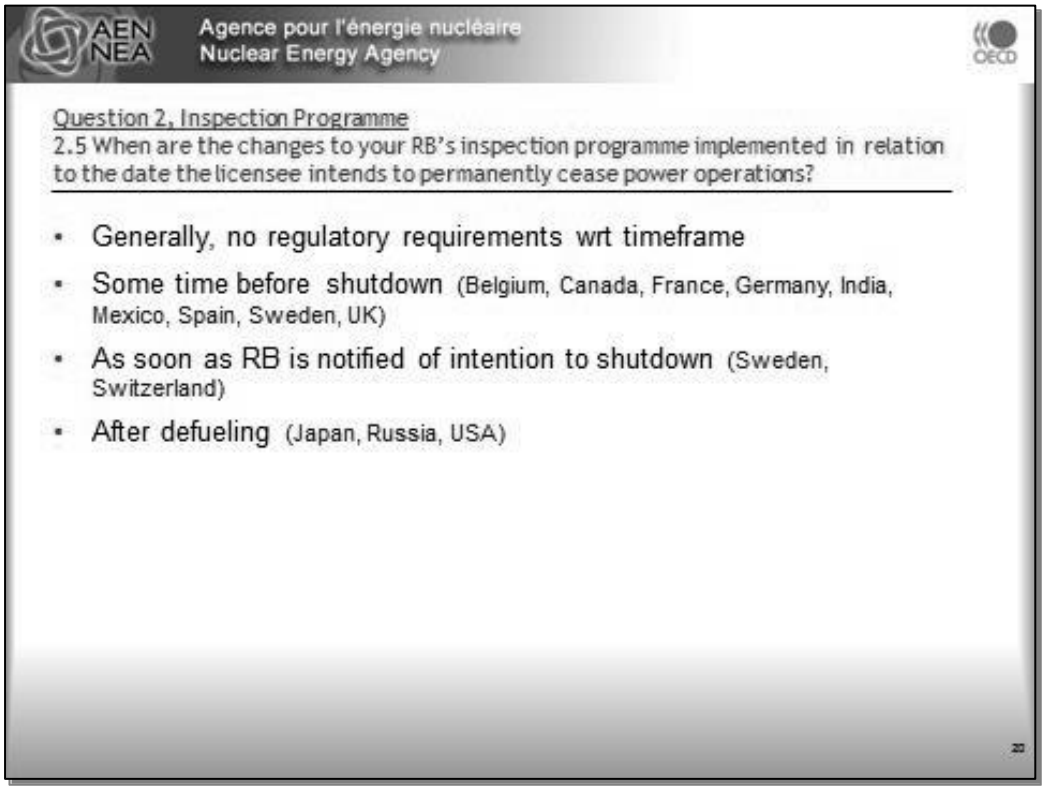
Question 2, Inspection Programme
2.4 Describe how your RB modifies its inspection programme in the following instances:
(a) with significant advanced formal notification or informal awareness (years); and
(b) with minimal advanced formal notification or informal awareness (months)
• Generally, RBs do not distinguish between these scenarios
– modify their inspection programme in the same manner whether they have significant or minimal advanced knowledge of shutdown (see question 2.2(a))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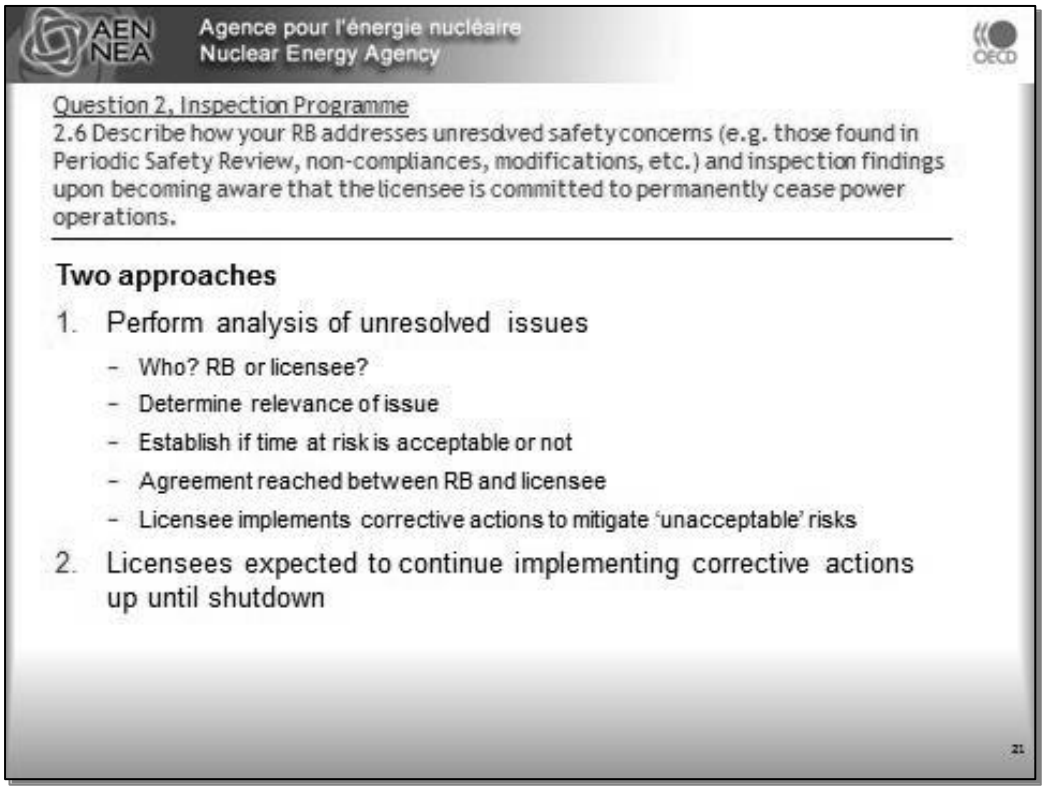
Question 2, Inspection Programme
2.5 When are the changes to your RB's inspection programme implemented in relation to the date the licensee intends to permanently cease power operations?
• Generally, no regulatory requirements wrt timeframe
• Some time before shutdown (Belgium, Canada, France, Germany, India, Mexico, Spain, Sweden, UK)
• As soon as RB is notified of intention to shutdown (Sweden, Switzerland)
• After defueling (Japan, Russia, USA)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Question 2, Inspection Programme
2.6 Describe how your RB addresses unresolved safety concerns (e.g. those found in Periodic Safety Review, non-compliances, modifications, etc.) and inspection findings upon becoming aware that the licensee is committed to permanently cease power operations.
Two approaches
1. Perform analysis of unresolved issues
- Who? RB or licensee?
- Determine relevance of issue
- Establish if time at risk is acceptable or not
- Agreement reached between RB and licensee
- Licensee implements corrective actions to mitigate 'unacceptable' risks
2. Licensees expected to continue implementing corrective actions up until shutdown

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Question 3, Scope of Inspections

3.1 Does your RB identify and define, by internal procedure/process or otherwise, differences in the scope and level of effort of inspections conducted during the transition phase (compared to the same inspections conducted prior to the transition phase)? If so, describe how the identified inspections are modified.

- About half do and half do not
- Scope and level of effort are modified based on
  - licensee activities
  - SSCs to remain in-service / to be taken out of service
  - changes to licensee programmes
  - operating experience
  - professional judgement
  - RB resources

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Question 3, Scope of Inspections

3.2 With respect to the scope and level of effort of inspections, which areas increase in importance, which areas decrease in importance and which areas maintain their importance? Give a brief comment explaining why.

- Control of foreign material
- Corrective action program
- Design basis inspections (e.g. systems, structures, components)
- Emergency preparedness (e.g. programme, exercises, availability of emergency response facilities)
- Environmental issues
- Equipment qualification (e.g. maintaining level of requirements)
- Financial resources (e.g. cost reduction plans, staffing, materials, etc.)
- Fire protection
- Housekeeping
- In service inspections (periodic tests)
- Industrial safety (personal safety)
- Licensee interaction with external stakeholders
- Maintenance activities
- Management of contractors
- Modifications (permanent and temporary)
- Organization and general management
- Qualification of licensee staff or contractors (e.g. new staff, language challenges, preservation of knowhow)
- Quality assurance
- Radiological protection
- Safety culture (e.g. motivation of staff, staff turnover)
- Staffing levels (e.g. minimum shift complement, Emergency Response Team, etc.)
- Subcriticality and fuel safety
- Training programmes
- Waste management

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Areas*	Scope			Level of Effort		
	"+"	o	"-"	"+"	o	"-"
Control of foreign material	1	7	3	1	6	4
Corrective action program	2	7	2	2	6	3
Design basis inspections	0	3	9	0	6	5
Emergency preparedness	0	6	6	0	6	5
Environmental issues	1	7	1	3	6	1
Equipment quailfications	1	5	6	1	6	3
Financial resources	3	1	1	3	1	1
Fire protection	1	8	1	3	7	0
Housekeeping	2	6	1	2	7	0
In-service inspections	0	1	8	0	2	7
Industrial safety (personal safety)	0	7	2	0	8	1
Licensee interaction with external stakeholders	5	2	0	5	2	0
Maintenance activities	1	3	7	1	4	6
Management of contractors	2	5	2	1	7	1
Modifications (permanent and temporary)	2	7	2	2	6	2
Organization and general management	8	4	0	7	4	0
Qualification of licensee staff or contractors	4	4	2	3	6	1

*This table serves as an example and does not contain all the information received.

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Question 4, RB Organisational Management

4.1 Describe how your RB manages internal changes to face new challenges resulting from a licensee's commitment to permanently cease power operations and to verify the continued effectiveness of its inspection capabilities. Include in your response a discussion of the following areas:

(a) organizational structure of the RB

- Generally, no significant changes during transition phase

(b) changes to the number of inspectors

- Generally, no change in number of inspectors
- Reduction in number of inspectors (Canada)

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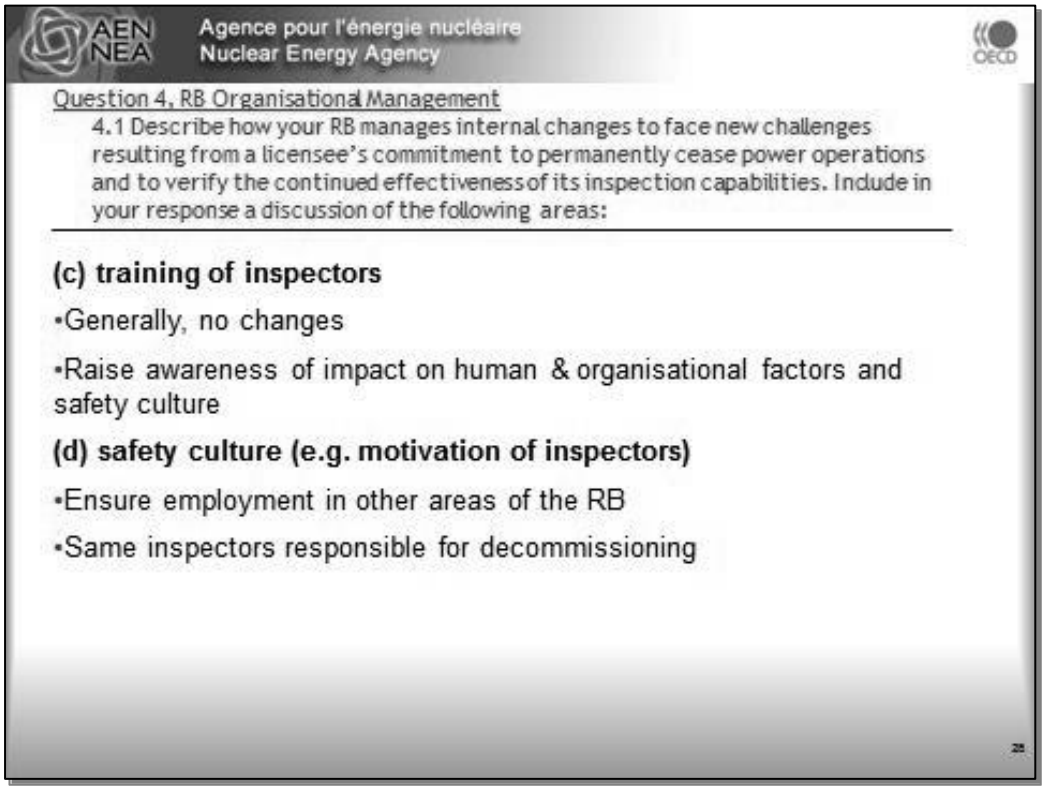
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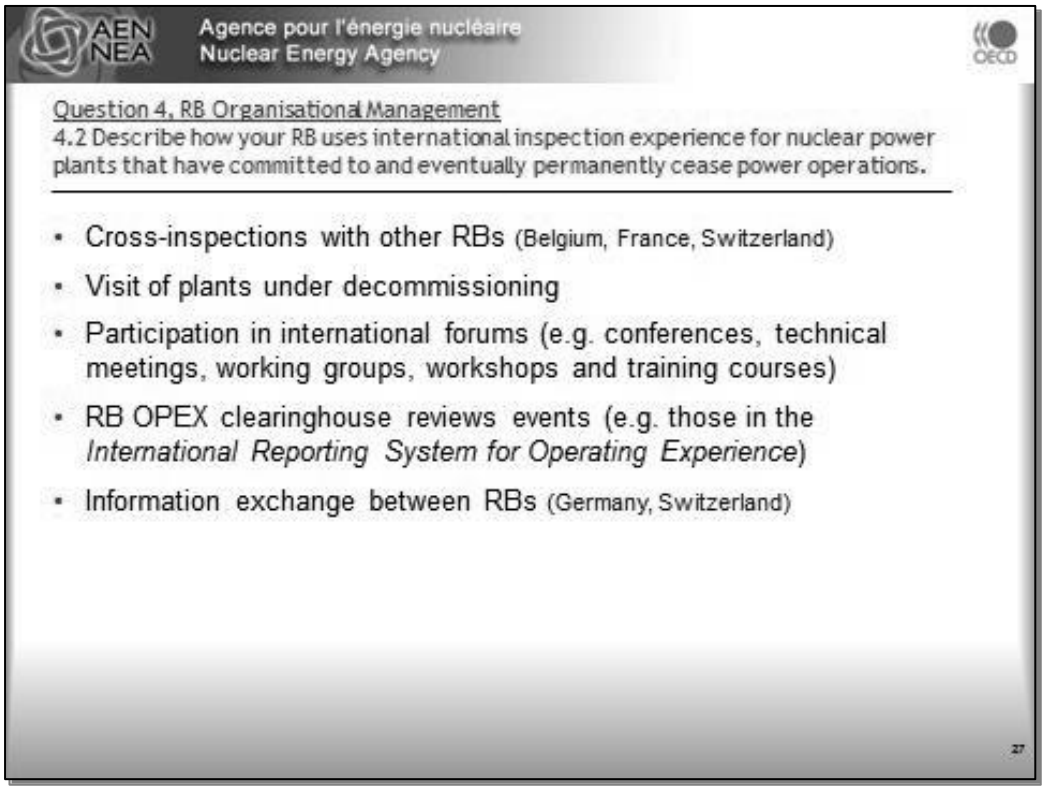
Nuclear Energy Agency
Question 4, RB Organisational Management
4.1 Describe how your RB manages internal changes to face new challenges resulting from a licensee's commitment to permanently cease power operations and to verify the continued effectiveness of its inspection capabilities. Include in your response a discussion of the following areas:
(c) training of inspectors
•Generally, no changes
•Raise awareness of impact on human & organisational factors and safety culture
(d) safety culture (e.g. motivation of inspectors)
•Ensure employment in other areas of the RB
•Same inspectors responsible for decommissioning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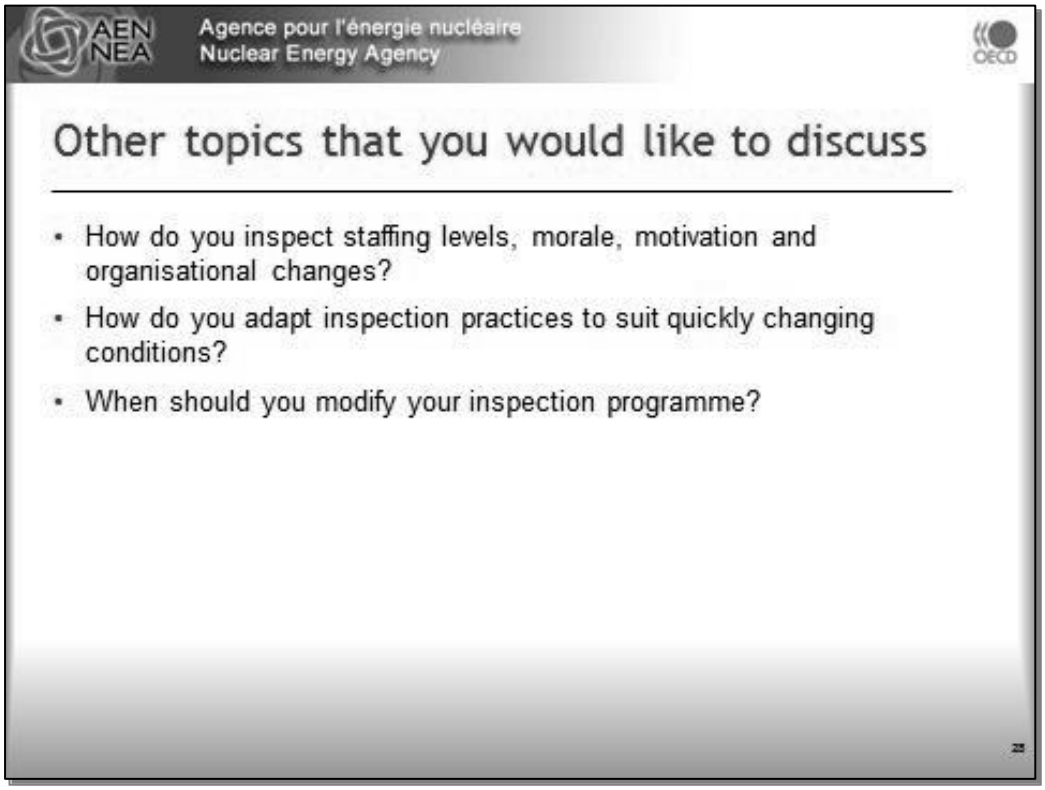
Question 4, RB Organisational Management
4.2 Describe how your RB uses international inspection experience for nuclear power plants that have committed to and eventually permanently cease power operations.
• Cross-inspections with other RBs (Belgium, France, Switzerland)
• Visit of plants under decommissioning
• Participation in international forums (e.g. conferences, technical meetings, working groups, workshops and training courses)
• RB OPEX clearinghouse reviews events (e.g. those in the International Reporting System for Operating Experience)
• Information exchange between RBs (Germany, Switzerland)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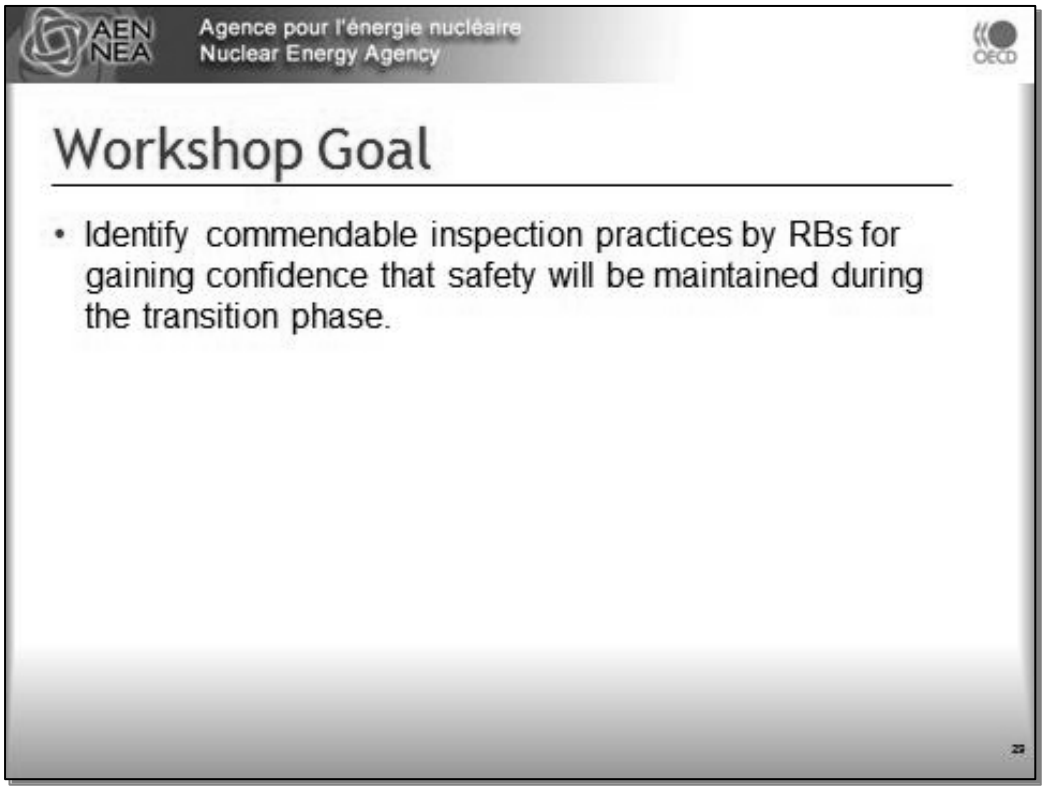
Other topics that you would like to discuss
• How do you inspect staffing levels, morale, motivation and organisational changes?
• How do you adapt inspection practices to suit quickly changing conditions?
• When should you modify your inspection programme?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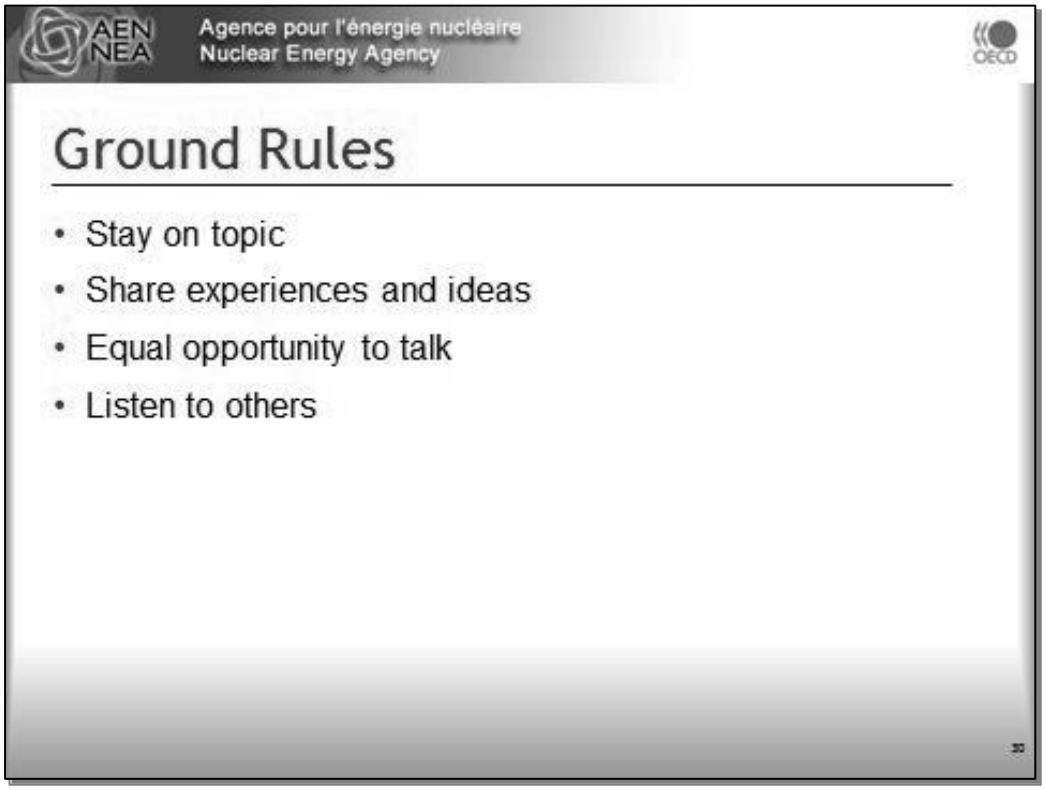
Workshop Goal
• Identify commendable inspection practices by RBs for gaining confidence that safety will be maintained during the transition phase.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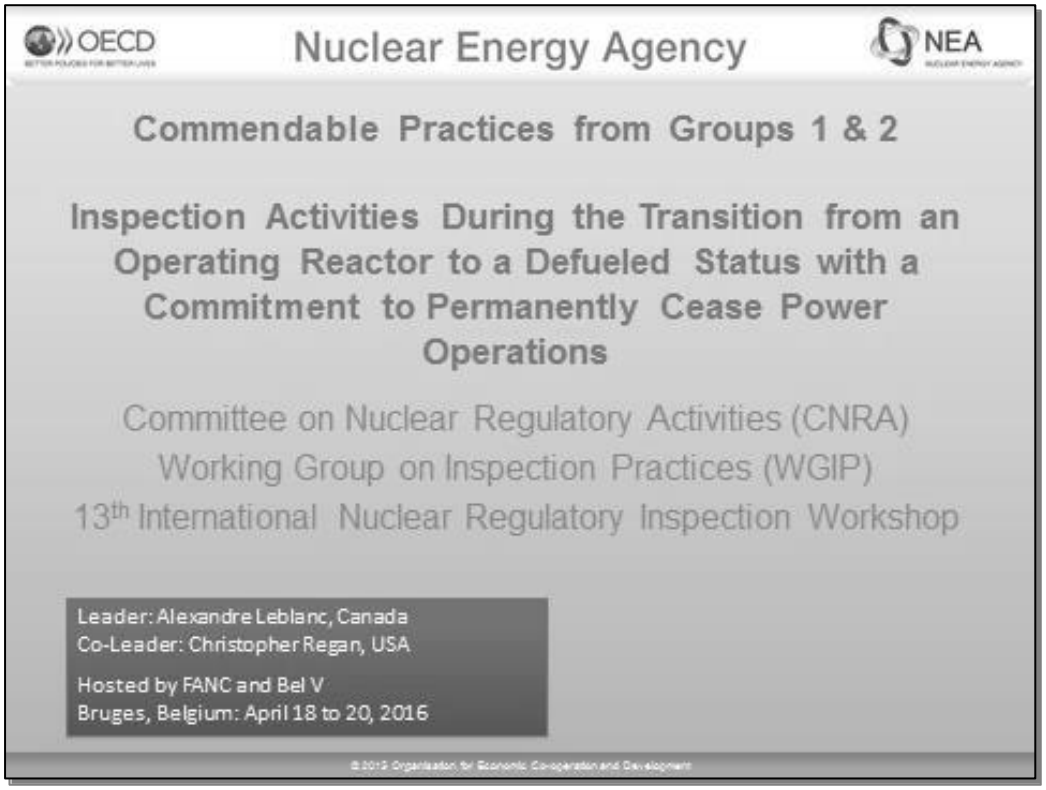
Ground Rules
• Stay on topic
• Share experiences and ideas
• Equal opportunity to talk
• Listen to others

14. TOPIC A: CLOSING PRESENTATION



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Workshop Discussion Group

Group 1

- Alexandre Leblanc, Canada
- Dirk Asselberghs, Belgium
- Frederik Van Wonterghem, Belgium
- Matthias Papra, Germany
- Helmut Scheib, Germany
- Junichi Kimura, Japan
- Hans Rudolf Fierz, Switzerland
- Takayoshi Nezuka, NEA

Group 2

- Christopher Regan, USA
- Chantal Mommaert, Belgium
- Kristof Van Cutsem, Belgium
- Marcel Buchholz, Germany
- Walter Glöckle, Germany
- Chang Ju Lee, Korea

 2

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Workshop Objectives

- Share and exchange information between workshop participants on the impact of the transition phase on RB inspections practices and inspection programs
- Identify commendable inspection practices by RBs for gaining confidence that sufficient oversight of licensee activities will be maintained during the transition phase

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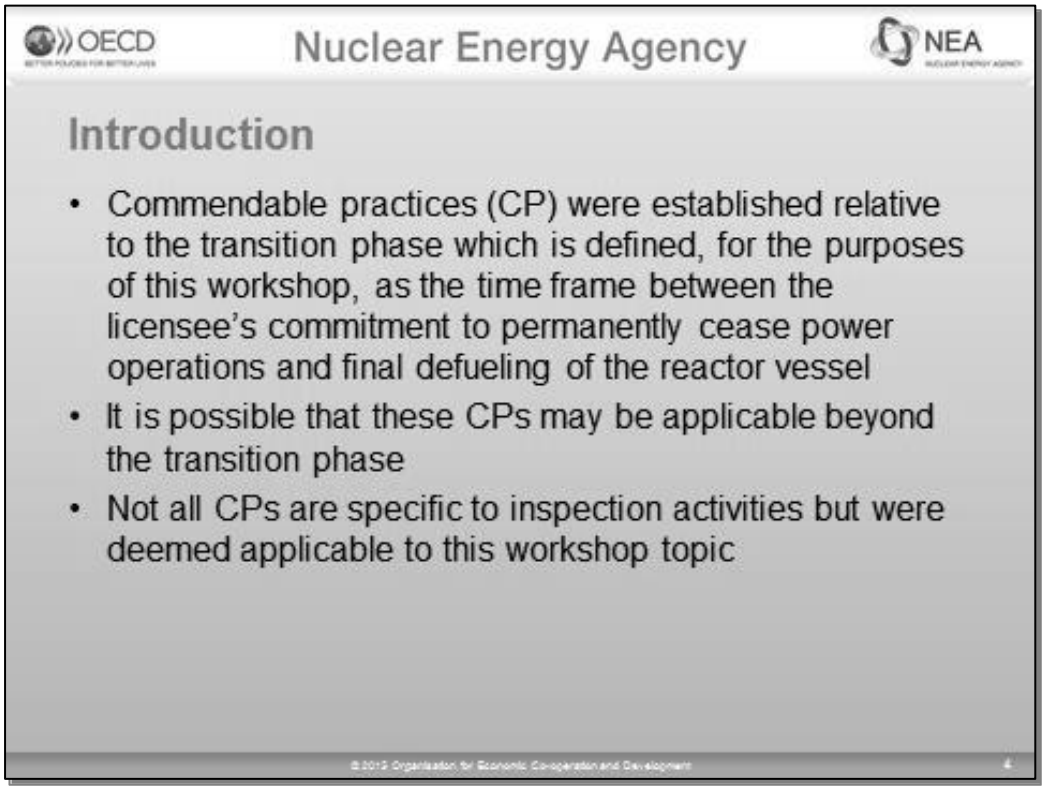
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NEA
Introduction
• Commendable practices (CP) were established relative to the transition phase which is defined, for the purposes of this workshop, as the time frame between the licensee's commitment to permanently cease power operations and final defueling of the reactor vessel
• It is possible that these CPs may be applicable beyond the transition phase
• Not all CPs are specific to inspection activities but were deemed applicable to this workshop topic
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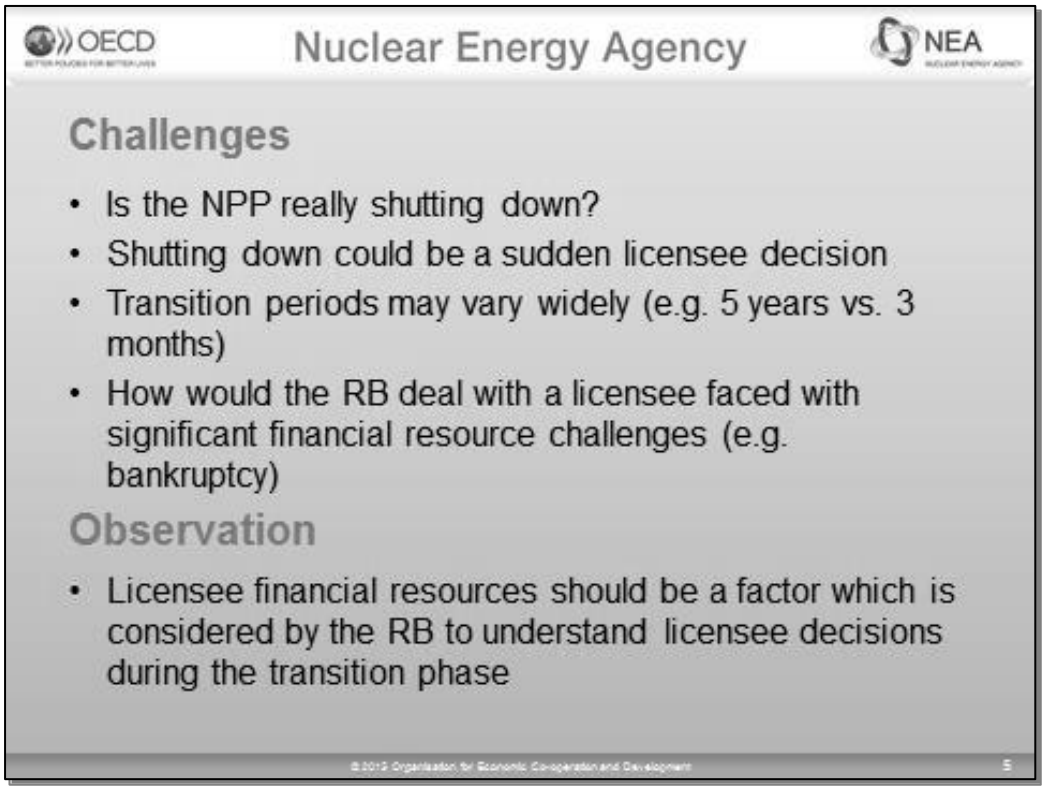
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Challenges
• Is the NPP really shutting down?
• Shutting down could be a sudden licensee decision
• Transition periods may vary widely (e.g. 5 years vs. 3 months)
• How would the RB deal with a licensee faced with significant financial resource challenges (e.g. bankruptcy)
Observation
• Licensee financial resources should be a factor which is considered by the RB to understand licensee decisions during the transition phase
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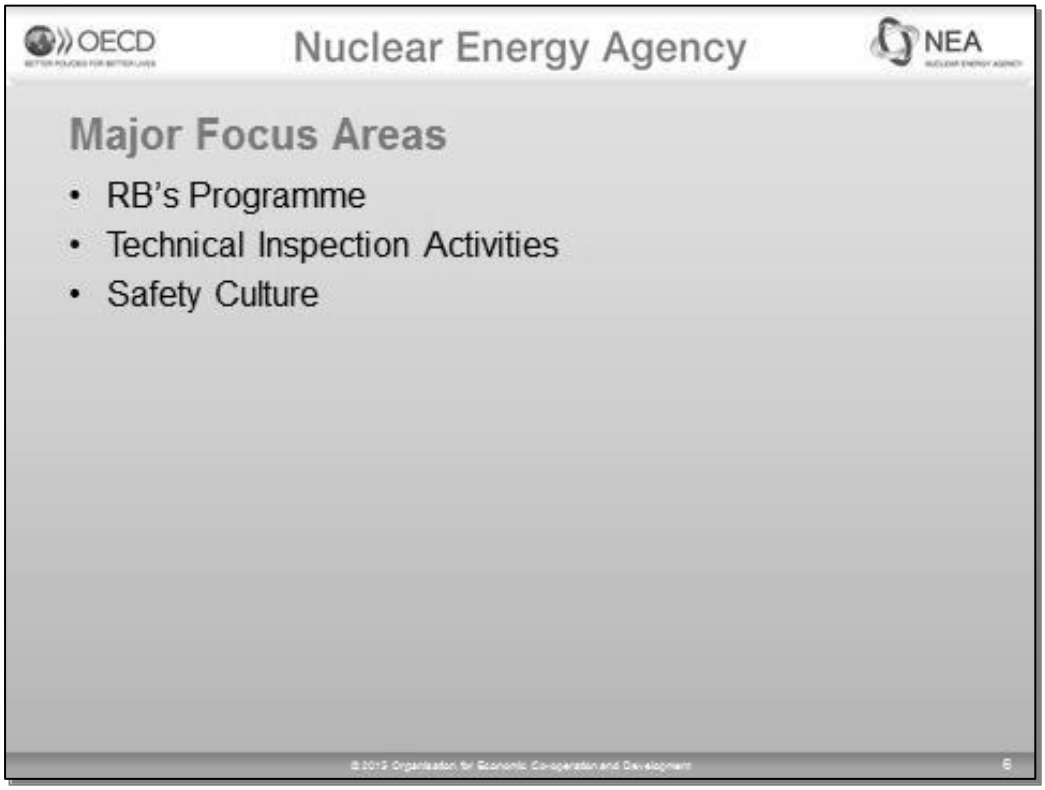
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Major Focus Areas
• RB's Programme
• Technical Inspection Activities
• Safety Culture
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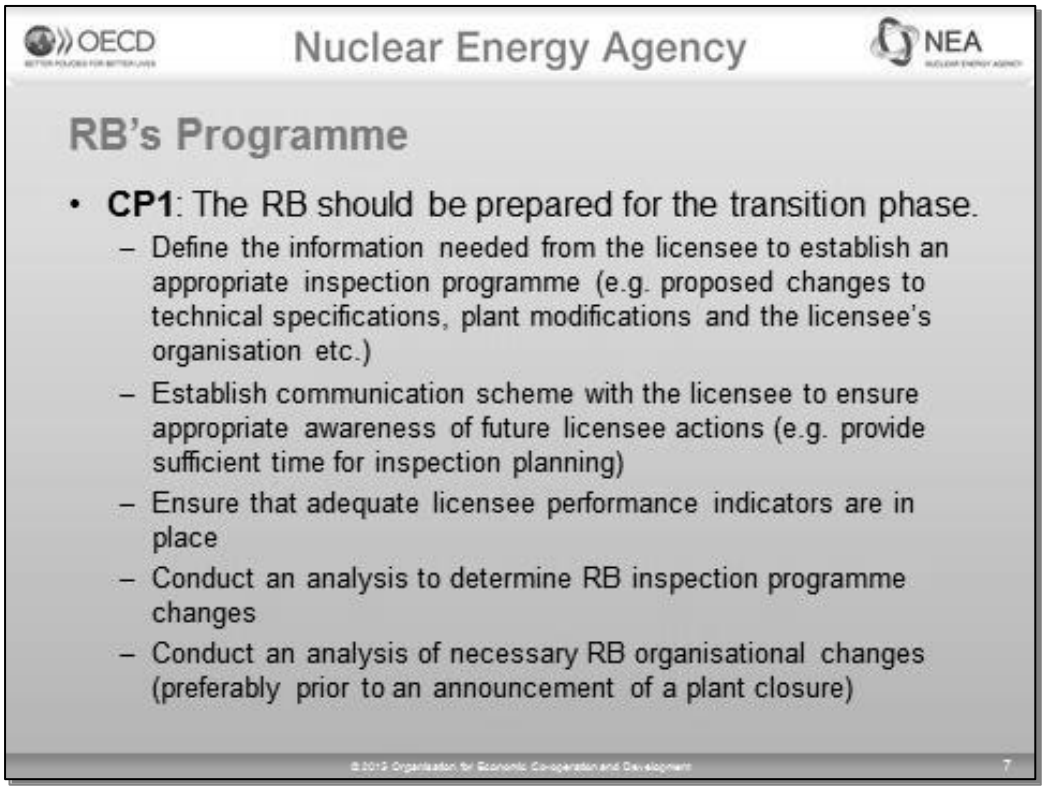
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RB's Programme
• CP1: The RB should be prepared for the transition phase.
– Define the information needed from the licensee to establish an appropriate inspection programme (e.g. proposed changes to technical specifications, plant modifications and the licensee's organisation etc.)
– Establish communication scheme with the licensee to ensure appropriate awareness of future licensee actions (e.g. provide sufficient time for inspection planning)
– Ensure that adequate licensee performance indicators are in place
– Conduct an analysis to determine RB inspection programme changes
– Conduct an analysis of necessary RB organisational changes (preferably prior to an announcement of a plant closure)
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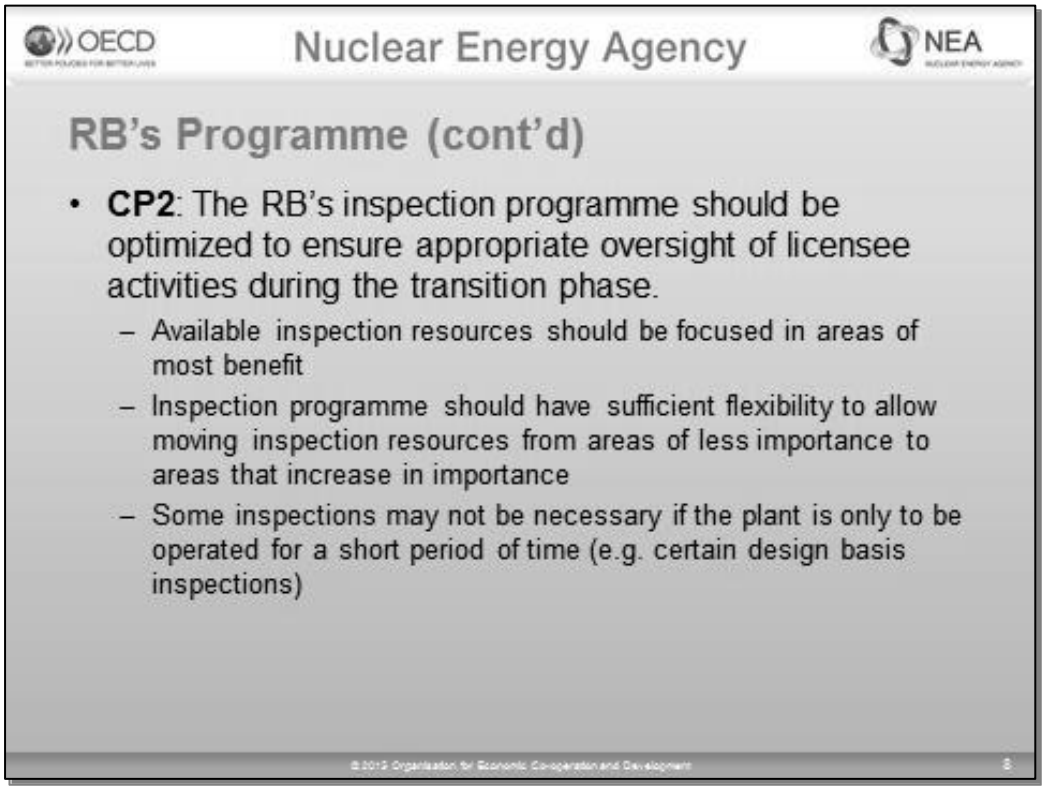
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RB's Programme (cont'd)
• CP2: The RB's inspection programme should be optimized to ensure appropriate oversight of licensee activities during the transition phase.
– Available inspection resources should be focused in areas of most benefit
– Inspection programme should have sufficient flexibility to allow moving inspection resources from areas of less importance to areas that increase in importance
– Some inspections may not be necessary if the plant is only to be operated for a short period of time (e.g. certain design basis inspections)
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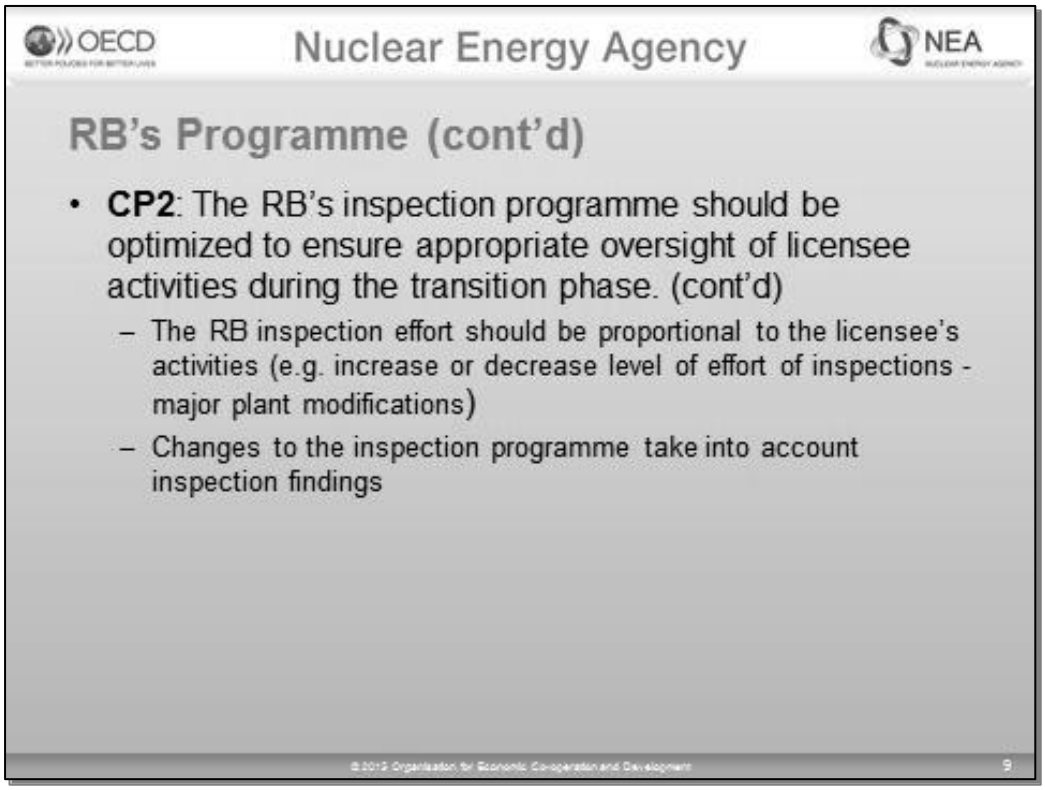
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RB's Programme (cont'd)
• CP2: The RB's inspection programme should be optimized to ensure appropriate oversight of licensee activities during the transition phase. (cont'd)
– The RB inspection effort should be proportional to the licensee's activities (e.g. increase or decrease level of effort of inspections - major plant modifications)
– Changes to the inspection programme take into account inspection findings
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RB's Programme (cont'd)

- **CP3**: Inspection resources should not be reduced until the transition phase is complete.
  - Still a fully functional reactor

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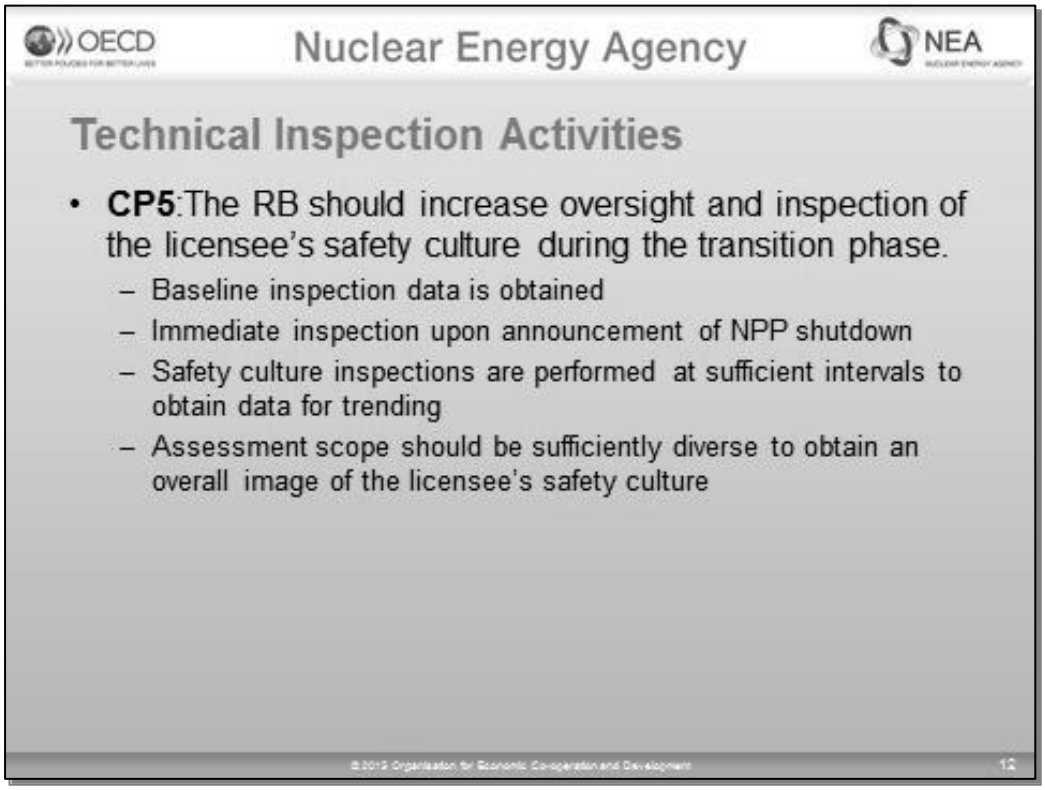
RB's Programme (cont'd)

- **CP4**: The RB should establish a programme to evaluate the licensee's safety culture during the transition phase.
  - RB inspectors should receive adequate safety culture training
  - The RB should ensure it has sufficient expertise to assess safety culture issues
  - RB programme should develop safety culture indicators (e.g. motivation, morale, staff workload, relationship between RB and licensee)
  - Includes a process to analyse and trend safety culture data
  - The programme should recognise that at multi-unit sites/licensees where at least one unit remains operational, the safety culture consequences (e.g. resulting from job losses) may not be so important or significant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Technical Inspection Activities
• CP5:The RB should increase oversight and inspection of the licensee's safety culture during the transition phase.
– Baseline inspection data is obtained
– Immediate inspection upon announcement of NPP shutdown
– Safety culture inspections are performed at sufficient intervals to obtain data for trending
– Assessment scope should be sufficiently diverse to obtain an overall image of the licensee's safety culture
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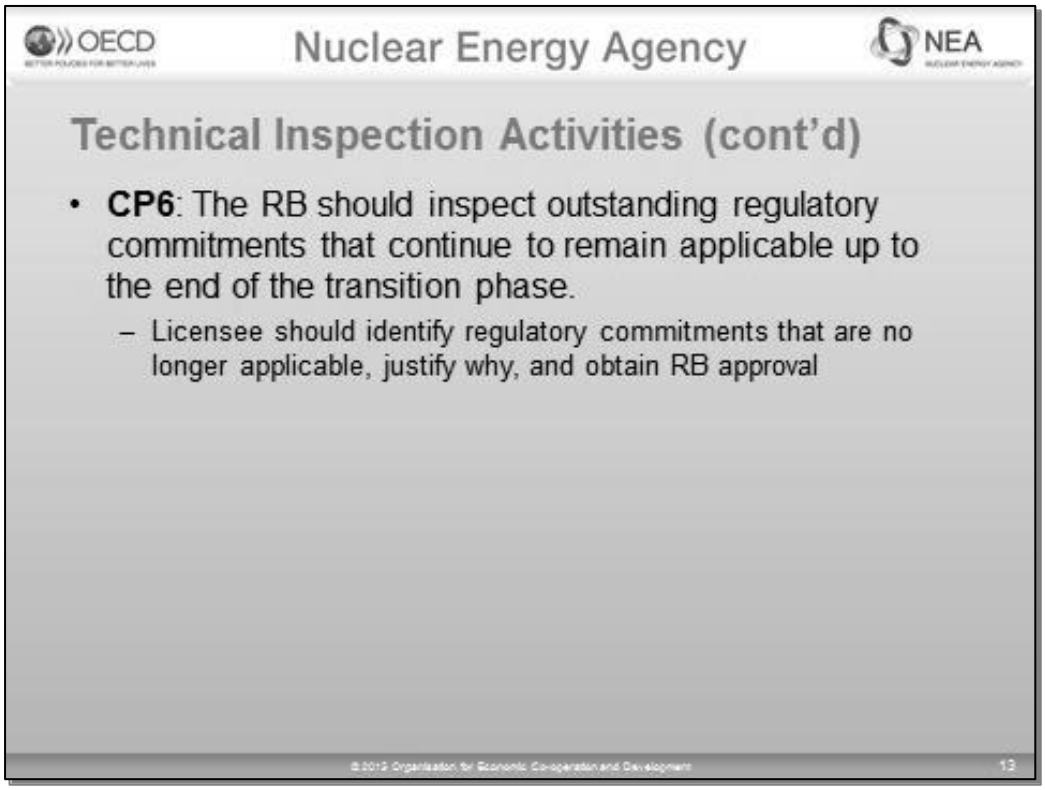
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Technical Inspection Activities (cont'd)
• CP6: The RB should inspect outstanding regulatory commitments that continue to remain applicable up to the end of the transition phase.
– Licensee should identify regulatory commitments that are no longer applicable, justify why, and obtain RB approval
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Technical Inspection Activities (cont'd)

- **CP7**: The RB should assess and inspect the licensee's evaluation of actions to be taken in response to identified non-compliances. More specifically, the RB should provide special consideration in the following areas during the transition phase:
  - What is the safety relevance or safety significance of the finding?
  - How firm is the commitment to shutdown the NPP?
  - What are the alternative compensatory measures proposed by the licensee?
  - How long does it take the licensee to make the change?
  - How long will the licensee's actions be in effect before end of life?
  - Will the action or change be useful beyond the transition phase?
  - What are the external pressures to implement changes (e.g. public)?

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Technical Inspection Activities (cont'd)

- **CP8**: During the transition phase, the RB should conduct inspections to verify that the licensee has control and understands the configuration of systems, structures and components (SSC).
  - Systems that have a safety function, that are functional or that are abandoned are defined and labeled
  - System boundaries are clearly defined (e.g. when a system is modified and part of it is abandoned)

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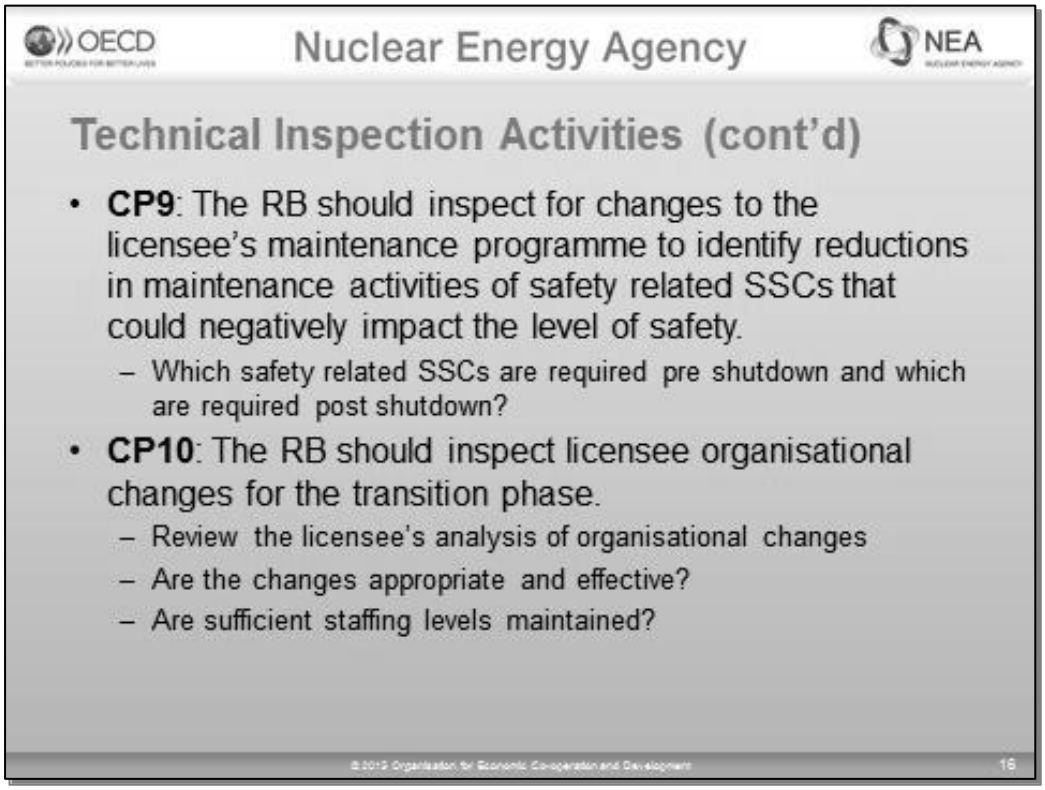
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Technical Inspection Activities (cont'd)
• CP9: The RB should inspect for changes to the licensee's maintenance programme to identify reductions in maintenance activities of safety related SSCs that could negatively impact the level of safety.
– Which safety related SSCs are required pre shutdown and which are required post shutdown?
• CP10: The RB should inspect licensee organisational changes for the transition phase.
– Review the licensee's analysis of organisational changes
– Are the changes appropriate and effective?
– Are sufficient staffing levels maintained?
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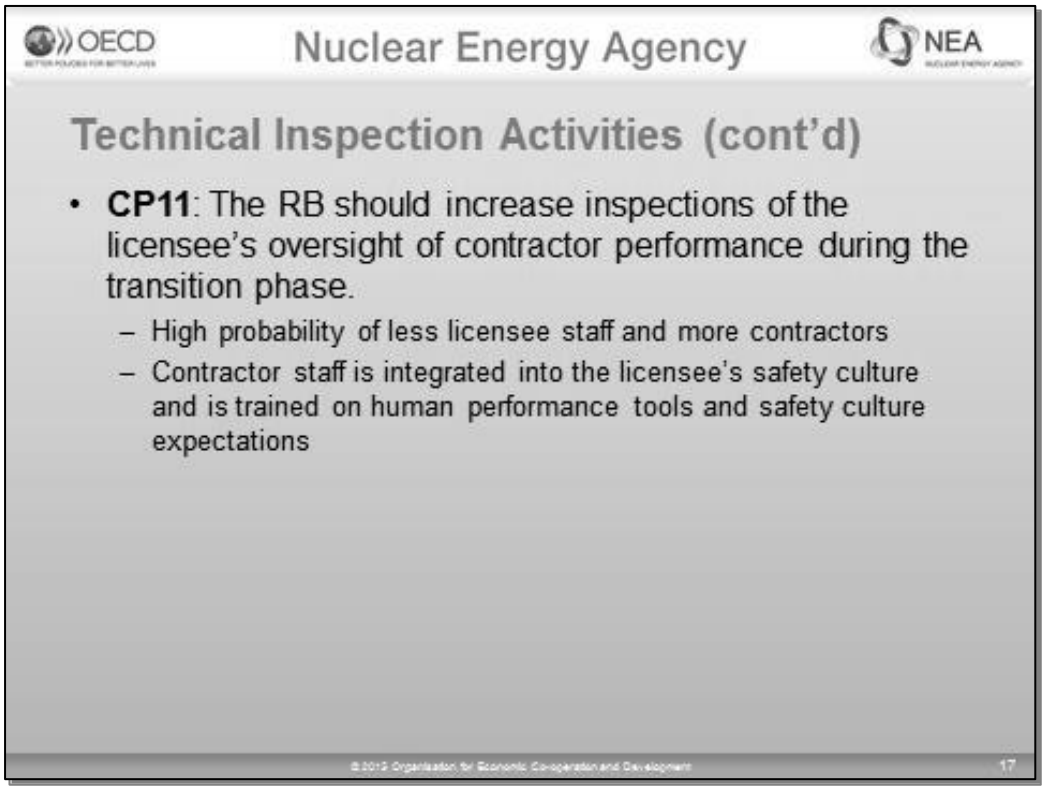
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Technical Inspection Activities (cont'd)
• CP11: The RB should increase inspections of the licensee's oversight of contractor performance during the transition phase.
– High probability of less licensee staff and more contractors
– Contractor staff is integrated into the licensee's safety culture and is trained on human performance tools and safety culture expectations
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Technical Inspection Activities (cont'd)

- **CP12**: If the licensee increases fuel handling activities, the RB should increase inspections in that area.
  - Fuel handling in spent fuel pool
  - Dry cask loading activities
  - Heavy load lifting
  - Additional radiation protection inspections
- **CP13**: If the licensee increases its effort in waste management, the RB should increase inspections in that area.
  - May also need additional radiation protection inspections

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Safety Culture

- **CP14**: The RB should ensure that the licensee has implemented a process/programme for two-way communication between licensee management and staff.
  - Reaffirm safety expectations and future changes
  - Methods of communication may include verbal, website, etc.

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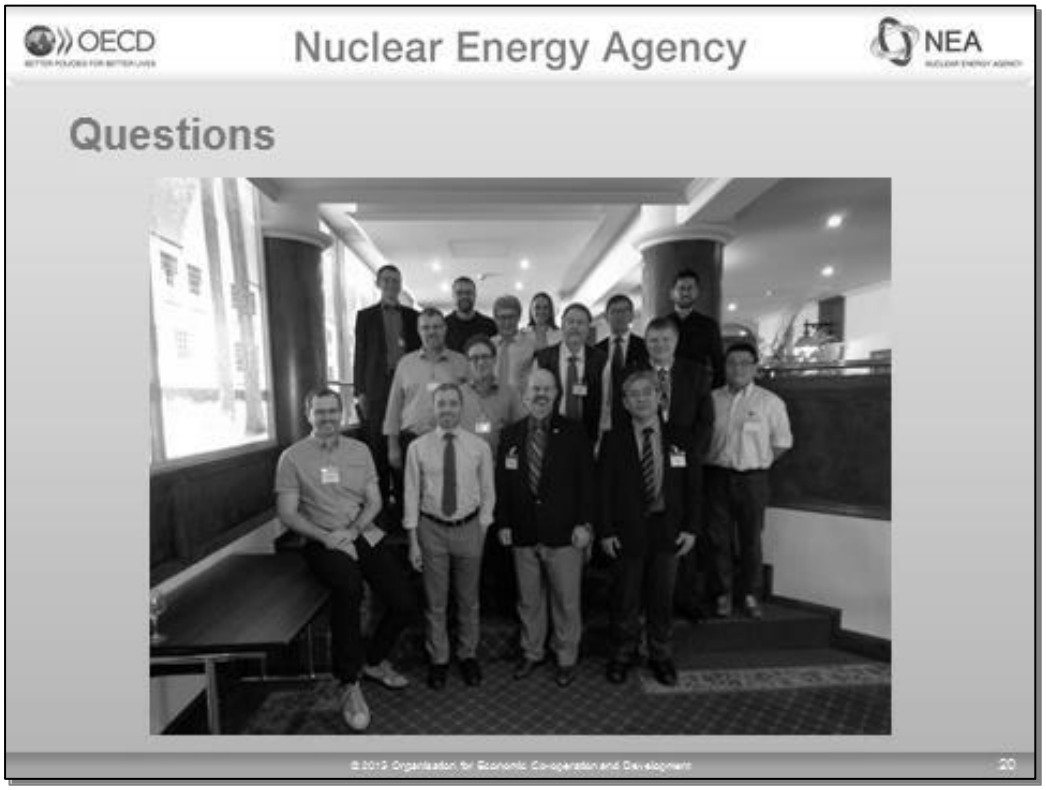
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Questions
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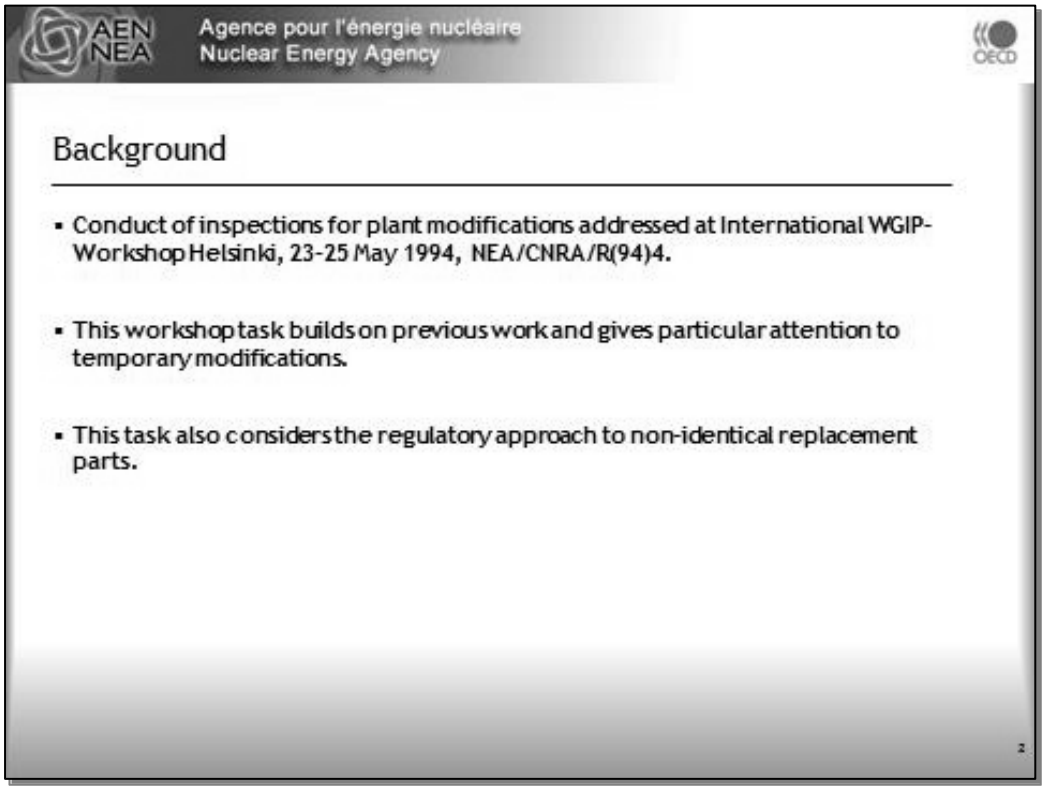
15. TOPIC B: OPENING PRESENTATION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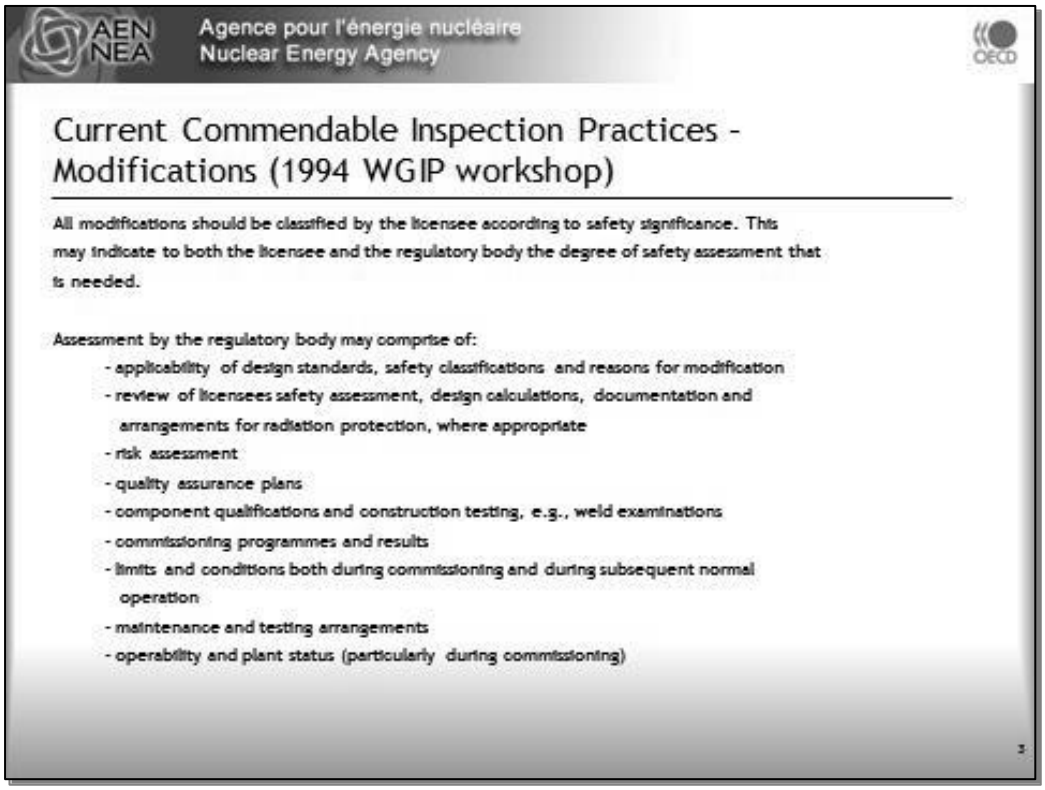
Nuclear Energy Agency
Background
▪ Conduct of inspections for plant modifications addressed at International WGIP-Workshop Helsinki, 23-25 May 1994, NEA/CNRA/R(94)4.
▪ This workshop task builds on previous work and gives particular attention to temporary modifications.
▪ This task also considers the regulatory approach to non-identical replacement parts.
2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Current Commendable Inspection Practices - Modifications (1994 WGIP workshop)
All modifications should be classified by the licensee according to safety significance. This may indicate to both the licensee and the regulatory body the degree of safety assessment that is needed.
Assessment by the regulatory body may comprise of:
- applicability of design standards, safety classifications and reasons for modification
- review of licensees safety assessment, design calculations, documentation and arrangements for radiation protection, where appropriate
- risk assessment
- quality assurance plans
- component qualifications and construction testing, e.g., weld examinations
- commissioning programmes and results
- limits and conditions both during commissioning and during subsequent normal operation
- maintenance and testing arrangements
- operability and plant status (particularly during commissioning)
3

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Current Commendable Inspection Practices - Modifications (1994 WGIP workshop) - Continued

The regulatory body authorises modifications of high safety significance before they are brought into full operation. Large and complex modifications are often authorised in stages, by separately authorising the manufacturing, construction, commissioning, and full operation phases.

The regulatory body can sample planned modifications of lower safety significance and intervene where necessary.

The regulatory inspection authority monitors the plans and progress of all modifications of both major and minor safety significance, and intervenes as necessary. By this means, the regulatory body may require modifications of low safety significance to be assessed and authorised by the regulatory body before being implemented.

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Current Commendable Inspection Practices - Modifications (1994 WGIP workshop) - Continued

The regulatory inspection authority checks

- implementation of quality assurance programmes
- the fabrication, testing and commissioning activities including
- design, installation, assembly control and implementation
- installation procedures
- operator training activities
- changes to operating and emergency procedures
- as-built-documentation
- test and commissioning procedures
- test and commissioning results

The regulatory inspection authority witnesses checks at hold points specified by the regulatory body, such as hold points during manufacture, installation, and commissioning. This inspection approach may apply particularly during large and complex modifications.

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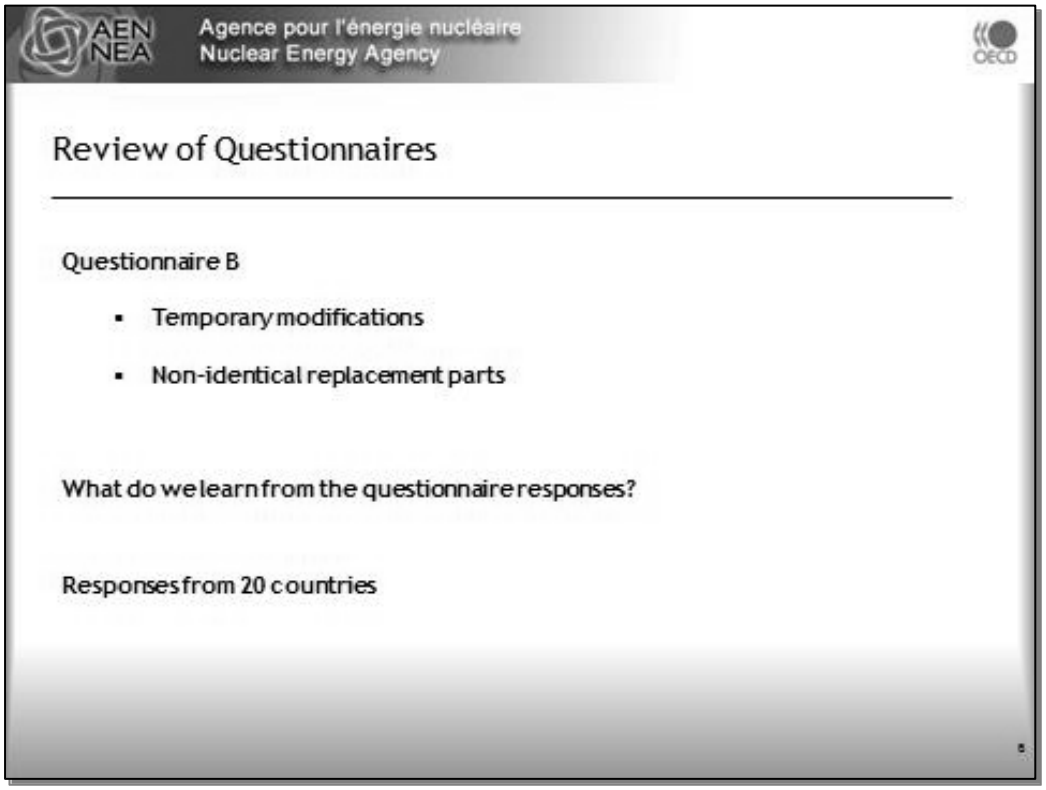
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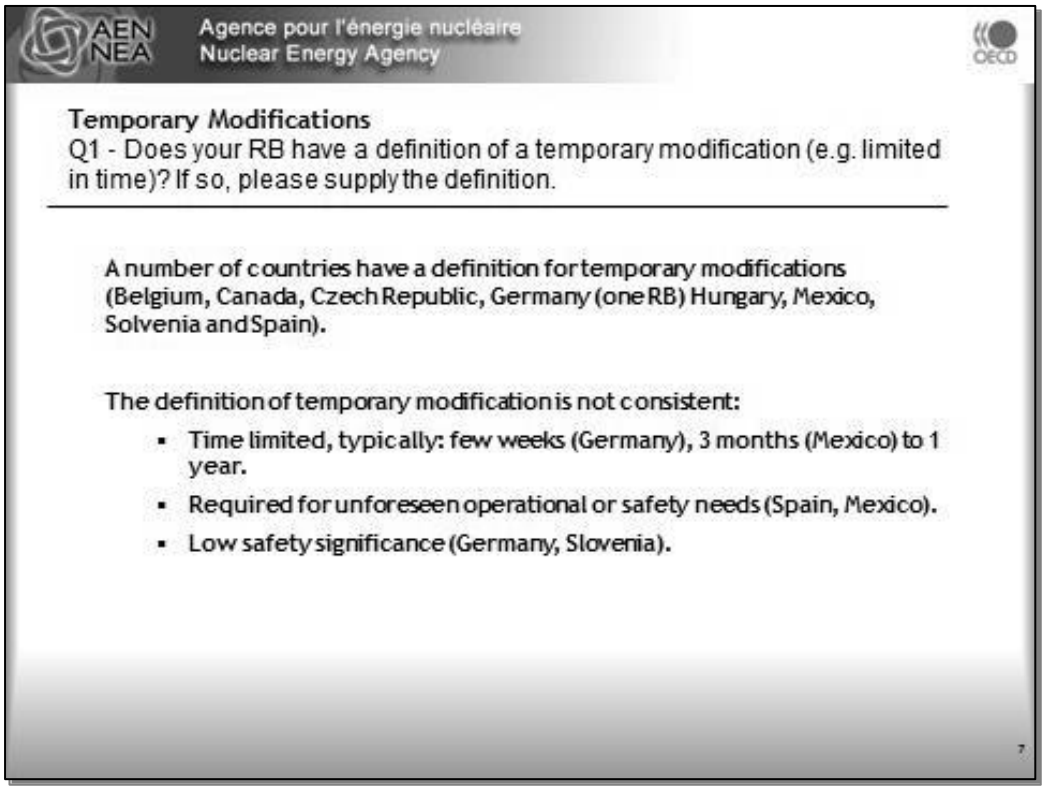
Review of Questionnaires
Questionnaire B
Temporary modifications
Non-identical replacement parts
What do we learn from the questionnaire responses?
Responses from 20 countries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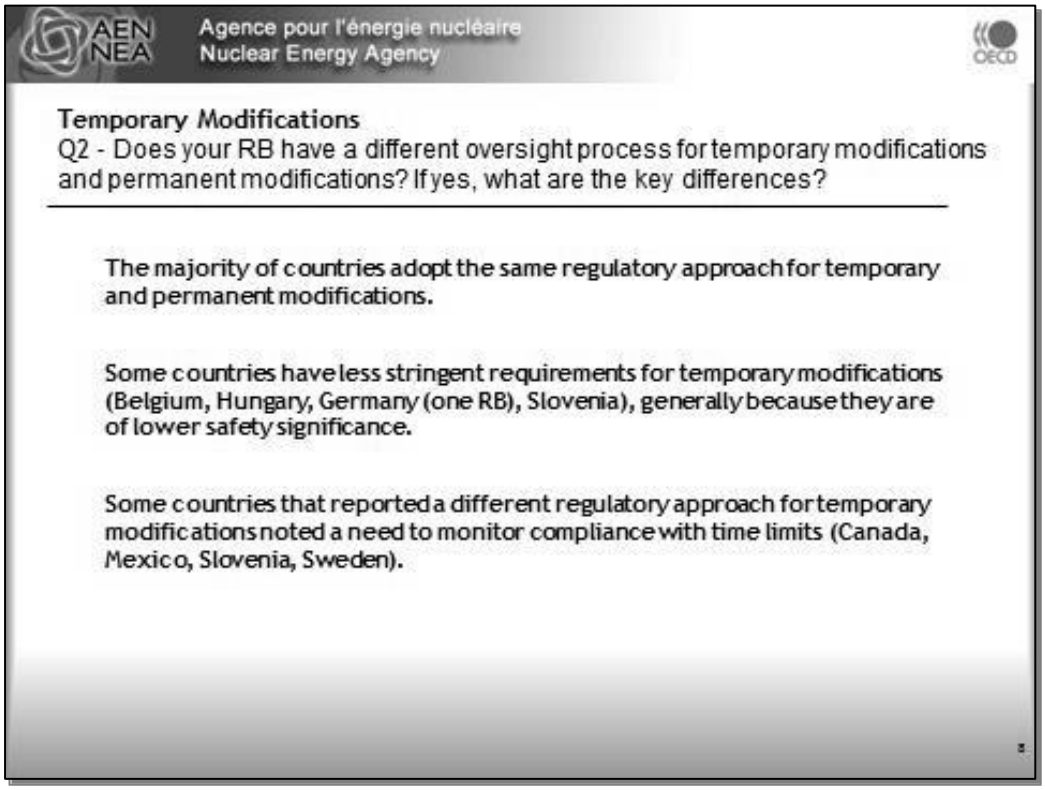
Nuclear Energy Agency
Temporary Modifications
Q1 - Does your RB have a definition of a temporary modification (e.g. limited in time)? If so, please supply the definition.
A number of countries have a definition for temporary modifications (Belgium, Canada, Czech Republic, Germany (one RB) Hungary, Mexico, Solvenia and Spain).
The definition of temporary modification is not consistent:
Time limited, typically: few weeks (Germany), 3 months (Mexico) to 1 year.
Required for unforeseen operational or safety needs (Spain, Mexico).
Low safety significance (Germany, Slovenia).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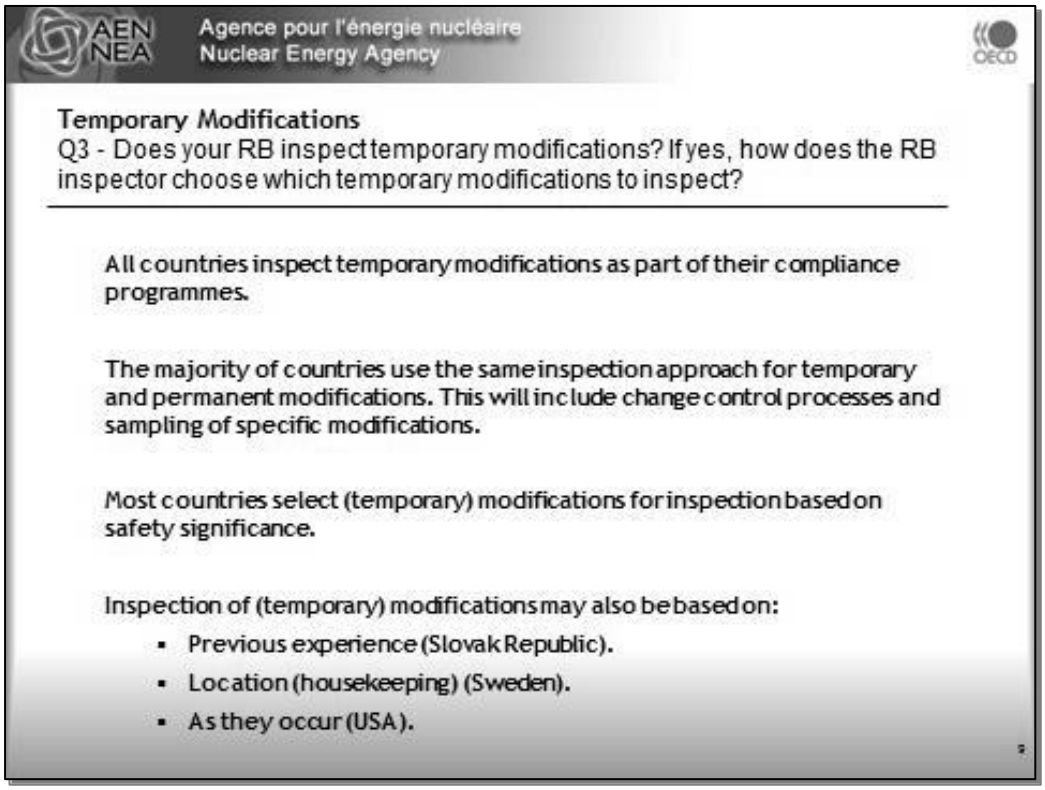
Nuclear Energy Agency
Temporary Modifications
Q2 - Does your RB have a different oversight process for temporary modifications and permanent modifications? If yes, what are the key differences?
The majority of countries adopt the same regulatory approach for temporary and permanent modifications.
Some countries have less stringent requirements for temporary modifications (Belgium, Hungary, Germany (one RB), Slovenia), generally because they are of lower safety significance.
Some countries that reported a different regulatory approach for temporary modifications noted a need to monitor compliance with time limits (Canada, Mexico, Slovenia, Sweden).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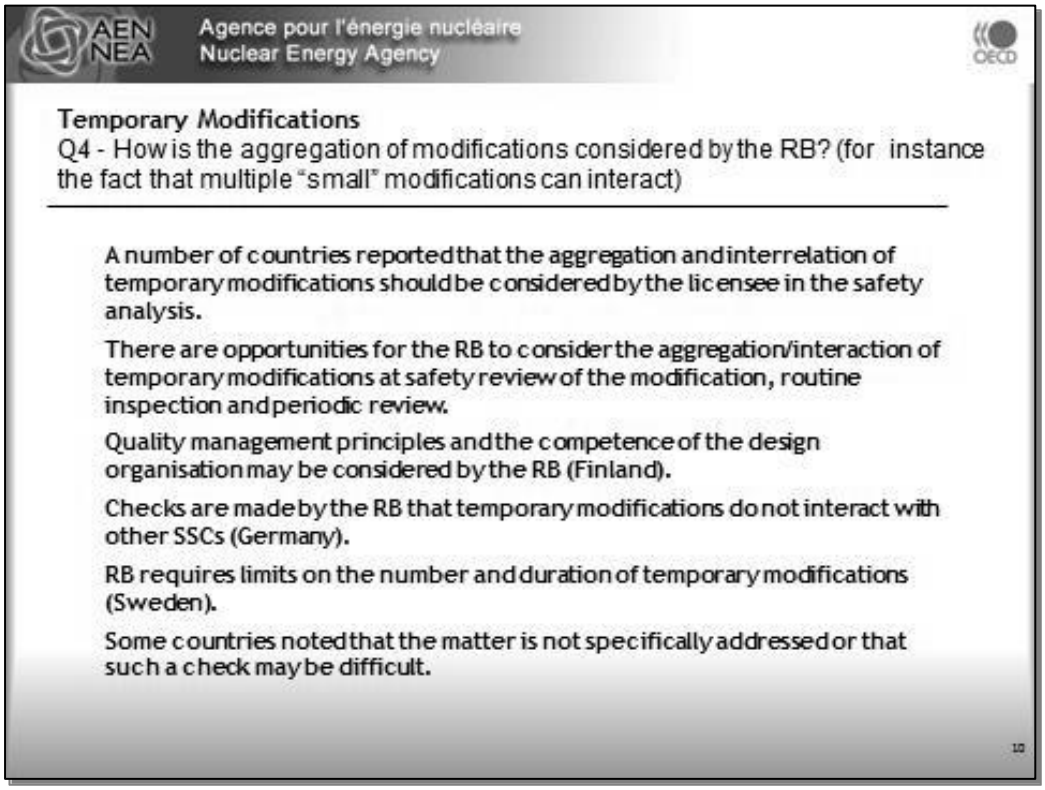
Temporary Modifications
Q3 - Does your RB inspect temporary modifications? If yes, how does the RB inspector choose which temporary modifications to inspect?
All countries inspect temporary modifications as part of their compliance programmes.
The majority of countries use the same inspection approach for temporary and permanent modifications. This will include change control processes and sampling of specific modifications.
Most countries select (temporary) modifications for inspection based on safety significance.
Inspection of (temporary) modifications may also be based on:
Previous experience (Slovak Republic).
Location (housekeeping) (Sweden).
As they occur (USA).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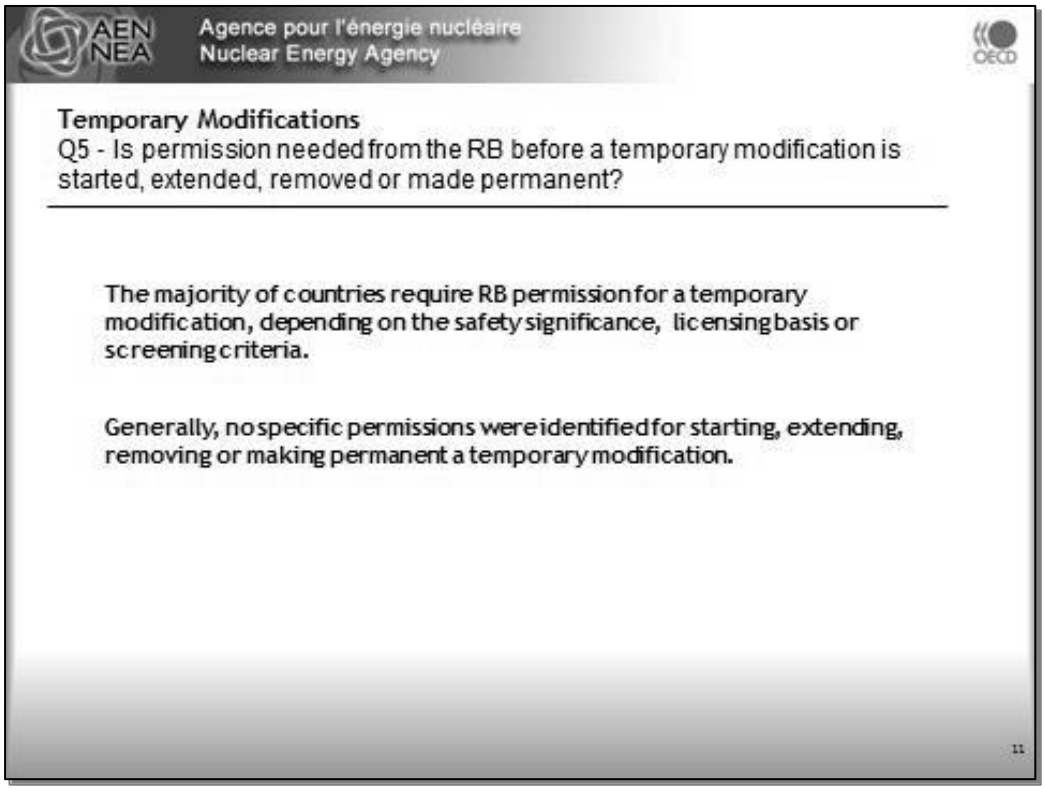
Temporary Modifications
Q4 - How is the aggregation of modifications considered by the RB? (for instance the fact that multiple "small" modifications can interact)
A number of countries reported that the aggregation and interrelation of temporary modifications should be considered by the licensee in the safety analysis.
There are opportunities for the RB to consider the aggregation/interaction of temporary modifications at safety review of the modification, routine inspection and periodic review.
Quality management principles and the competence of the design organisation may be considered by the RB (Finland).
Checks are made by the RB that temporary modifications do not interact with other SSCs (Germany).
RB requires limits on the number and duration of temporary modifications (Sweden).
Some countries noted that the matter is not specifically addressed or that such a check may be difficult.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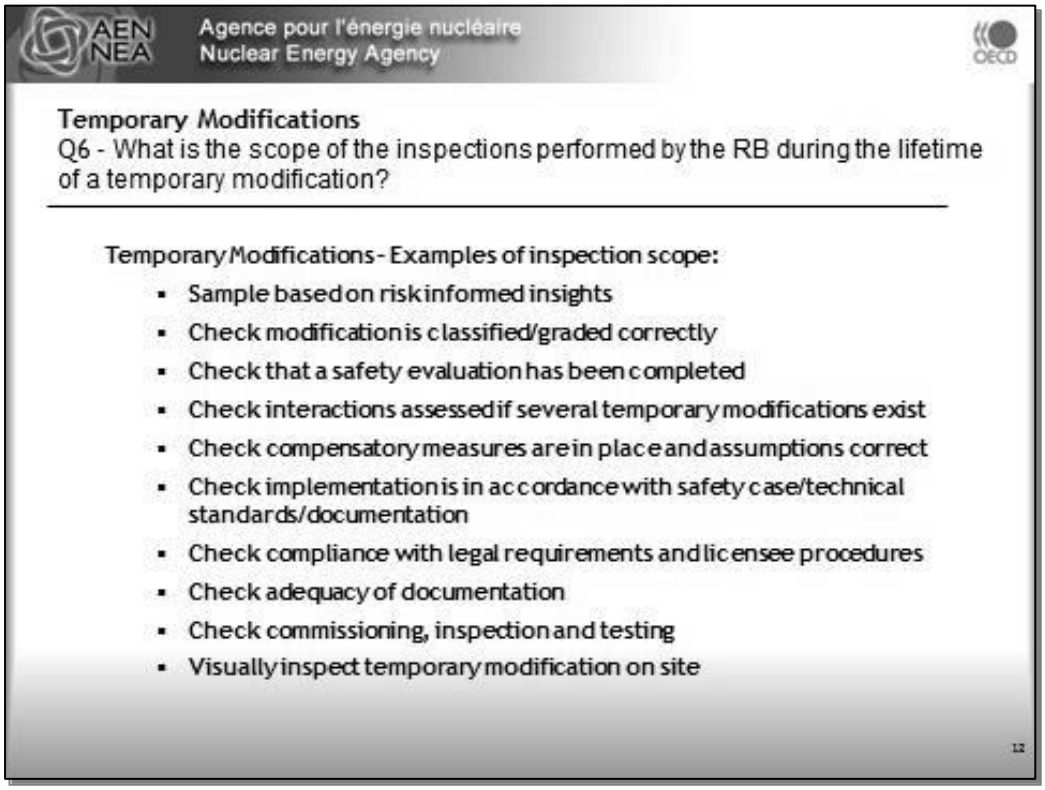
Temporary Modifications
Q5 - Is permission needed from the RB before a temporary modification is started, extended, removed or made permanent?
The majority of countries require RB permission for a temporary modification, depending on the safety significance, licensing basis or screening criteria.
Generally, no specific permissions were identified for starting, extending, removing or making permanent a temporary modification.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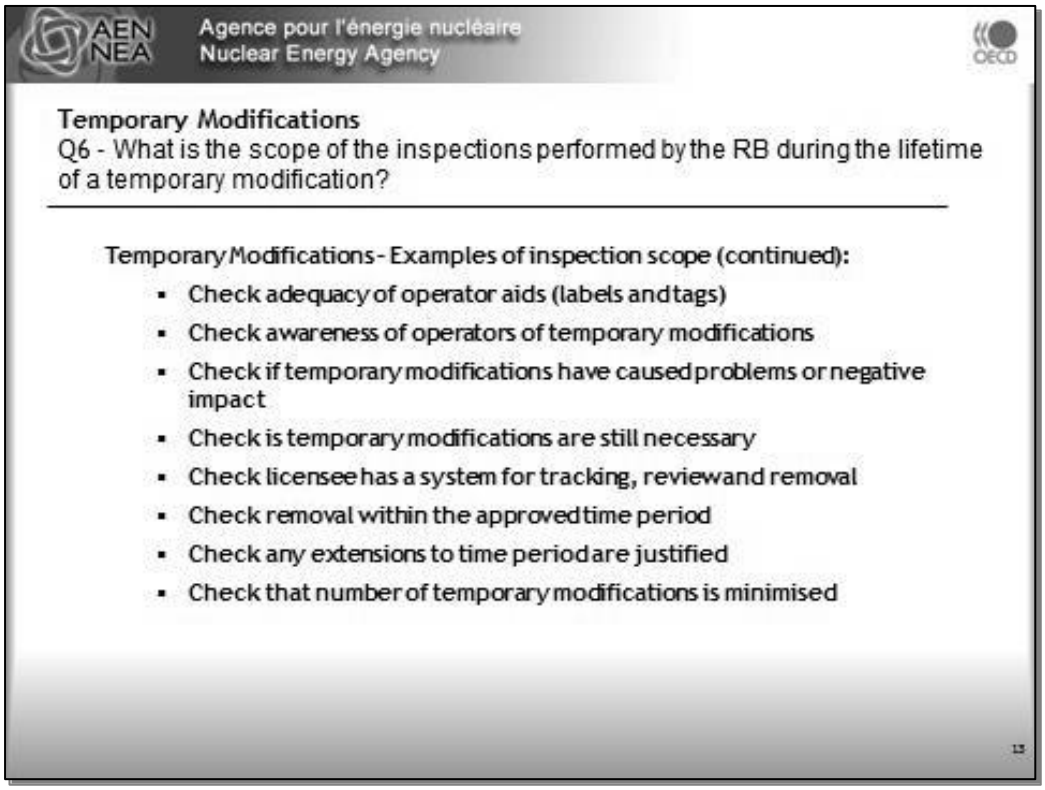
Temporary Modifications
Q6 - What is the scope of the inspections performed by the RB during the lifetime of a temporary modification?
Temporary Modifications - Examples of inspection scope:
Sample based on risk informed insights
Check modification is classified/graded correctly
Check that a safety evaluation has been completed
Check interactions assessed if several temporary modifications exist
Check compensatory measures are in place and assumptions correct
Check implementation is in accordance with safety case/technical standards/documentation
Check compliance with legal requirements and licensee procedures
Check adequacy of documentation
Check commissioning, inspection and testing
Visually inspect temporary modification on site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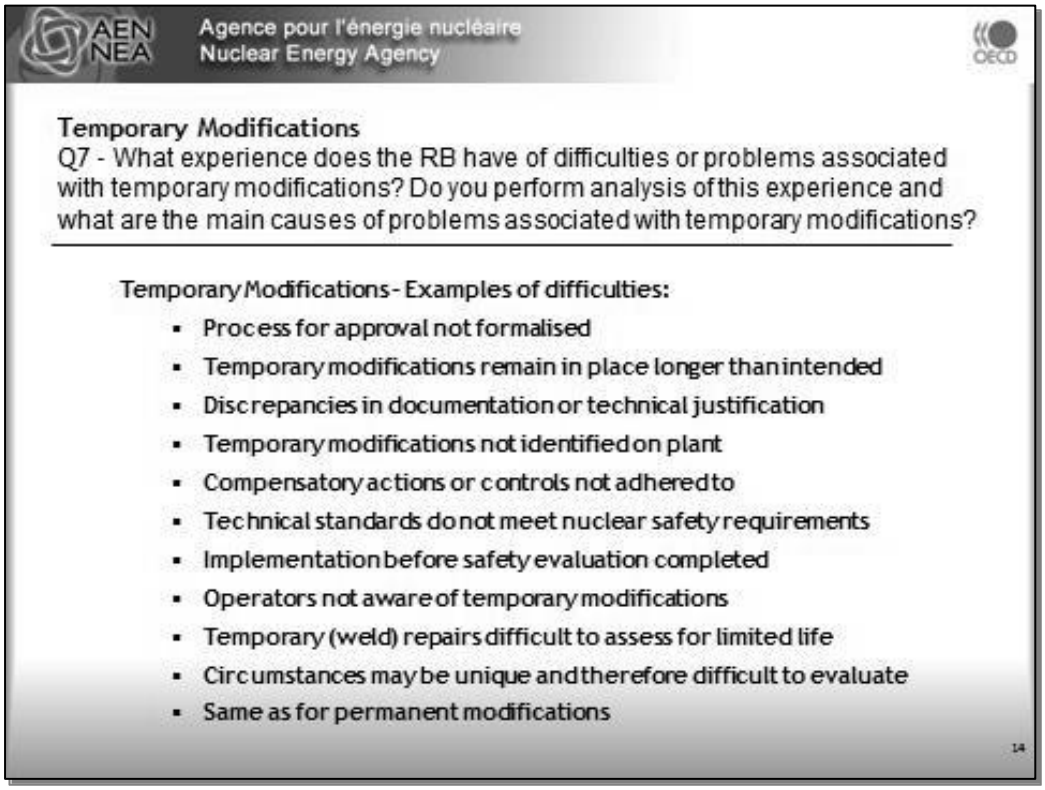
Temporary Modifications
Q6 - What is the scope of the inspections performed by the RB during the lifetime of a temporary modification?
Temporary Modifications - Examples of inspection scope (continued):
Check adequacy of operator aids (labels and tags)
Check awareness of operators of temporary modifications
Check if temporary modifications have caused problems or negative impact
Check is temporary modifications are still necessary
Check licensee has a system for tracking, review and removal
Check removal within the approved time period
Check any extensions to time period are justified
Check that number of temporary modifications is minimised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Temporary Modifications
Q7 - What experience does the RB have of difficulties or problems associated with temporary modifications? Do you perform analysis of this experience and what are the main causes of problems associated with temporary modifications?
Temporary Modifications - Examples of difficulties:
Process for approval not formalised
Temporary modifications remain in place longer than intended
Discrepancies in documentation or technical justification
Temporary modifications not identified on plant
Compensatory actions or controls not adhered to
Technical standards do not meet nuclear safety requirements
Implementation before safety evaluation completed
Operators not aware of temporary modifications
Temporary (weld) repairs difficult to assess for limited life
Circumstances may be unique and therefore difficult to evaluate
Same as for permanent modifications
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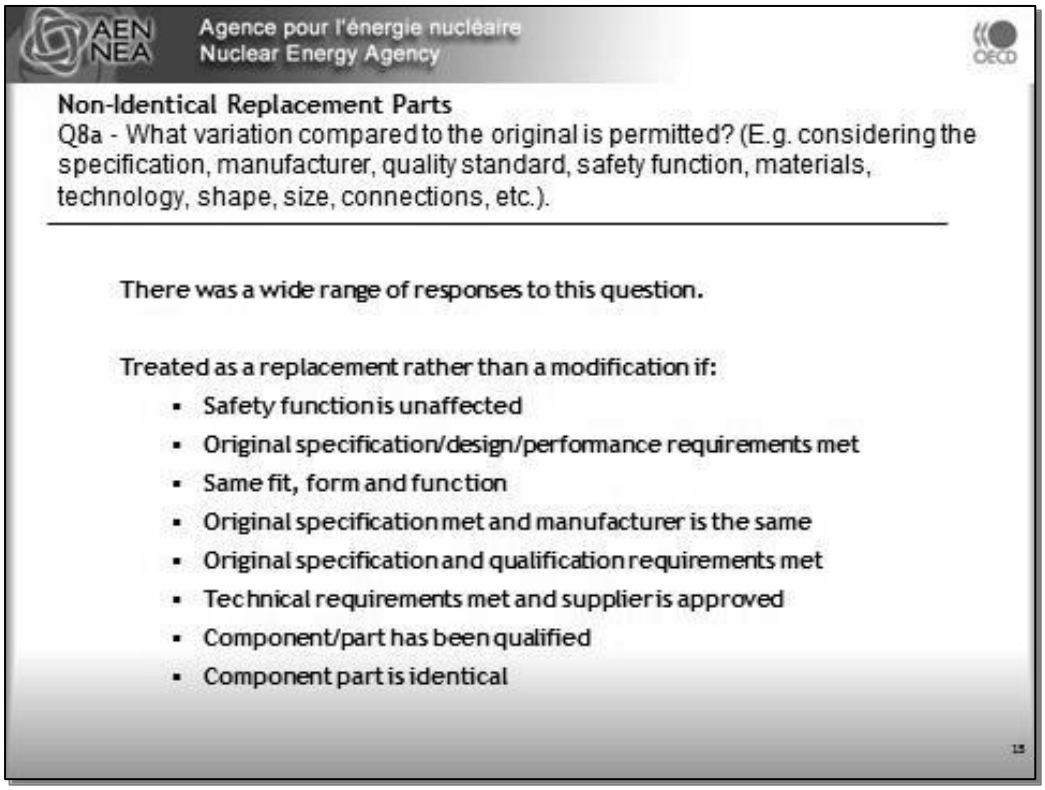
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Non-Identical Replacement Parts
Q8a - What variation compared to the original is permitted? (E.g. considering the specification, manufacturer, quality standard, safety function, materials, technology, shape, size, connections, etc.).
There was a wide range of responses to this question.
Treated as a replacement rather than a modification if:
Safety function is unaffected
Original specification/design/performance requirements met
Same fit, form and function
Original specification met and manufacturer is the same
Original specification and qualification requirements met
Technical requirements met and supplier is approved
Component/part has been qualified
Component part is identical
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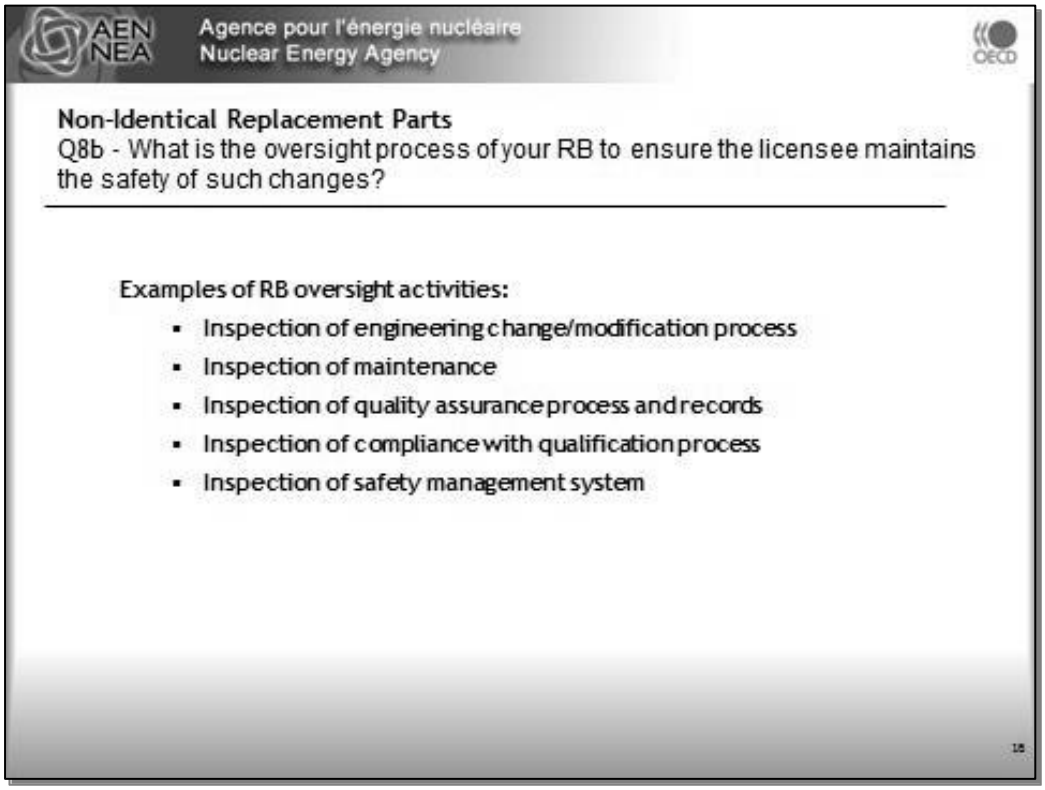
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Non-Identical Replacement Parts
Q8b - What is the oversight process of your RB to ensure the licensee maintains the safety of such changes?
Examples of RB oversight activities:
Inspection of engineering change/modification process
Inspection of maintenance
Inspection of quality assurance process and records
Inspection of compliance with qualification process
Inspection of safety management system
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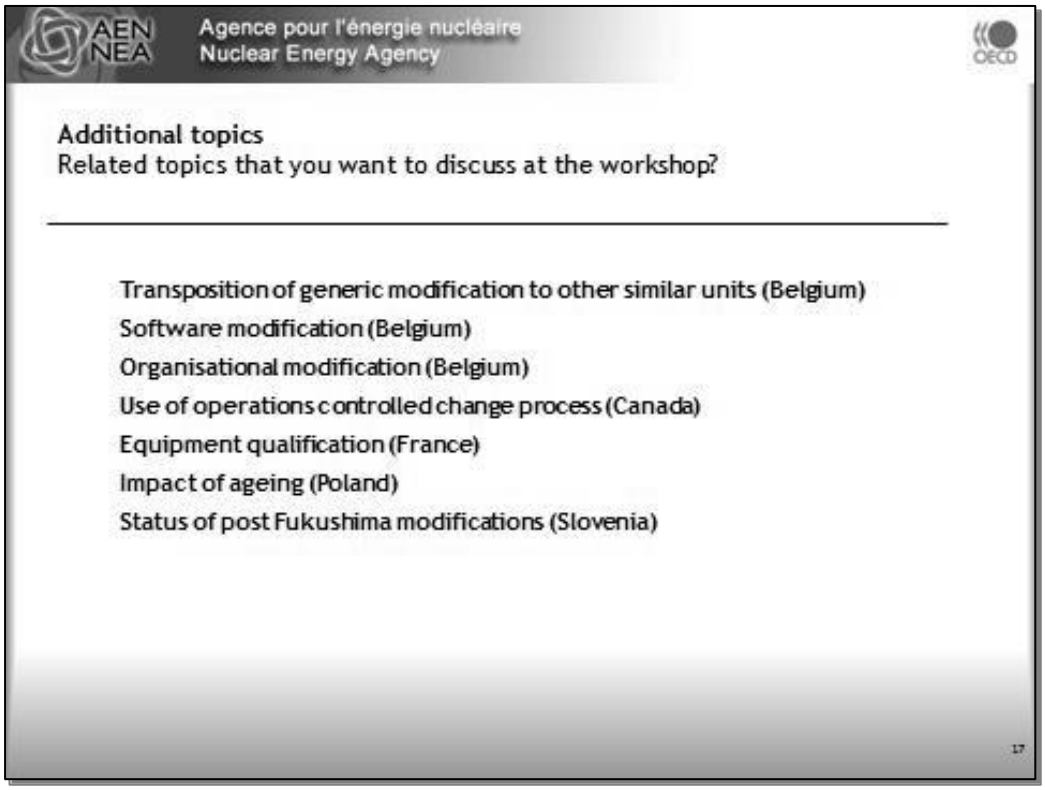
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Additional topics
Related topics that you want to discuss at the workshop?
Transposition of generic modification to other similar units (Belgium)
Software modification (Belgium)
Organisational modification (Belgium)
Use of operations controlled change process (Canada)
Equipment qualification (France)
Impact of ageing (Poland)
Status of post Fukushima modifications (Slovenia)
17


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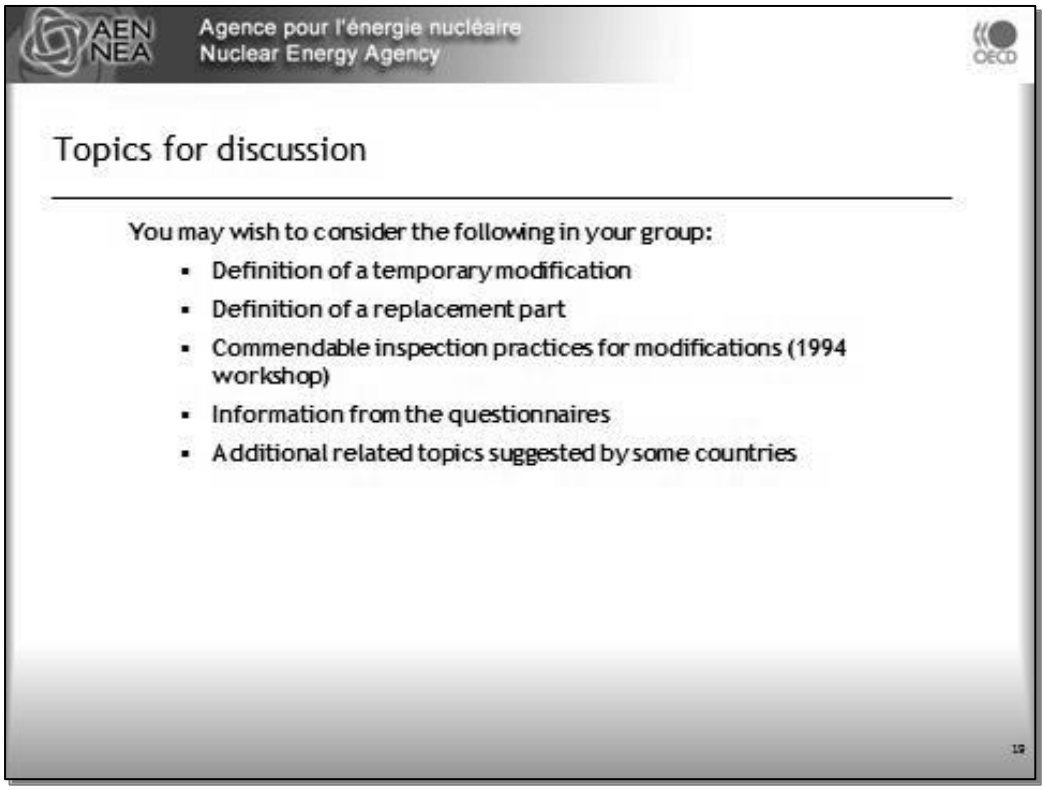
Francisco José Gallardo Macia, Spain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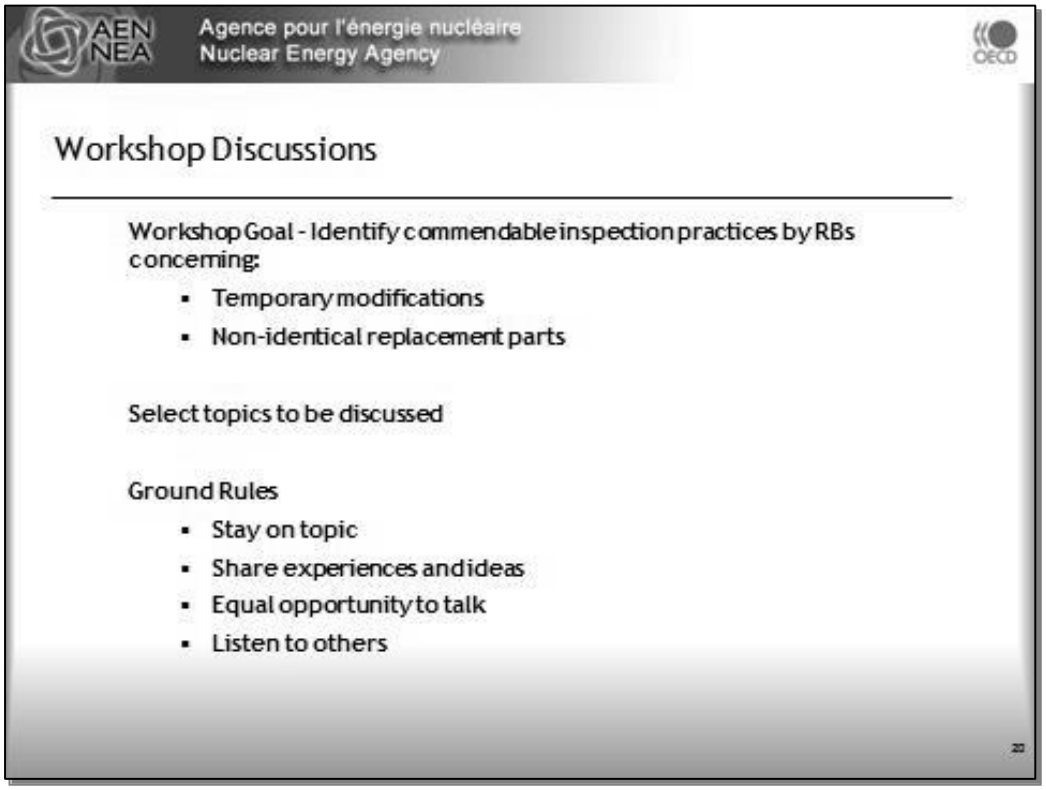
Topics for discussion
You may wish to consider the following in your group:
Definition of a temporary modification
Definition of a replacement part
Commendable inspection practices for modifications (1994 workshop)
Information from the questionnaires
Additional related topics suggested by some countries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Workshop Discussions
Workshop Goal - Identify commendable inspection practices by RBs concerning:
Temporary modifications
Non-identical replacement parts
Select topics to be discussed
Ground Rules
Stay on topic
Share experiences and ideas
Equal opportunity to talk
Listen to others
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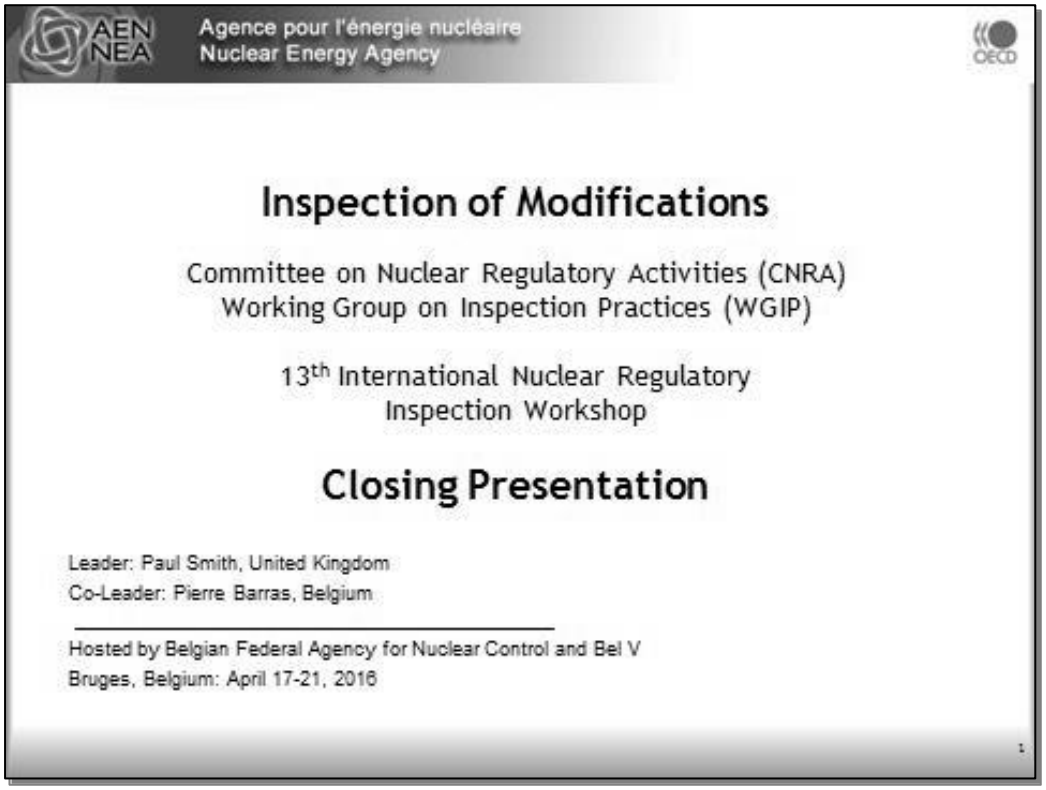
16. TOPIC B: CLOSING PRESENTATION



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Workshop Discussion Groups

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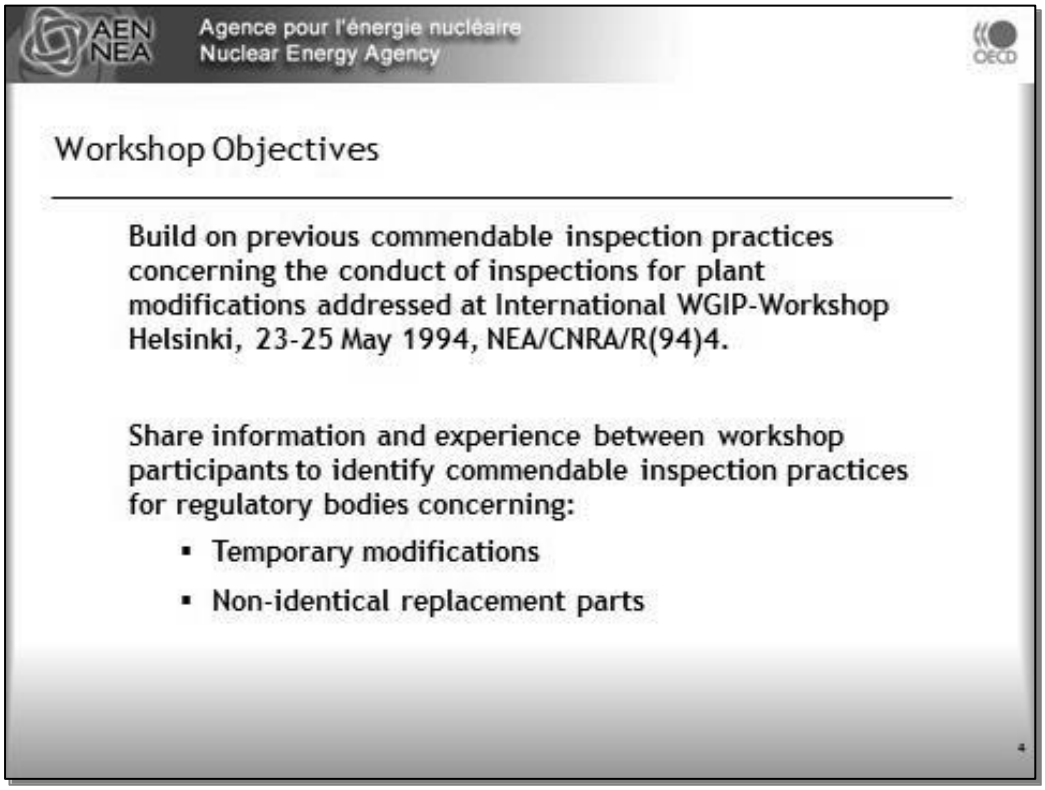
Groups 3 and 4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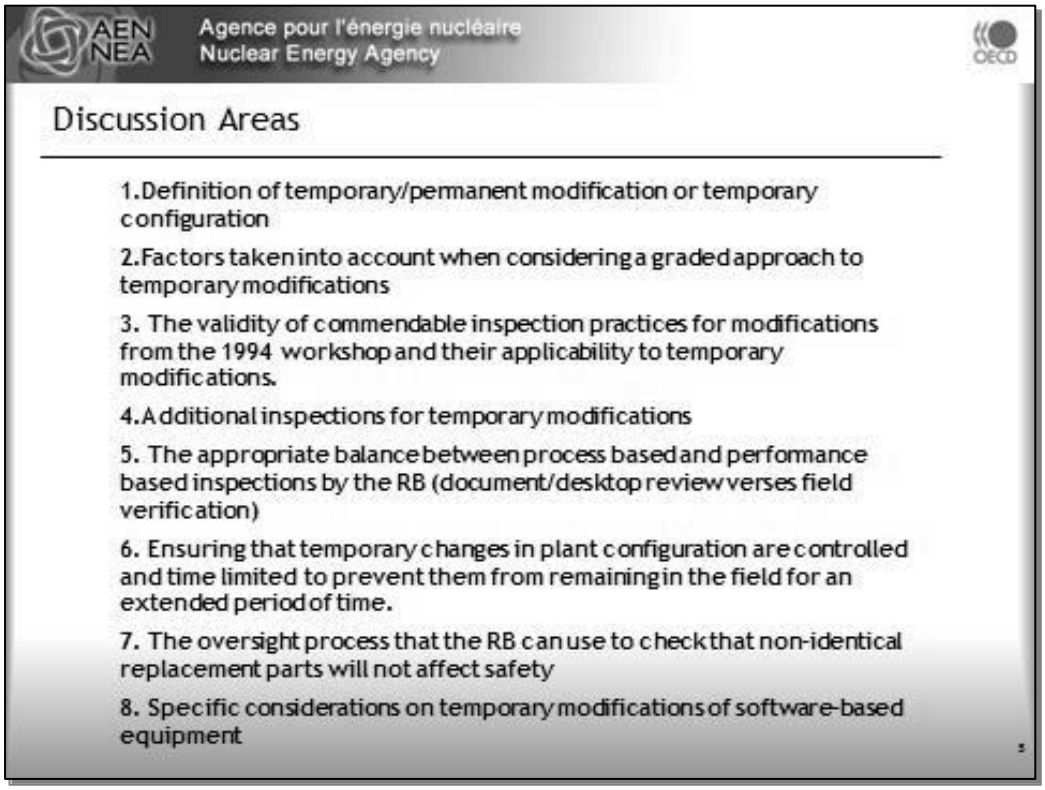
Workshop Objectives
Build on previous commendable inspection practices concerning the conduct of inspections for plant modifications addressed at International WGIP-Workshop Helsinki, 23-25 May 1994, NEA/CNRA/R(94)4.
Share information and experience between workshop participants to identify commendable inspection practices for regulatory bodies concerning:
Temporary modifications
Non-identical replacement parts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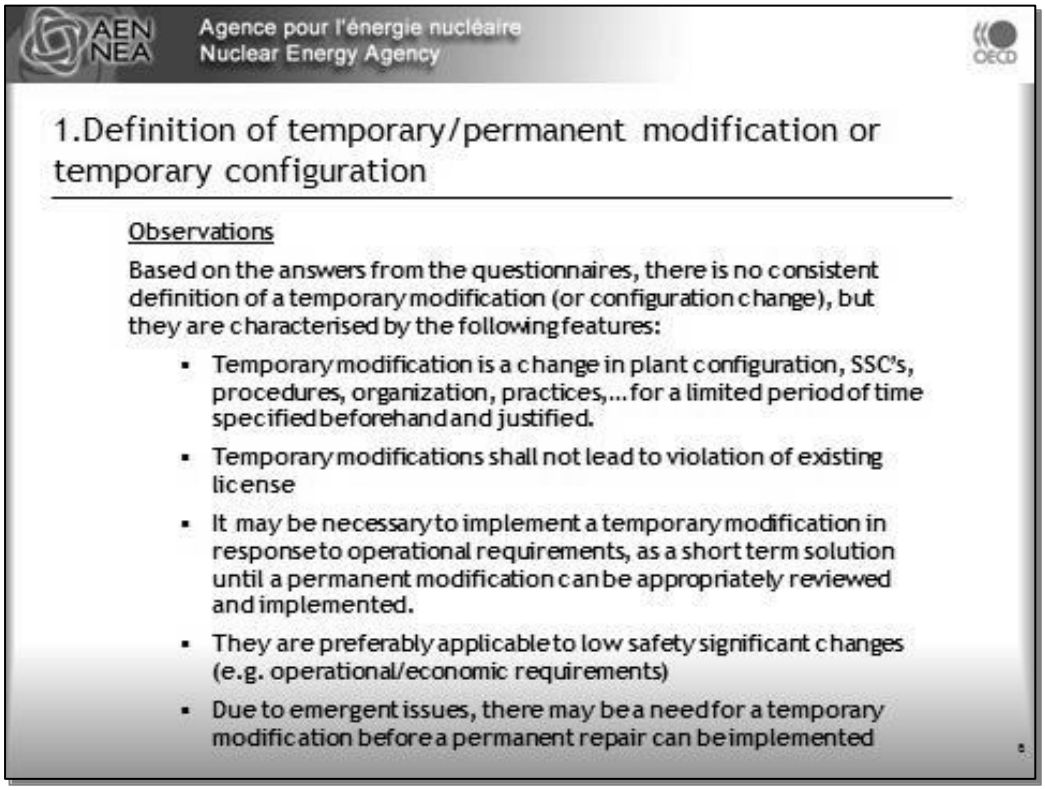
Discussion Areas
1. Definition of temporary/permanent modification or temporary configuration
2. Factors taken into account when considering a graded approach to temporary modifications
3. The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.
4. Additional inspections for temporary modifications
5. The appropriate balance between process based and performance based inspections by the RB (document/desktop review verses field verification)
6. Ensuring that temporary changes in plant configuration are controlled and time limited to prevent them from remaining in the field for an extended period of time.
7. The oversight process that the RB can use to check that non-identical replacement parts will not affect safety
8. Specific considerations on temporary modifications of software-based equipment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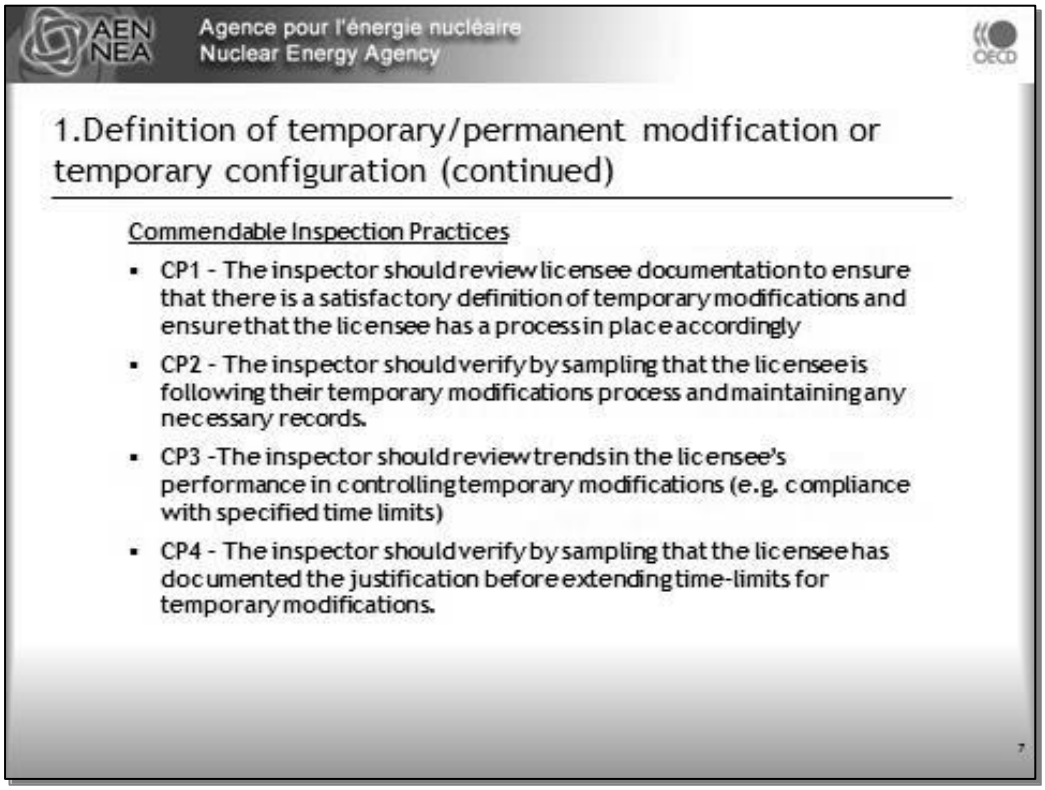
1.Definition of temporary/permanent modification or temporary configuration
Observations
Based on the answers from the questionnaires, there is no consistent definition of a temporary modification (or configuration change), but they are characterised by the following features:
Temporary modification is a change in plant configuration, SSC's, procedures, organization, practices,...for a limited period of time specified beforehand and justified.
Temporary modifications shall not lead to violation of existing license
It may be necessary to implement a temporary modification in response to operational requirements, as a short term solution until a permanent modification can be appropriately reviewed and implemented.
They are preferably applicable to low safety significant changes (e.g. operational/economic requirements)
Due to emergent issues, there may be a need for a temporary modification before a permanent repair can be implemented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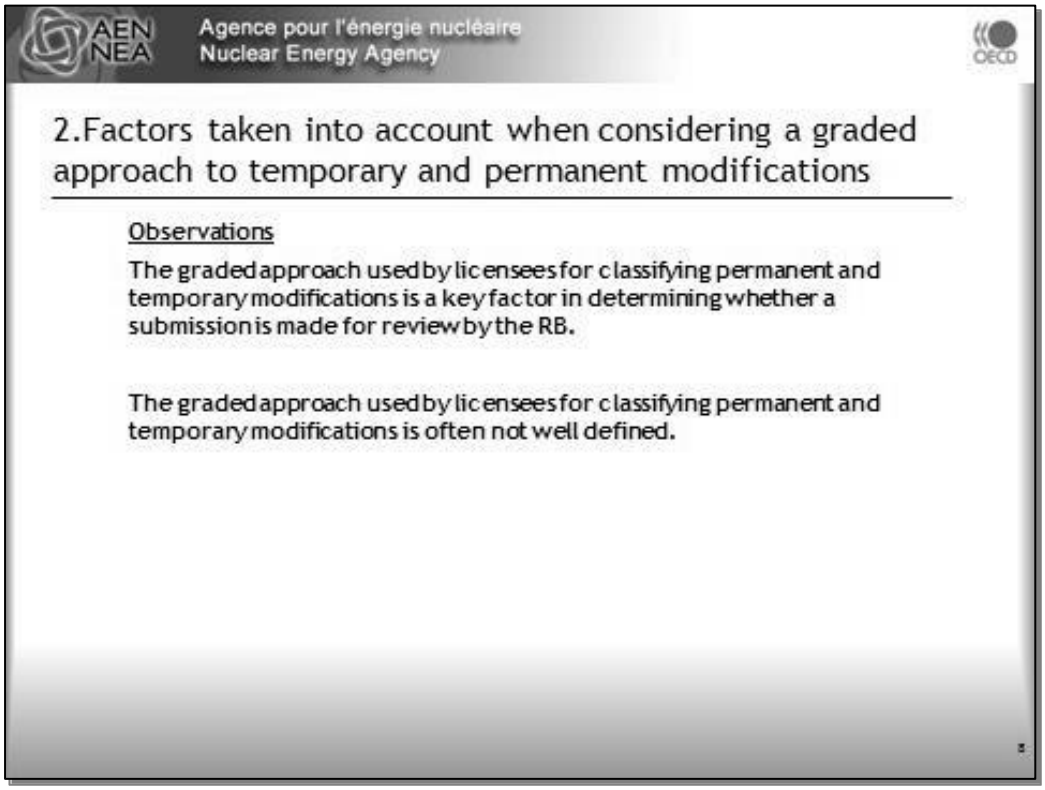
1.Definition of temporary/permanent modification or temporary configuration (continued)
Commendable Inspection Practices
CP1 - The inspector should review licensee documentation to ensure that there is a satisfactory definition of temporary modifications and ensure that the licensee has a process in place accordingly
CP2 - The inspector should verify by sampling that the licensee is following their temporary modifications process and maintaining any necessary records.
CP3 -The inspector should review trends in the licensee's performance in controlling temporary modifications (e.g. compliance with specified time limits)
CP4 - The inspector should verify by sampling that the licensee has documented the justification before extending time-limits for temporary modifications.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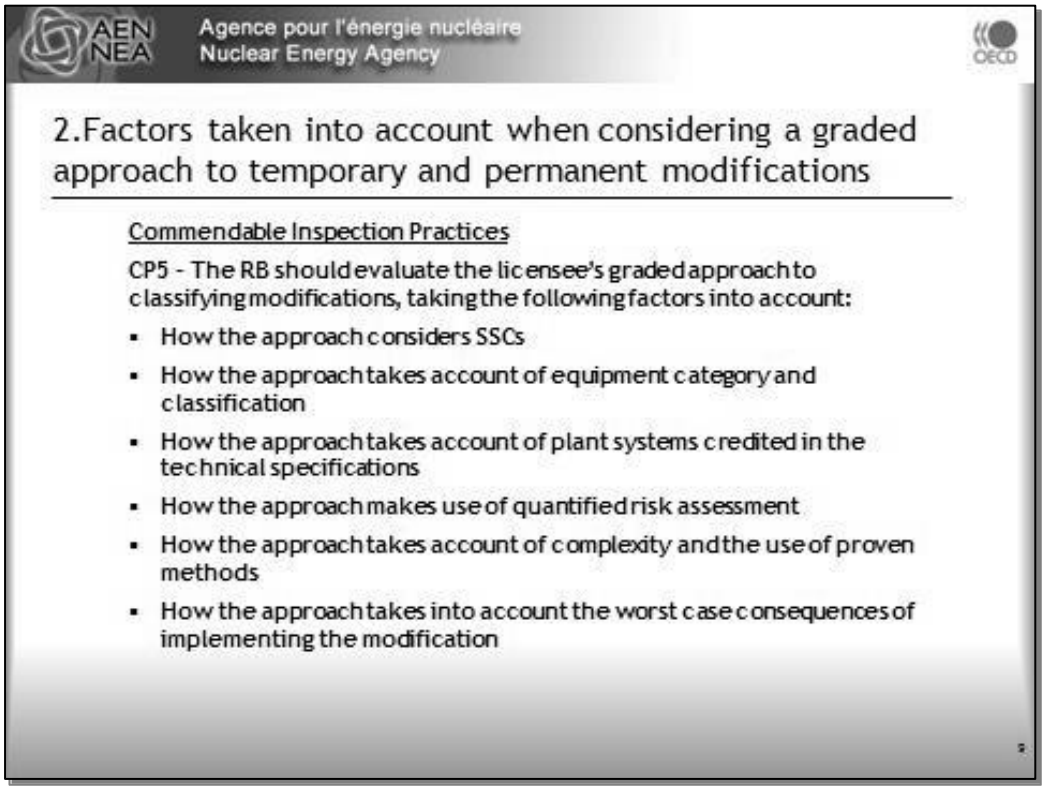
2.Factors taken into account when considering a graded approach to temporary and permanent modifications
Observations
The graded approach used by licensees for classifying permanent and temporary modifications is a key factor in determining whether a submission is made for review by the RB.
The graded approach used by licensees for classifying permanent and temporary modifications is often not well defined.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2.Factors taken into account when considering a graded approach to temporary and permanent modifications
Commendable Inspection Practices
CP5 - The RB should evaluate the licensee's graded approach to classifying modifications, taking the following factors into account:
How the approach considers SSCs
How the approach takes account of equipment category and classification
How the approach takes account of plant systems credited in the technical specifications
How the approach makes use of quantified risk assessment
How the approach takes account of complexity and the use of proven methods
How the approach takes into account the worst case consequences of implementing the modification

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3. The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.

Observations

Review of the 1994 commendable inspection practices for modifications is relevant because the majority of countries use the same inspection approach for temporary and permanent modifications.

The 1994 commendable inspection practices have an emphasis on large and complex modifications which are planned well in advance and may be authorised in stages. Whereas temporary modifications are typically associated with emergent issues and are less complex.

Issues such as plant status and operability are more important in the case of temporary modifications

Necessary changes to the existing (1994) commendable practices for modifications were identified at the 2016 WGIP workshop (WGIP summary version)

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3. The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.

1994 Commendable Inspection Practices - All Modifications - Changes

All modifications should be classified by the licensee according to safety significance. This may indicate to both the licensee and the regulatory body the degree of safety assessment that is needed.

Assessment by the regulatory body may comprise of:

- applicability of design standards, safety classifications and reasons for modification
- review of licensees safety assessment, design calculations, documentation and arrangements for radiation protection, where appropriate
- risk assessment
- *licensee consideration of OpEx*
- quality assurance plans
- component qualifications and construction testing, e.g., weld examinations
- commissioning programmes and results
- limits and conditions both during commissioning and during subsequent normal operation
- maintenance and testing arrangements
- operability and plant status (particularly during commissioning)

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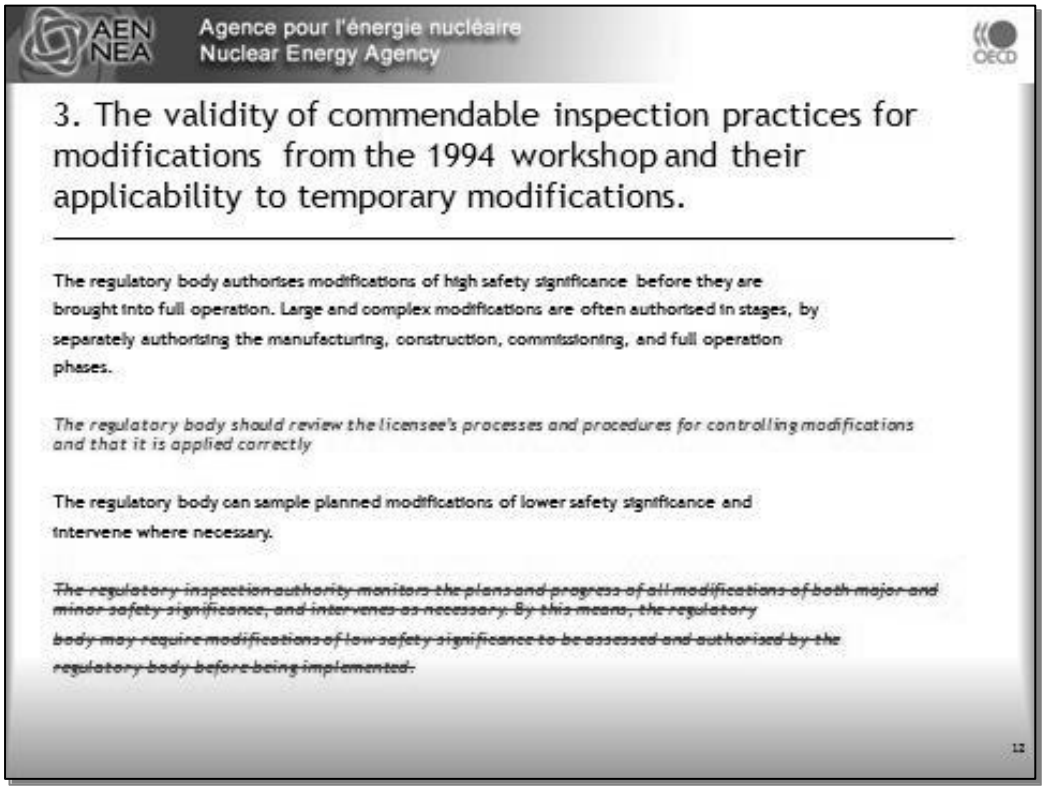
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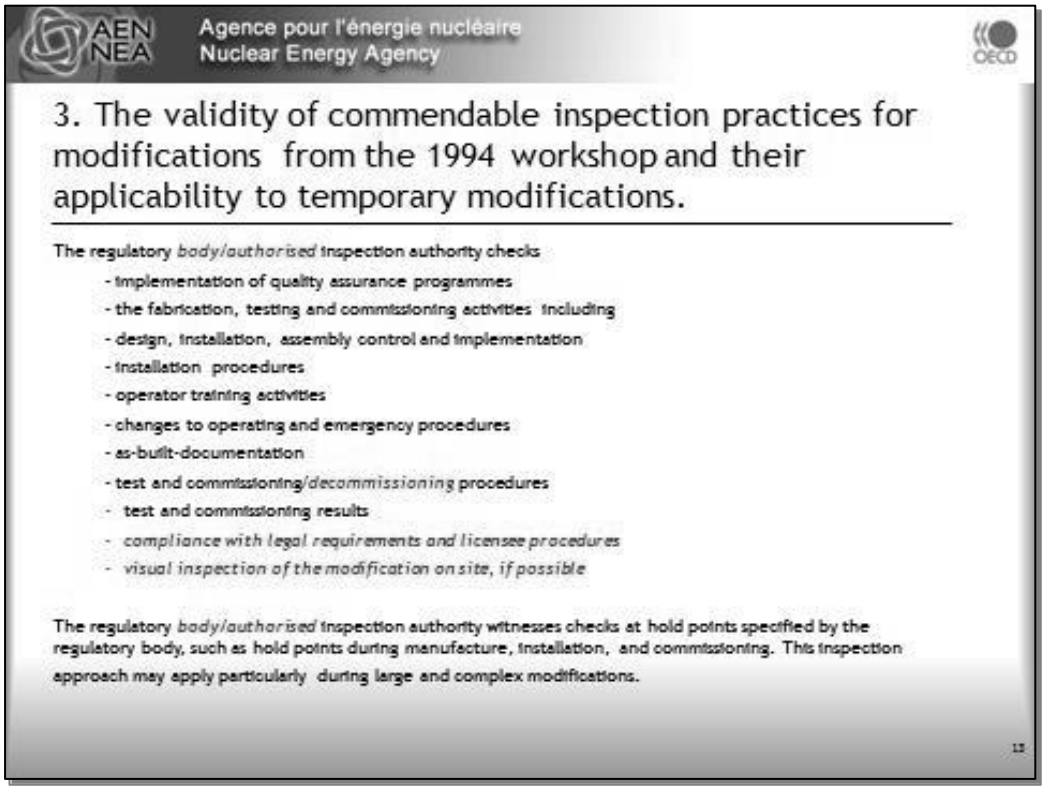
3. The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.
The regulatory body authorises modifications of high safety significance before they are brought into full operation. Large and complex modifications are often authorised in stages, by separately authorising the manufacturing, construction, commissioning, and full operation phases.
The regulatory body should review the licensee's processes and procedures for controlling modifications and that it is applied correctly
The regulatory body can sample planned modifications of lower safety significance and intervene where necessary.
The regulatory inspection authority monitors the plans and progress of all modifications of both major and minor safety significance, and intervenes as necessary. By this means, the regulatory body may require modifications of low safety significance to be assessed and authorised by the regulatory body before being implemented.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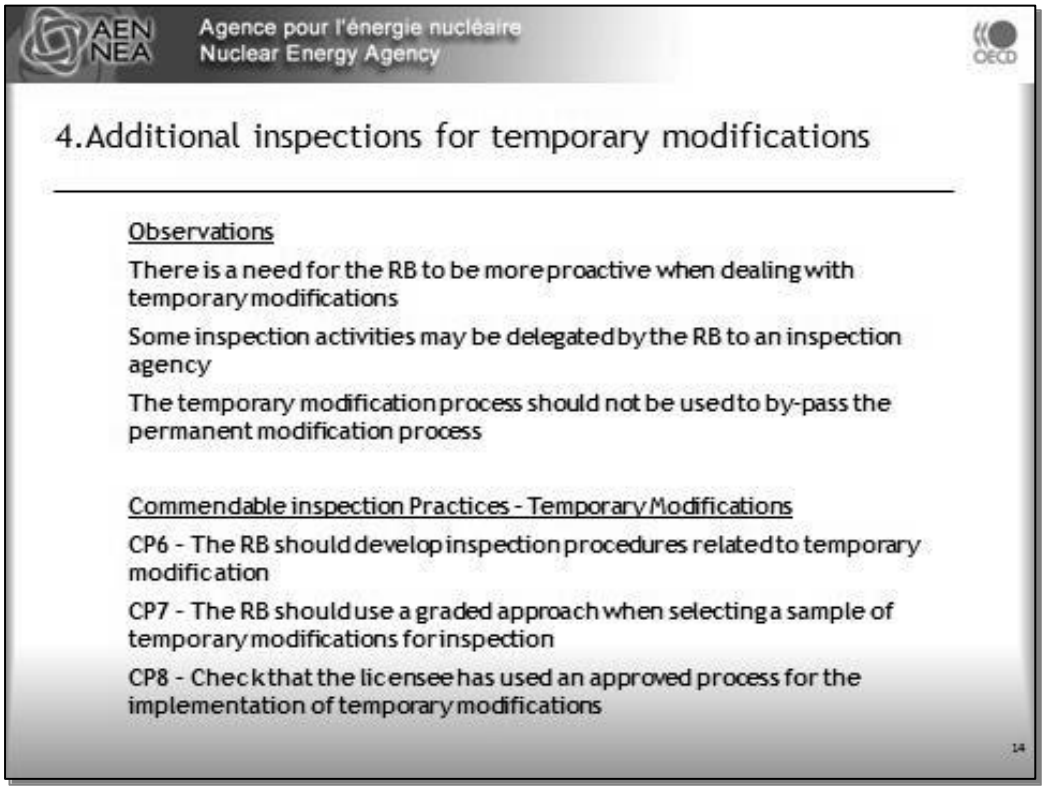
3. The validity of commendable inspection practices for modifications from the 1994 workshop and their applicability to temporary modifications.
The regulatory body/authorised inspection authority checks
- implementation of quality assurance programmes
- the fabrication, testing and commissioning activities including
- design, installation, assembly control and implementation
- installation procedures
- operator training activities
- changes to operating and emergency procedures
- as-built-documentation
- test and commissioning/decommissioning procedures
- test and commissioning results
- compliance with legal requirements and licensee procedures
- visual inspection of the modification on site, if possible
The regulatory body/authorised inspection authority witnesses checks at hold points specified by the regulatory body, such as hold points during manufacture, installation, and commissioning. This inspection approach may apply particularly during large and complex modifications.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4.Additional inspections for temporary modifications
Observations
There is a need for the RB to be more proactive when dealing with temporary modifications
Some inspection activities may be delegated by the RB to an inspection agency
The temporary modification process should not be used to by-pass the permanent modification process
Commendable inspection Practices - Temporary Modifications
CP6 - The RB should develop inspection procedures related to temporary modification
CP7 - The RB should use a graded approach when selecting a sample of temporary modifications for inspection
CP8 - Check that the licensee has used an approved process for the implementation of temporary modifications
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4.Additional inspections for temporary modifications
Commendable inspection Practices - Temporary Modifications
CP9 - Check that temporary modifications are classified/graded correctly and that a safety evaluation has been completed and documented
CP10 - Check that interactions have been assessed by the licensee if several modifications exist
CP11 - Check that any required compensatory measures are in place and effective
CP12 - Check that documentation affected by temporary modification is appropriately marked in master documentation and controlled copies
CP13 - Check the adequacy of operator aids (labels/tags/instructions)
CP14 - Check that operators are aware of any temporary modifications, as appropriate, especially:
The Impact on plant operation
Safety limits and conditions of the implemented temporary modification
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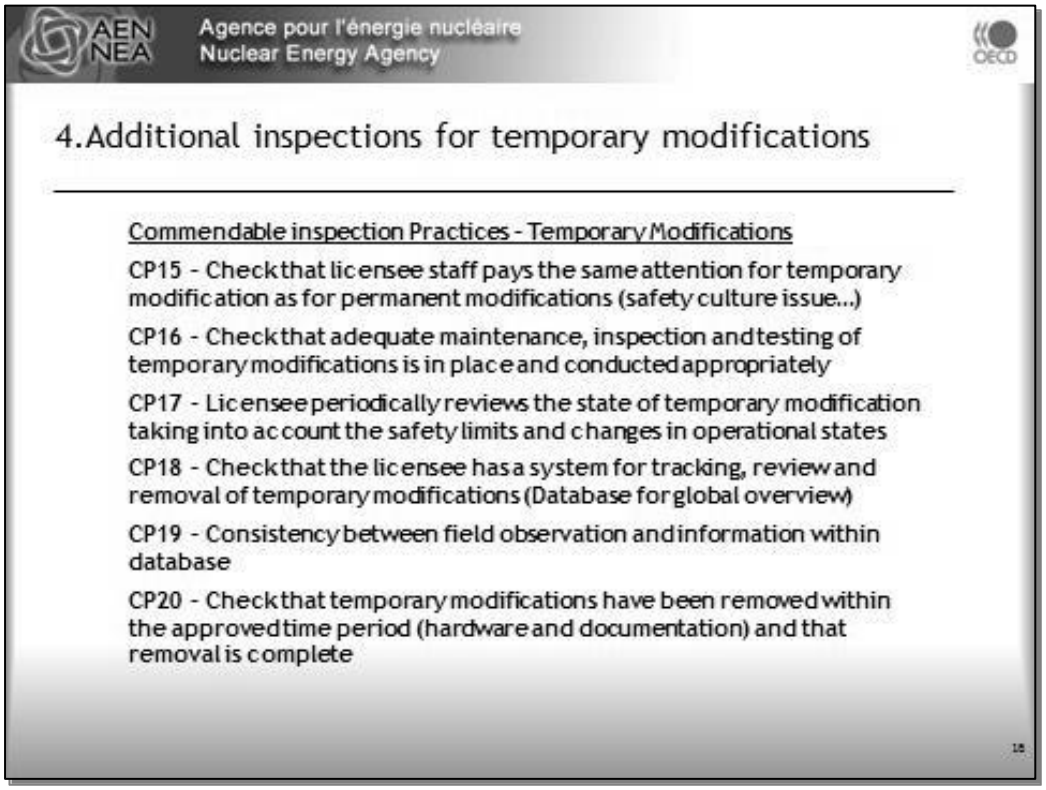
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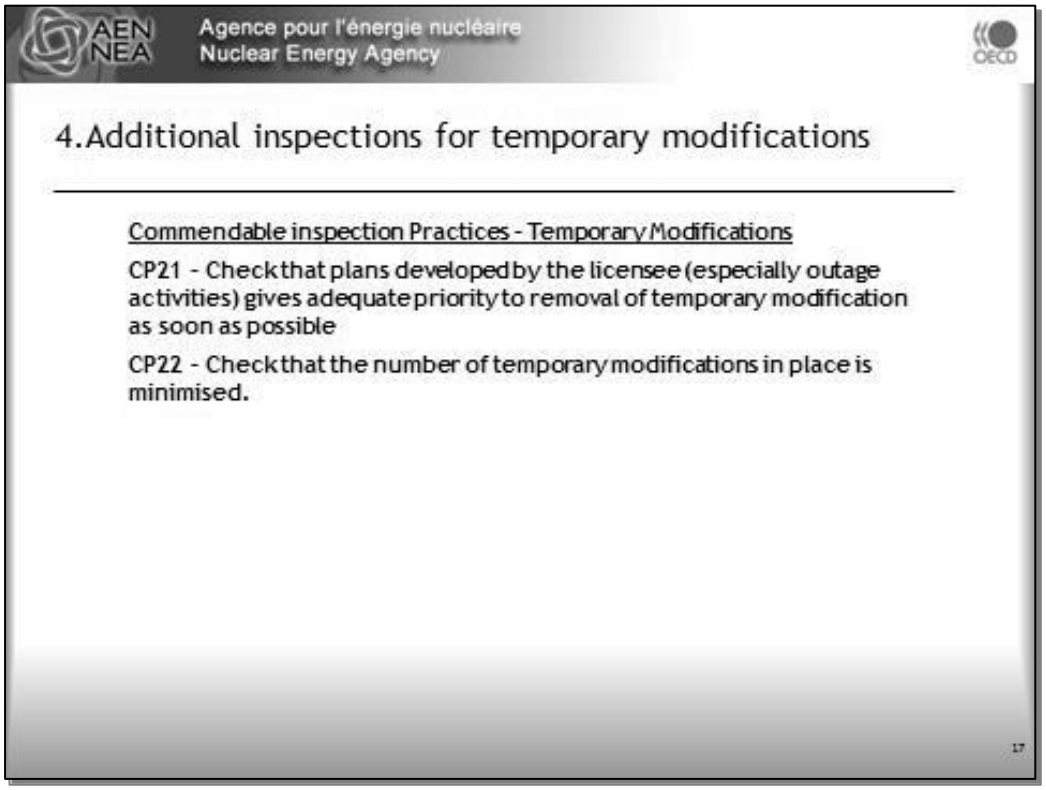
4.Additional inspections for temporary modifications
Commendable inspection Practices - Temporary Modifications
CP15 - Check that licensee staff pays the same attention for temporary modification as for permanent modifications (safety culture issue...)
CP16 - Check that adequate maintenance, inspection and testing of temporary modifications is in place and conducted appropriately
CP17 - Licensee periodically reviews the state of temporary modification taking into account the safety limits and changes in operational states
CP18 - Check that the licensee has a system for tracking, review and removal of temporary modifications (Database for global overview)
CP19 - Consistency between field observation and information within database
CP20 - Check that temporary modifications have been removed within the approved time period (hardware and documentation) and that removal is complete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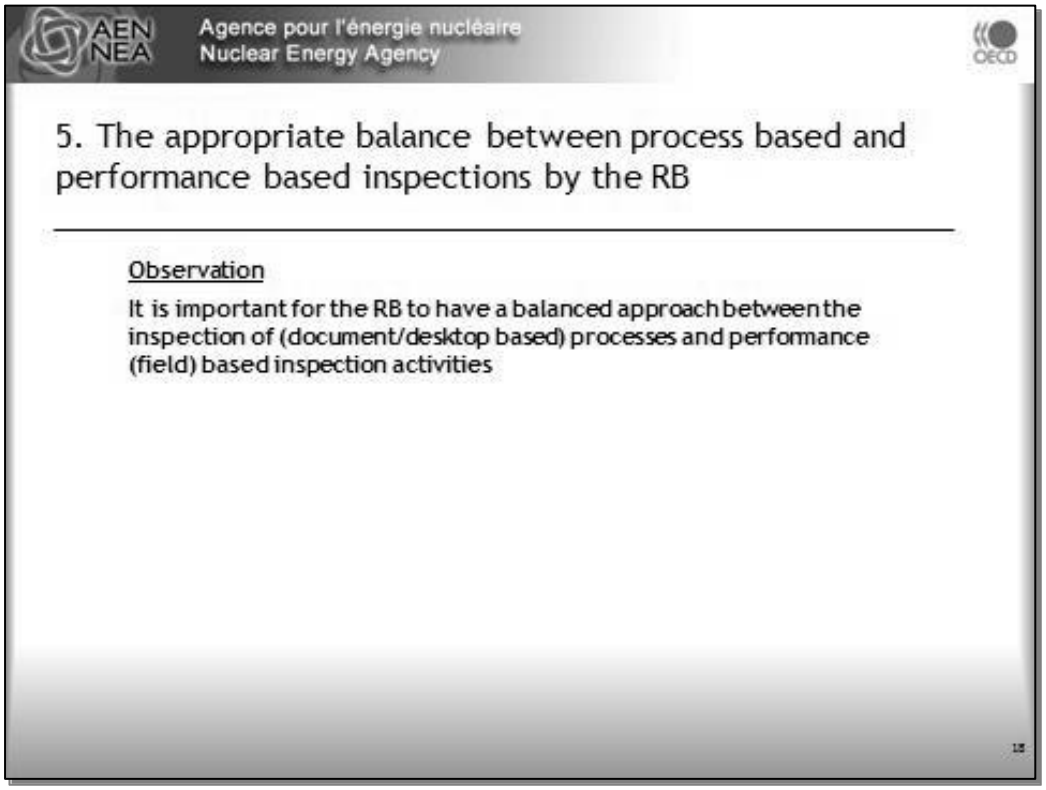
4.Additional inspections for temporary modifications
Commendable inspection Practices - Temporary Modifications
CP21 - Check that plans developed by the licensee (especially outage activities) gives adequate priority to removal of temporary modification as soon as possible
CP22 - Check that the number of temporary modifications in place is minimised.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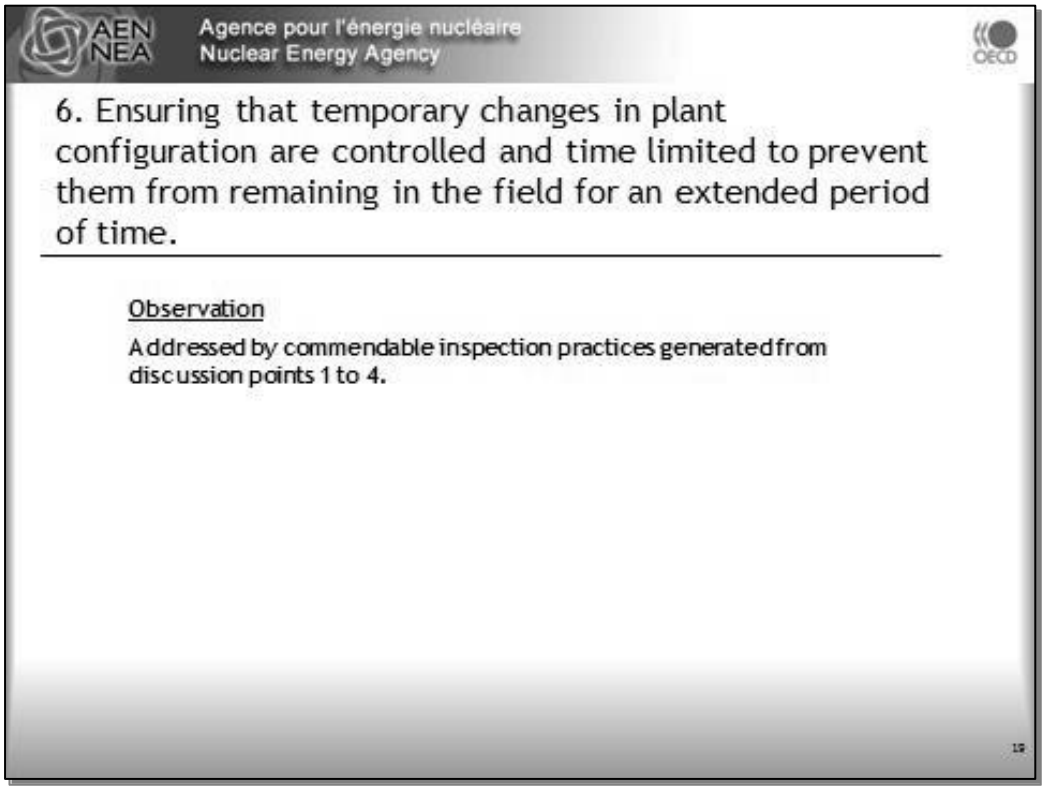
5. The appropriate balance between process based and performance based inspections by the RB
Observation
It is important for the RB to have a balanced approach between the inspection of (document/desktop based) processes and performance (field) based inspection activities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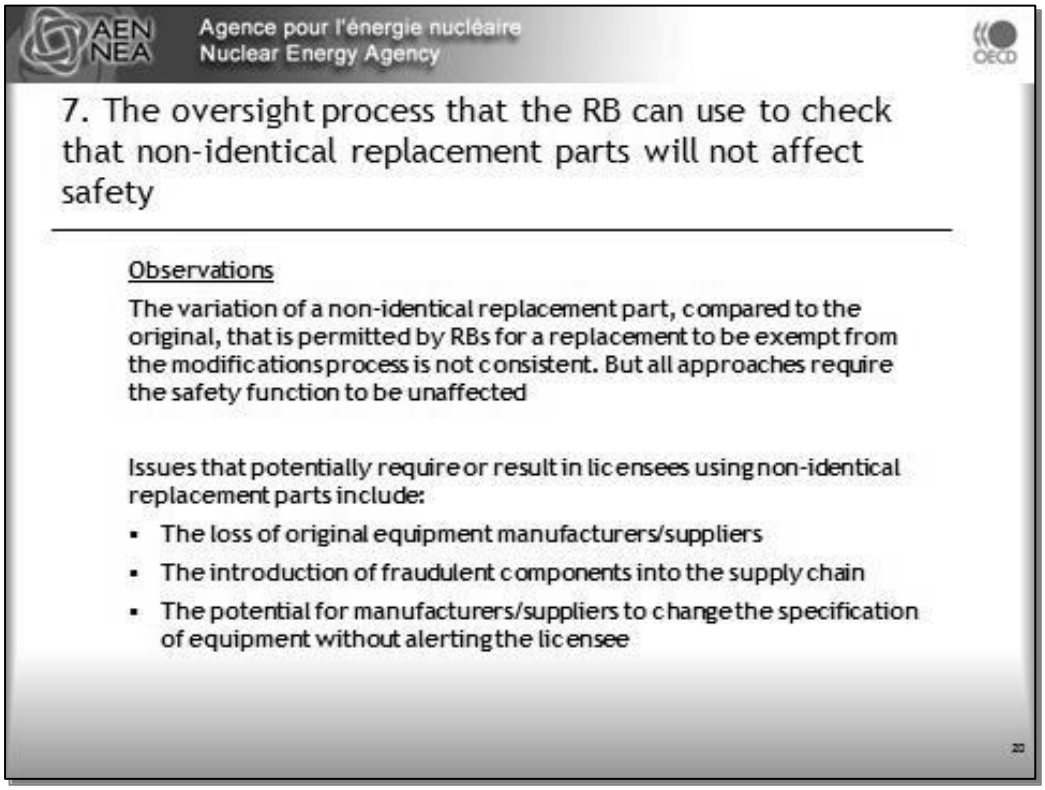
6. Ensuring that temporary changes in plant configuration are controlled and time limited to prevent them from remaining in the field for an extended period of time.
Observation
Addressed by commendable inspection practices generated from discussion points 1 to 4.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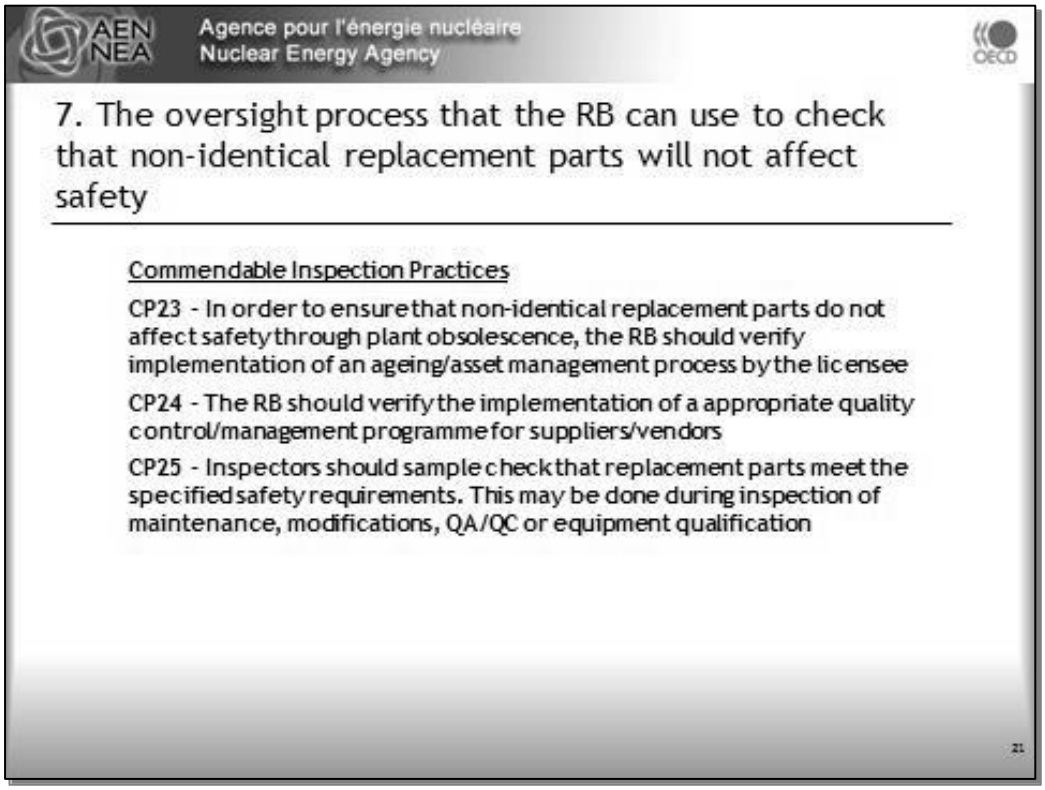
7. The oversight process that the RB can use to check that non-identical replacement parts will not affect safety
Observations
The variation of a non-identical replacement part, compared to the original, that is permitted by RBs for a replacement to be exempt from the modifications process is not consistent. But all approaches require the safety function to be unaffected
Issues that potentially require or result in licensees using non-identical replacement parts include:
The loss of original equipment manufacturers/suppliers
The introduction of fraudulent components into the supply chain
The potential for manufacturers/suppliers to change the specification of equipment without alerting the licensee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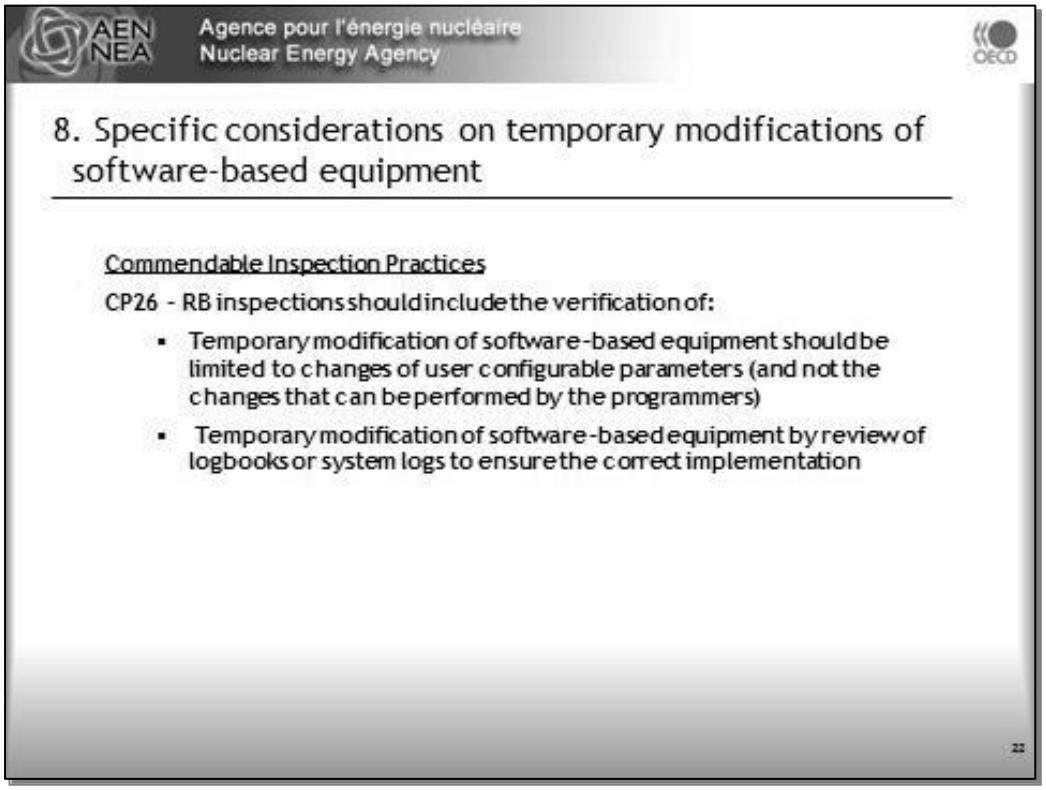
7. The oversight process that the RB can use to check that non-identical replacement parts will not affect safety
Commendable Inspection Practices
CP23 - In order to ensure that non-identical replacement parts do not affect safety through plant obsolescence, the RB should verify implementation of an ageing/asset management process by the licensee
CP24 - The RB should verify the implementation of a appropriate quality control/management programme for suppliers/vendors
CP25 - Inspectors should sample check that replacement parts meet the specified safety requirements. This may be done during inspection of maintenance, modifications, QA/QC or equipment qualification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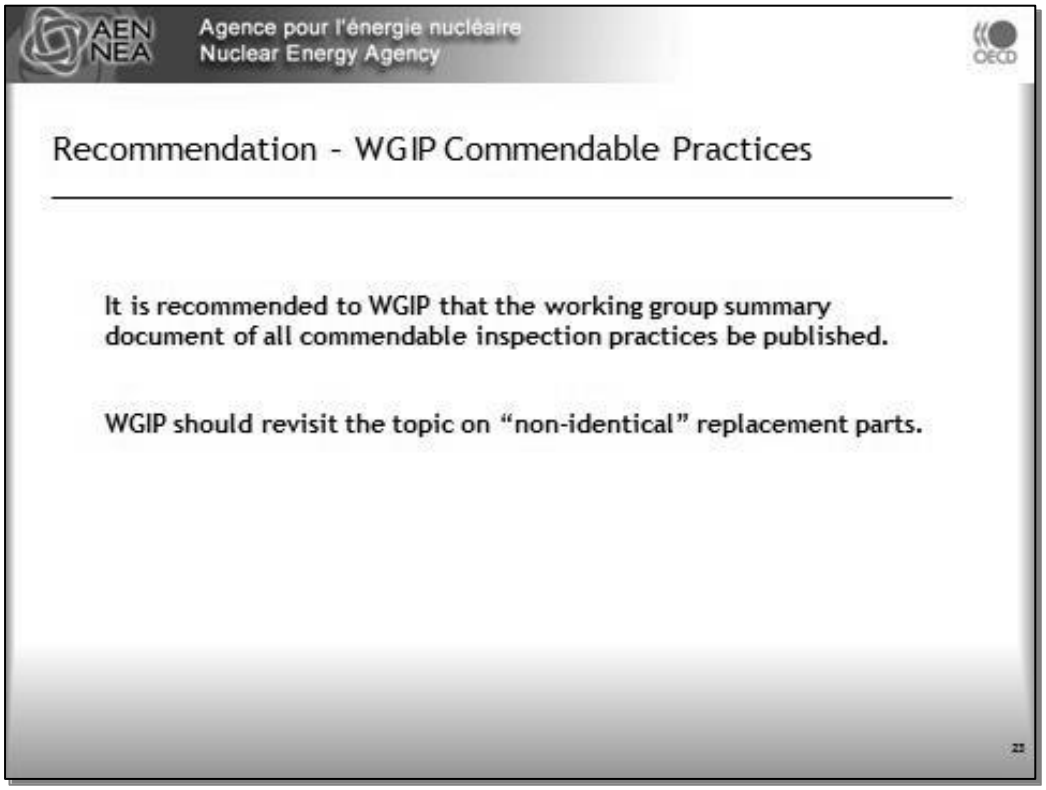
8. Specific considerations on temporary modifications of software-based equipment
Commendable Inspection Practices
CP26 - RB inspections should include the verification of:
Temporary modification of software-based equipment should be limited to changes of user configurable parameters (and not the changes that can be performed by the programmers)
Temporary modification of software-based equipment by review of logbooks or system logs to ensure the correct implementation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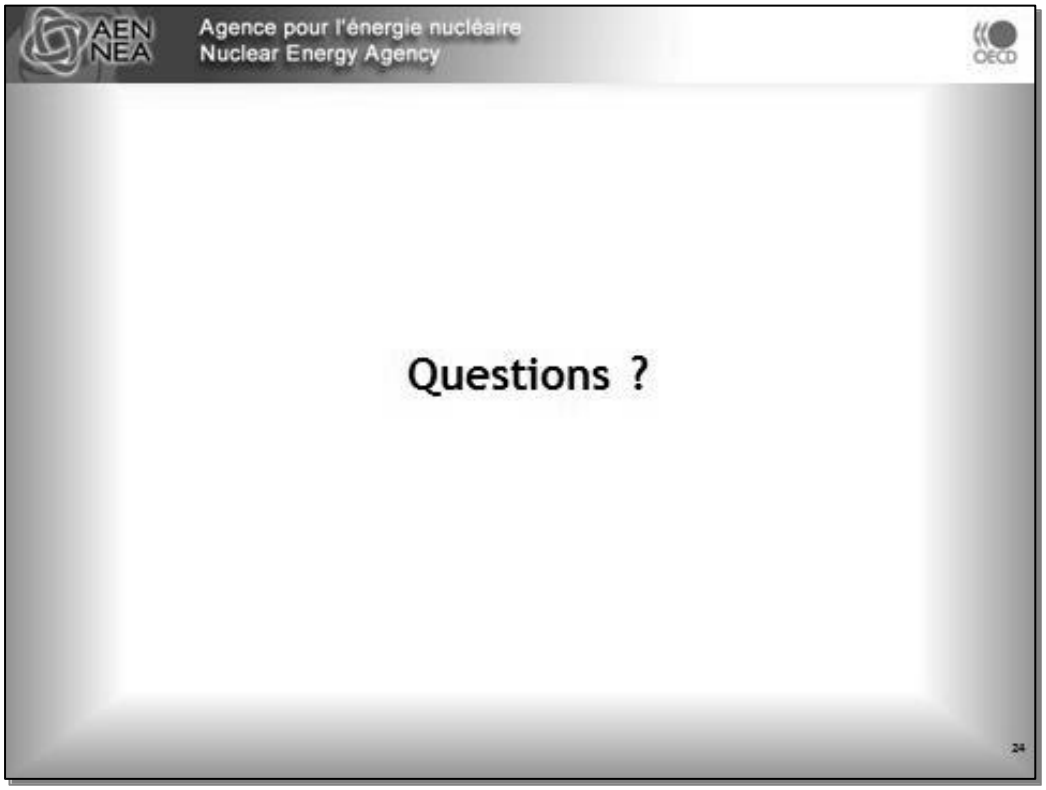
Recommendation - WGIP Commendable Practices
It is recommended to WGIP that the working group summary document of all commendable inspection practices be published.
WGIP should revisit the topic on "non-identical" replacement parts.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Questions ?
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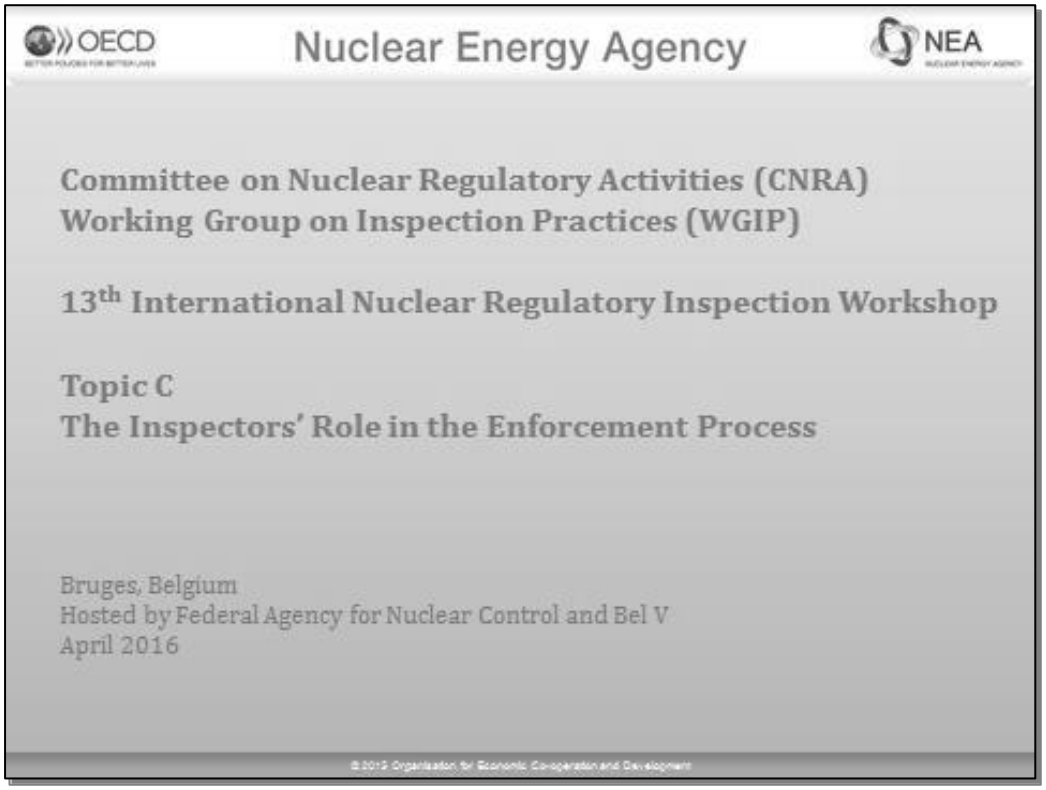
17. TOPIC C: OPENING PRESENTATION



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Introduction / Background (1)

Enforcement is a key regulatory function [IAEA GSR Part 1Req. 30, 31].

The WGIP already dealt with this topic in 2005 and published a report called "Regulatory Inspection Practices to bring about Compliance" [NEA/CNRA/R(2005)1]. It was noted in the report that it would be beneficial to do further work on the issue.

However, this have not been really done yet. So, the idea was to do that in a Workshop and to focus on the inspector's role in the enforcement process.

In practice, inspectors and RB work and encounter problems and issues that need to be improved or corrected every day.

Can we share our experiences of the best practices of enforcement? Openly and honestly!

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Introduction / Background (2)

A main result of the previous report in 2005 was that in most OECD/NEA countries a series of graded enforcement options are available for the RB

- giving advice
- oral and written cautions
- letters
- requirement to make improvement
- prohibition on activities
- directly imposed fines
- direction to shut down
- refusal to approve or permission an activity
- license withdrawal
- prosecution in courts

Where do you stand as an inspector?
What is your practice?

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Evaluation of Questionnaires - General

Responses from 19 Countries – Thanks a lot!

Content of Questionnaire

1. Inspectors' role in evaluating the safety significance of findings
2. Inspectors' role in the enforcement process
3. Inspectors' role in the Follow-up on the licensee's response
4. What issue would you like to discuss during the Workshop?

Answers from questions 1 to 3 show both

- quite similar practices in some countries
- but also variation and differences, of course

Answers from question 4 present a lot of good proposals for the discussion!

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1. Inspectors' role in evaluating the safety significance of findings

Question 1.1
What is the starting point for the enforcement process in regulatory inspections conducted by the inspector (e.g. a finding, a non-compliance, a violation, a wilful violation, etc.)?

- Not generally fixed
- Varies from country to country
- In most countries in principle any (significant) finding of a non-compliance, deviation or violation to procedures, licences, standards, regulations, requirements or acts etc.
- A higher level kind of offence like "wilful" is not necessary

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1. Inspectors' role in evaluating the safety significance of findings

Question 1.2
What is the inspectors' role in evaluating the safety significance of the finding, non-compliance or any violation mentioned above?

- In most countries the inspector is responsible for some kind of an "initial safety evaluation"
- In most countries the inspectors' initial safety evaluation serves as a basis to start the enforcement process by the RB
- In some countries the inspector decide by himself to start the enforcement process
- Some countries noted explicitely that the inspector has to take protection measures in case of immediate danger

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2. Inspectors' role in the enforcement process

Question 2.1
With respect to the graded enforcement options of the RB listed in foreword, what is the limit of the inspectors' authority?

- In some countries the inspectors' authority is limited to identifying and assessing of findings
- In some countries the inspectors' authority is limited to the lower level of enforcement options like giving advice, oral and written cautions, letters etc.
- In some countries, at least in principle, there is no limit, especially in the case of imminent danger
- In most countries the enforcement process may be initiated by the inspector, but will be adopted and completed by the RB

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2. Inspectors' role in the enforcement process

Question 2.2
Does the inspector have discretion to choose enforcement options?

- In some countries the inspector has no discretion, mainly in those countries where the enforcement process is adopted by the RB
- In some countries the inspector has discretion, mainly in those countries where the inspector's authority includes enforcement options

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2. Inspectors' role in the enforcement process

Question 2.3
How is the enforcement power given to inspector? (i.e. directly by legislative power; indirectly by internal RB processes; etc.)

- In most countries directly by legislative power
- In some countries indirectly by internal RB processes
- In some countries there is no enforcement power given to inspectors

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2. Inspectors' role in the enforcement process

Question 2.4
How does the inspector participate in the enforcement process of the RB once it has started?

•In some countries the inspector does not participate in the enforcement process of the RB, his participation is limited to identifying and assessing of findings and reporting

•In most countries the inspector participates in the enforcement process of the RB from beginning to the end

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2. Inspectors' role in the enforcement process

Question 2.5
Is there any written guidance for the inspectors concerning the RBs enforcement processes? Please describe briefly what kind of guidance or technical tools are available to the inspectors.

•In most countries there is written guidance

•The kind of internal guidance or technical tools varies from country to country, e.g.

- Overall enforcement policy
- Enforcement Management Model
- Enforcement Management Manual
- Special enforcement procedures or processes
- Enforcement guidance tables
- Process maps
- Databases
- Inspection procedures or instructions concerning the enforcement process

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2. Inspectors' role in the enforcement process

Question 2.6
How does the RB ensure consistency in the inspectors' behavior in the enforcement processes?

- In most countries the enforcement process is discussed with or carried out by the RB's management
- In some countries the enforcement process is detailed in the procedures or written enforcement policy or law

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2. Inspectors' role in the enforcement process

Question 2.7
Are the inspectors specifically trained in the topic of enforcement?

According to national practice of enforcement

- In some countries there is a detailed enforcement process and there usually is topical training on enforcement
- If enforcement is done only by the RB's management then there is usually a more general type of training
- In some countries inspectors do not have enforcement powers so there is no training

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3. Inspectors' role in the Follow-up on the licensee`s response

Question 3.1
Please describe briefly inspectors' role.

- In most countries the inspector need to verify closure of the issues
- In some countries there is an inspection to verify closure of the issues

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4. What issue would you like to discuss during the Workshop?

Monetary penalties / fines

- Penalties issued by inspector or RB
- Any data on benefits/drawbacks on using "strict" enforcement methods (like penalties)
- Experience of the inspectors on the necessity to use "harsh" enforcement actions compared to "mild" actions like oral advice
- What are the experiences about imposing fines? Are monetary fines considered to be a useful or useless measure?

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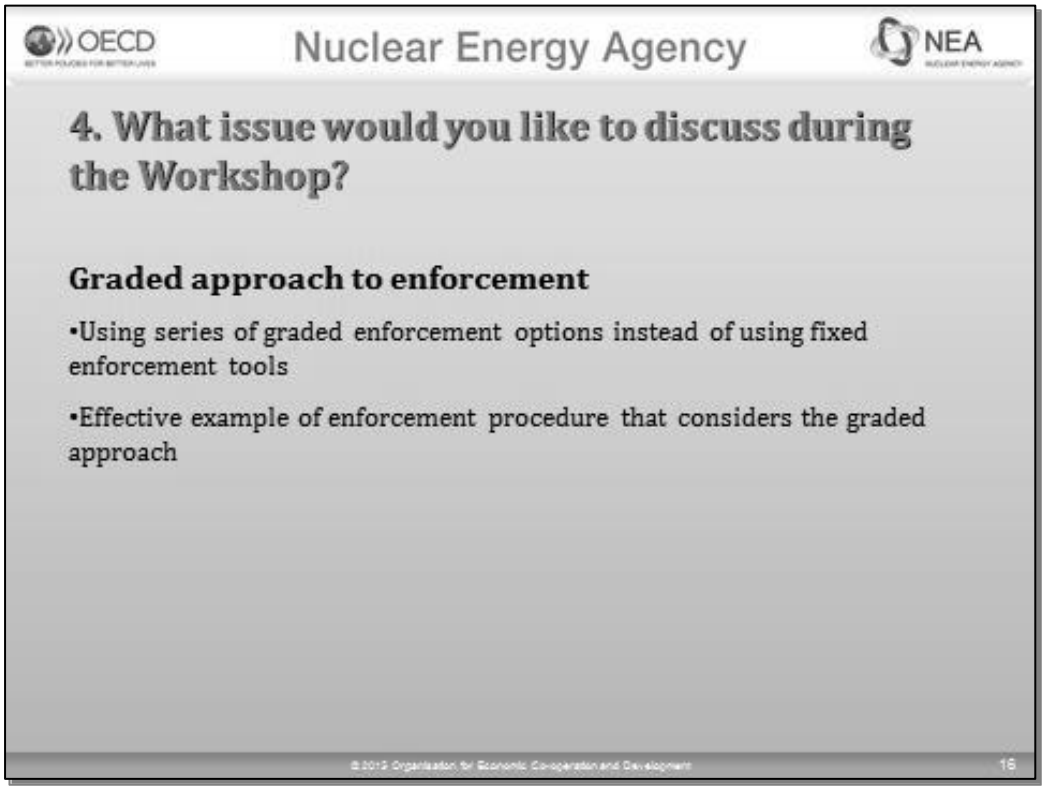
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4. What issue would you like to discuss during the Workshop?
Graded approach to enforcement
•Using series of graded enforcement options instead of using fixed enforcement tools
•Effective example of enforcement procedure that considers the graded approach
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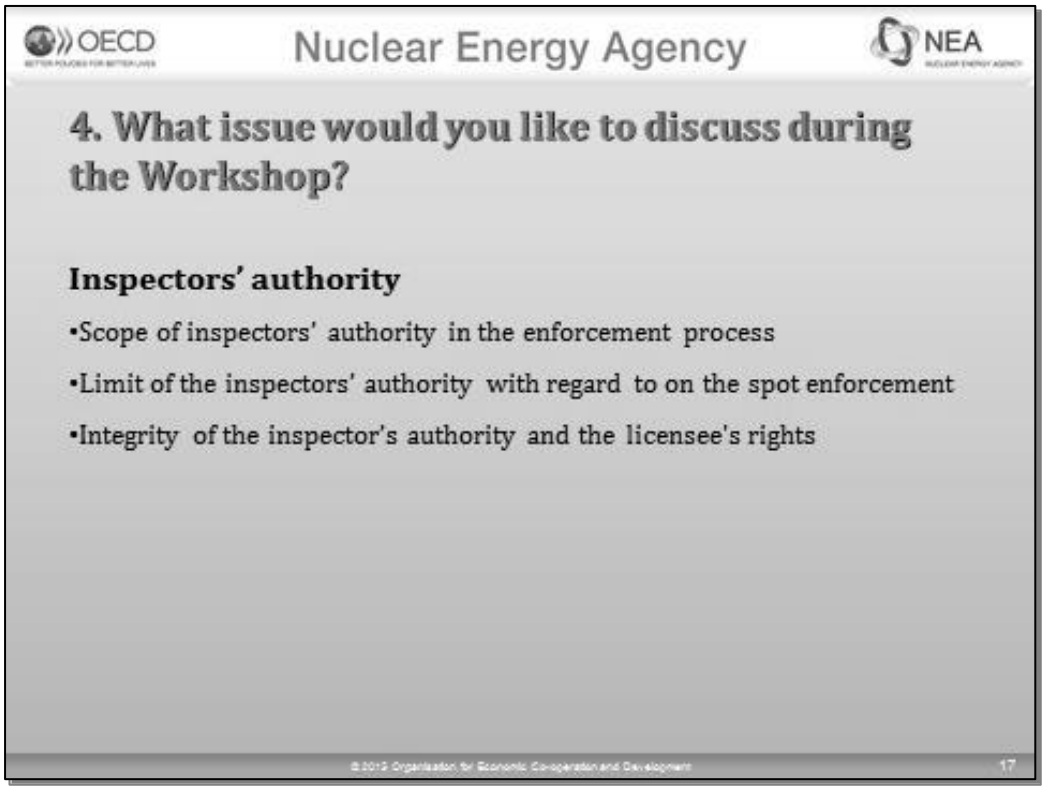
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4. What issue would you like to discuss during the Workshop?
Inspectors' authority
•Scope of inspectors' authority in the enforcement process
•Limit of the inspectors' authority with regard to on the spot enforcement
•Integrity of the inspector's authority and the licensee's rights
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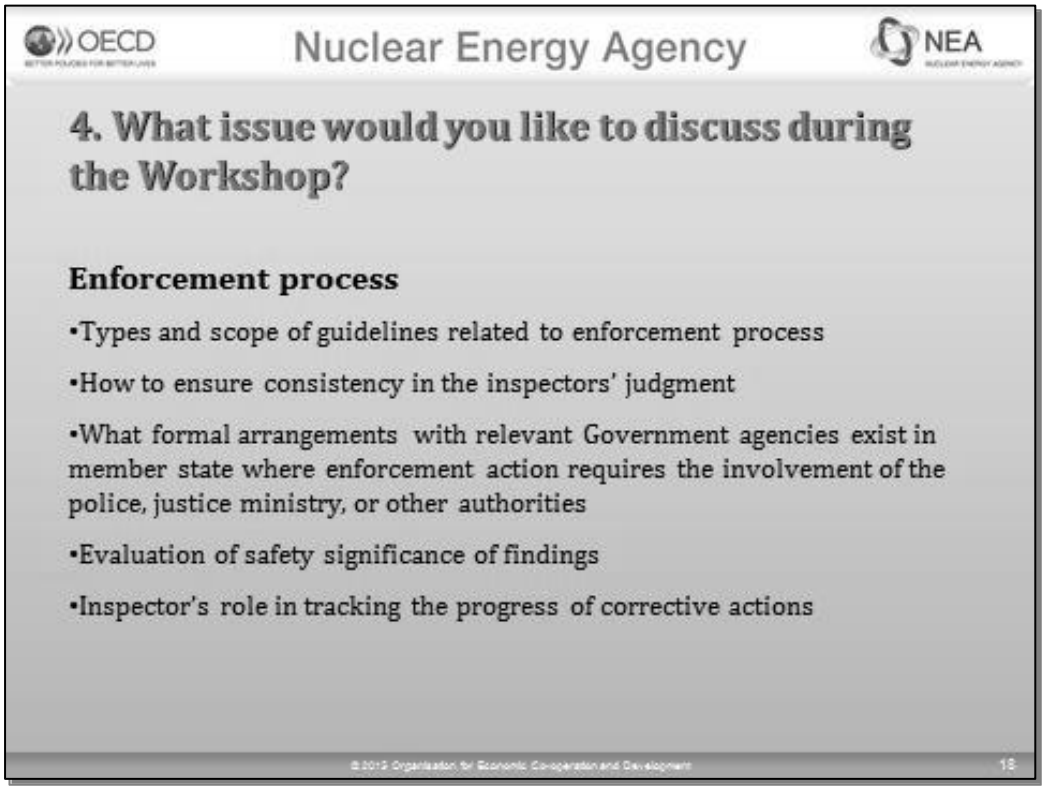
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4. What issue would you like to discuss during the Workshop?
Enforcement process
•Types and scope of guidelines related to enforcement process
•How to ensure consistency in the inspectors' judgment
•What formal arrangements with relevant Government agencies exist in member state where enforcement action requires the involvement of the police, justice ministry, or other authorities
•Evaluation of safety significance of findings
•Inspector's role in tracking the progress of corrective actions
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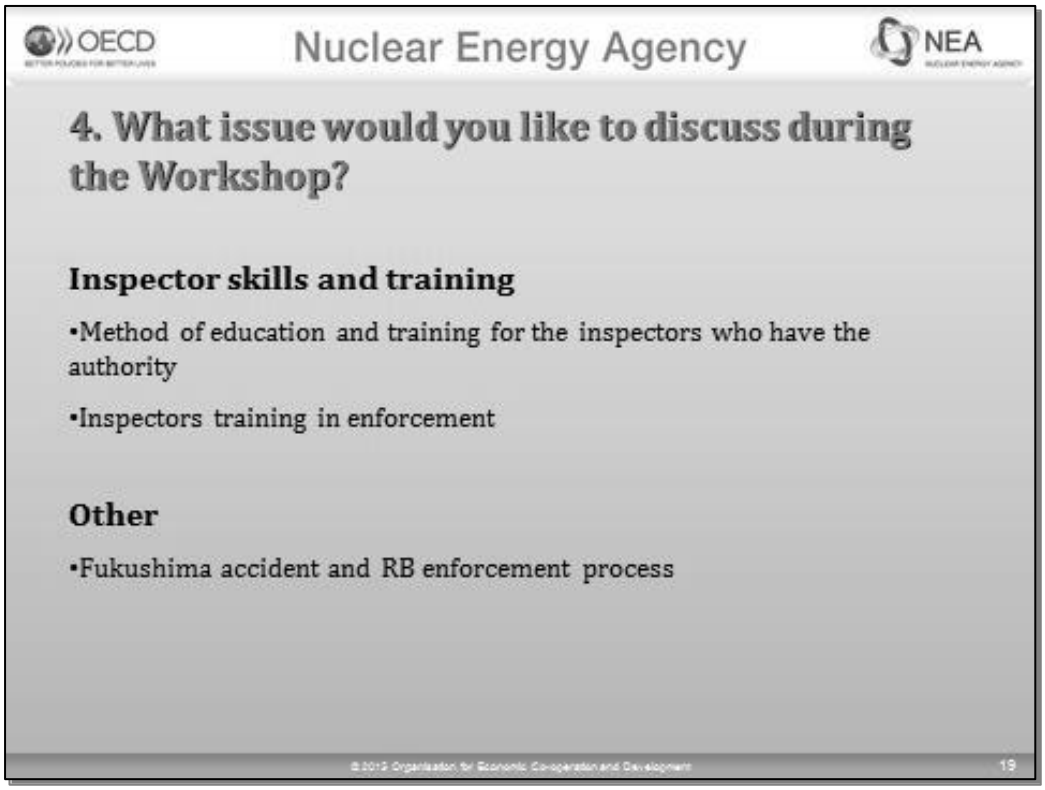
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4. What issue would you like to discuss during the Workshop?
Inspector skills and training
•Method of education and training for the inspectors who have the authority
•Inspectors training in enforcement
Other
•Fukushima accident and RB enforcement process
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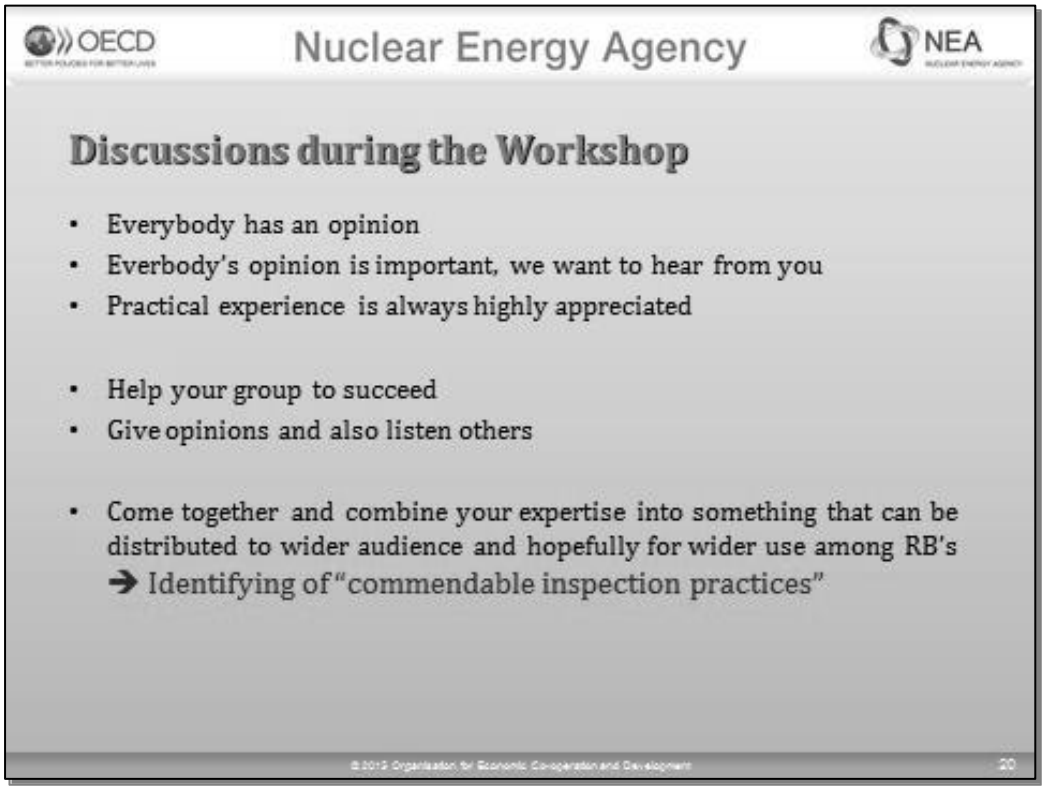
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Discussions during the Workshop
• Everybody has an opinion
• Everbody's opinion is important, we want to hear from you
• Practical experience is always highly appreciated
• Help your group to succeed
• Give opinions and also listen others
• Come together and combine your expertise into something that can be distributed to wider audience and hopefully for wider use among RB's
➔ Identifying of "commendable inspection practices"
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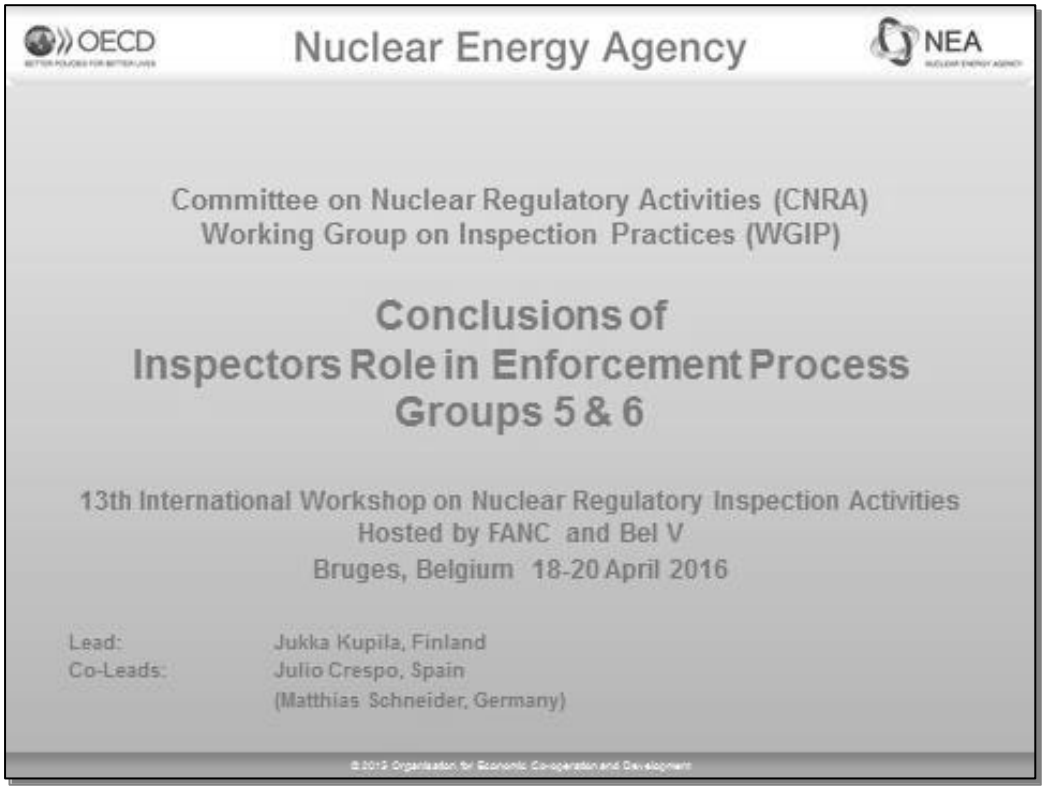
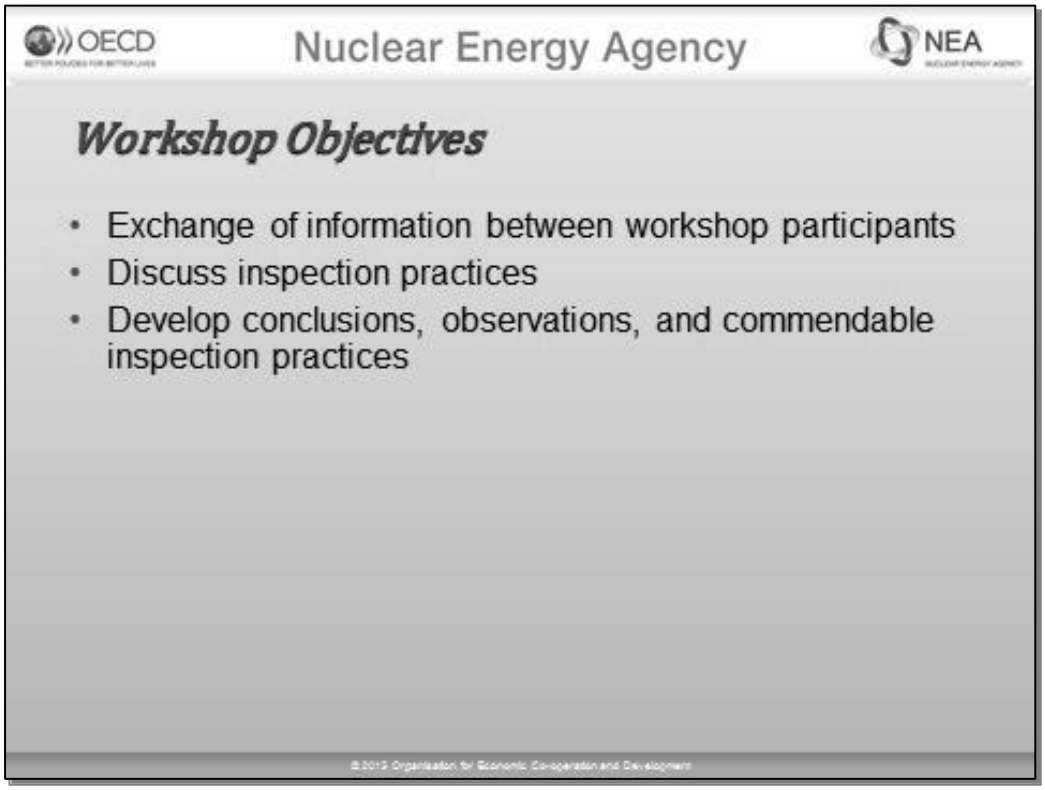
18. TOPIC C: CLOSING PRESENTATION





The Inspectors' Role in the Enforcement Process	
Group 5	Group 6
Jukka Kupila, Finland*	Julio Crespo, Spain*
Yves Van den Berghe, Belgium	An Wetsaert, Belgium
Anupama Prasad, Canada	Miroslav Jakes, Czech Republic*
Yves Guenniel, France*	Sergey Khlebystov, Russia*
Fabio Schaib, Germany	Sebastjan Savli, Slovenia*
Koji Takiyoshi, Japan	Karoline Godén, Sweden
Marcin Dabrowski, Poland*	Daniel Billeter, Switzerland
Ami Patel, USA	Stephen Saunders, United Kingdom
	Tim Kobata, IAEA*

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Family picture of subgroups 5 & 6

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Use of Previous Work by the WGIP

The WGIP published a report in 2005 called "Regulatory Inspection Practices to bring about Compliance" [NEA/CNRA/R(2005)1].

A main result of the that report was that in most OECD/NEA countries a series of graded enforcement options are available for the RB ranging from giving advice, oral and written cautions into issuing fines, license withdrawal and prosecution in court.

This result was taken as a starting point for the workshop.

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Evaluation of Questionnaires - General

Content of Questionnaire

1. Inspectors' role in evaluating the safety significance of findings
2. Inspectors' role in the enforcement process
3. Inspectors' role in the Follow-up on the licensee's response
4. What issue would you like to discuss during the Workshop?

19 country responses show

- quite similar practices but variation according to regulatory framework
- inspectors having no enforcement powers, minor enforcement powers or inspector/RB having well established enforcement powers

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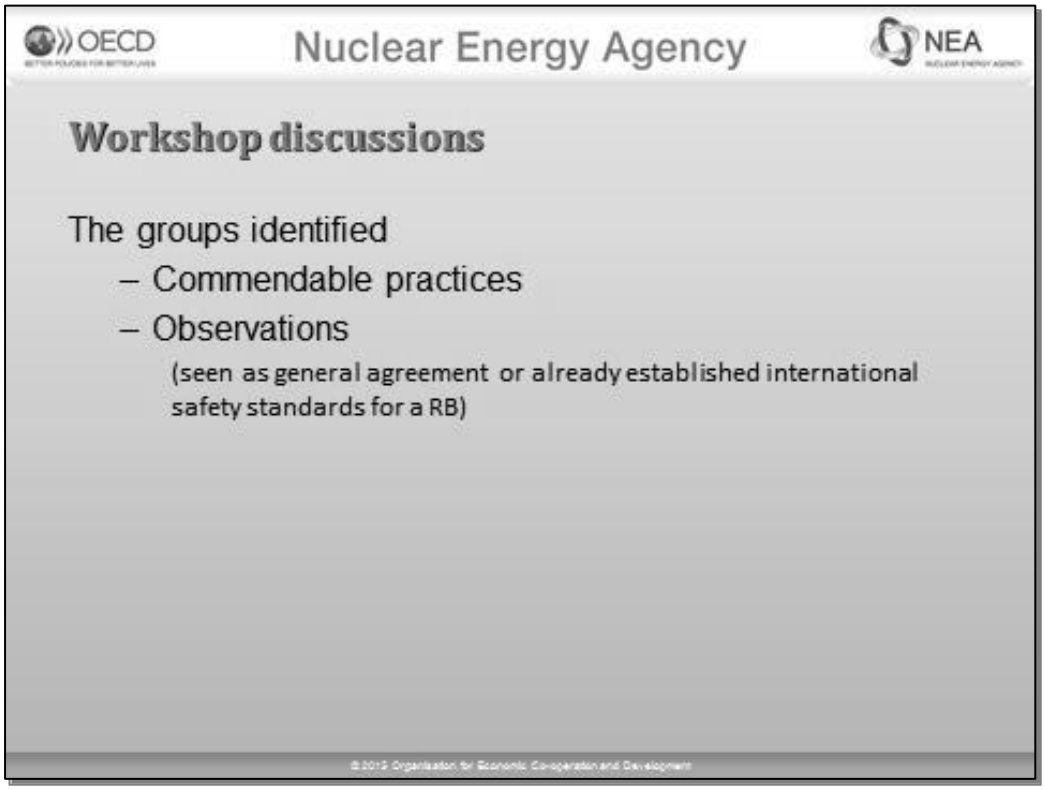
Workshop discussions

In questionnaire answers participants expressed interest to discuss the following topics

- Graded approach to enforcement
- Monetary penalties / fines
- Inspectors' authority
- Inspector skills and training

Discussions were held in two subgroups, both having independent discussions with an opportunity to exchange opinions and results of their work during the workshop. Final conclusions were compiled by the two topic leads from WGIP to reflect the discussions and with an effort to harmonize conclusions.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Workshop discussions
The groups identified
– Commendable practices
– Observations
(seen as general agreement or already established international safety standards for a RB)
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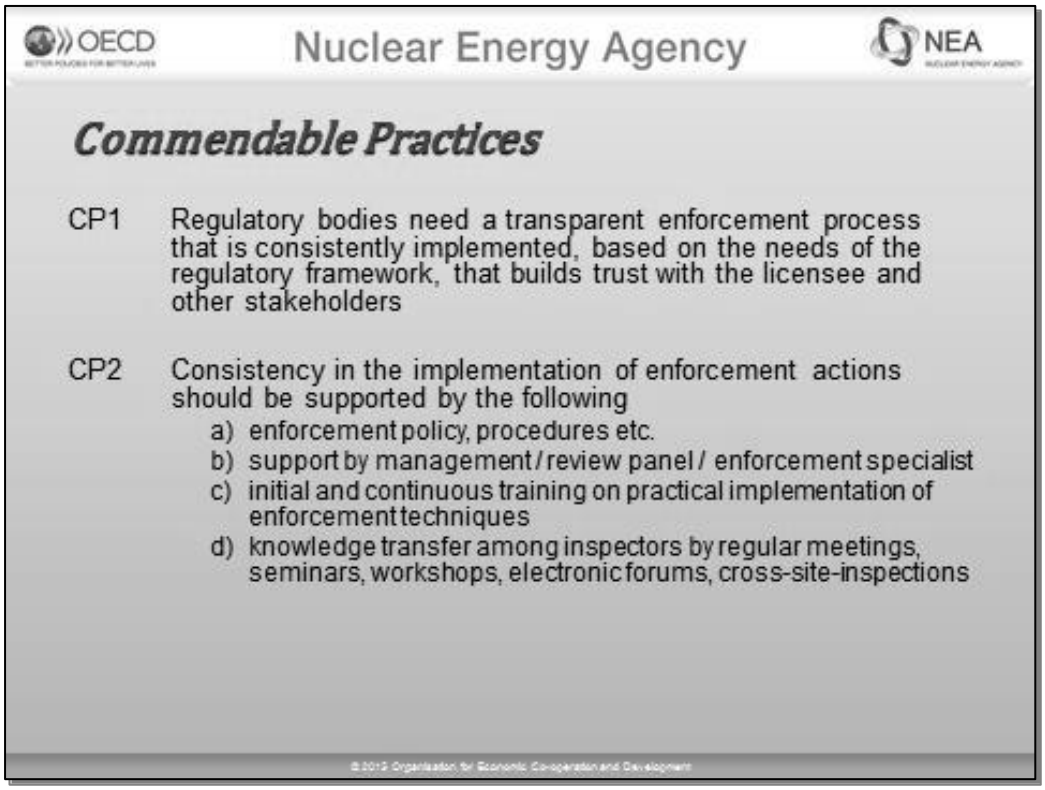
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Commendable Practices
CP1 Regulatory bodies need a transparent enforcement process that is consistently implemented, based on the needs of the regulatory framework, that builds trust with the licensee and other stakeholders
CP2 Consistency in the implementation of enforcement actions should be supported by the following
a) enforcement policy, procedures etc.
b) support by management / review panel / enforcement specialist
c) initial and continuous training on practical implementation of enforcement techniques
d) knowledge transfer among inspectors by regular meetings, seminars, workshops, electronic forums, cross-site-inspections
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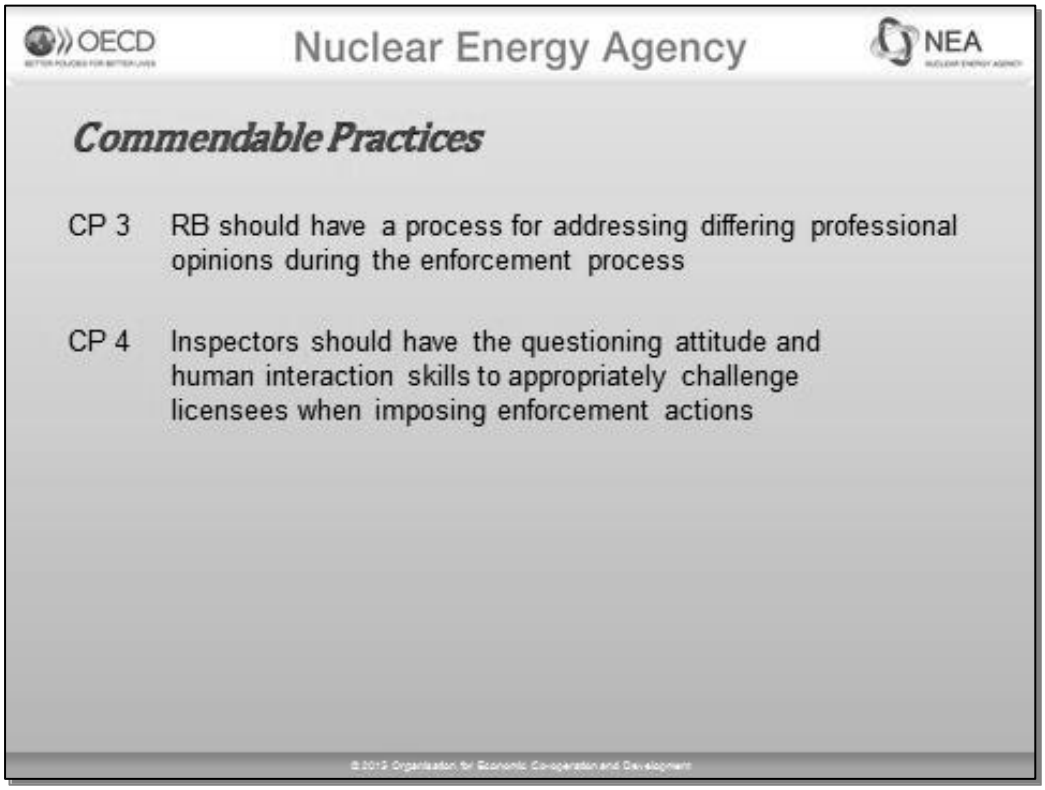
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Commendable Practices
CP 3 RB should have a process for addressing differing professional opinions during the enforcement process
CP 4 Inspectors should have the questioning attitude and human interaction skills to appropriately challenge licensees when imposing enforcement actions
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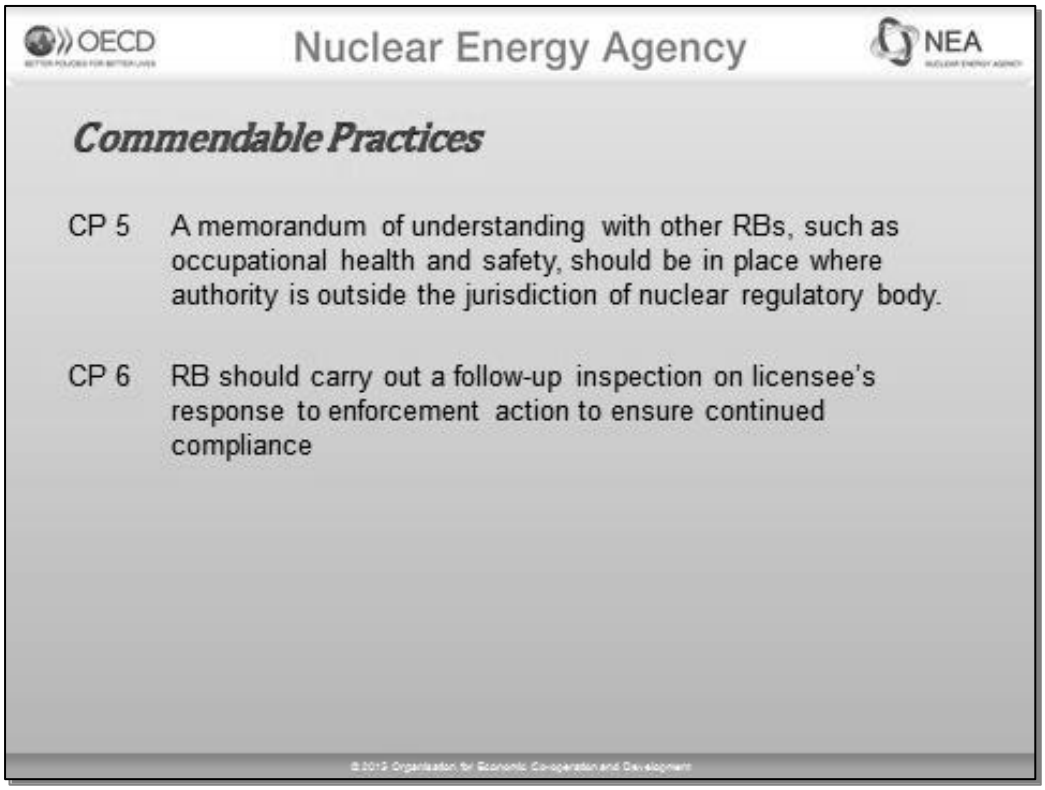
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Commendable Practices
CP 5 A memorandum of understanding with other RBs, such as occupational health and safety, should be in place where authority is outside the jurisdiction of nuclear regulatory body.
CP 6 RB should carry out a follow-up inspection on licensee's response to enforcement action to ensure continued compliance
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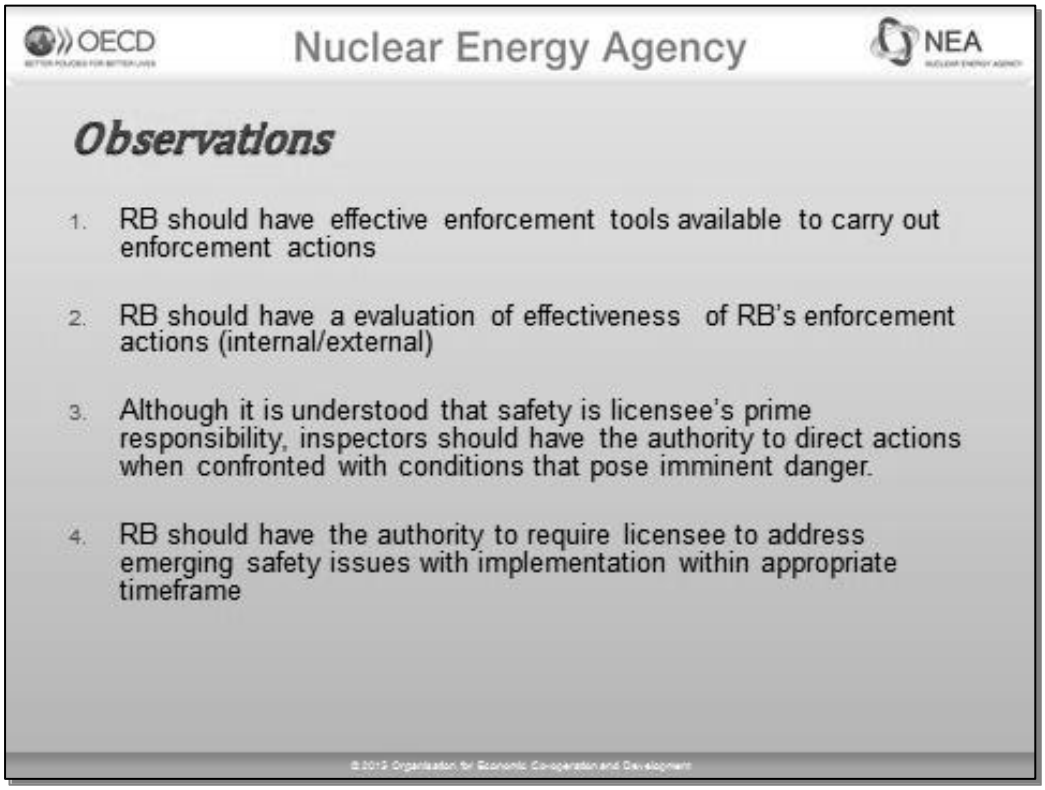
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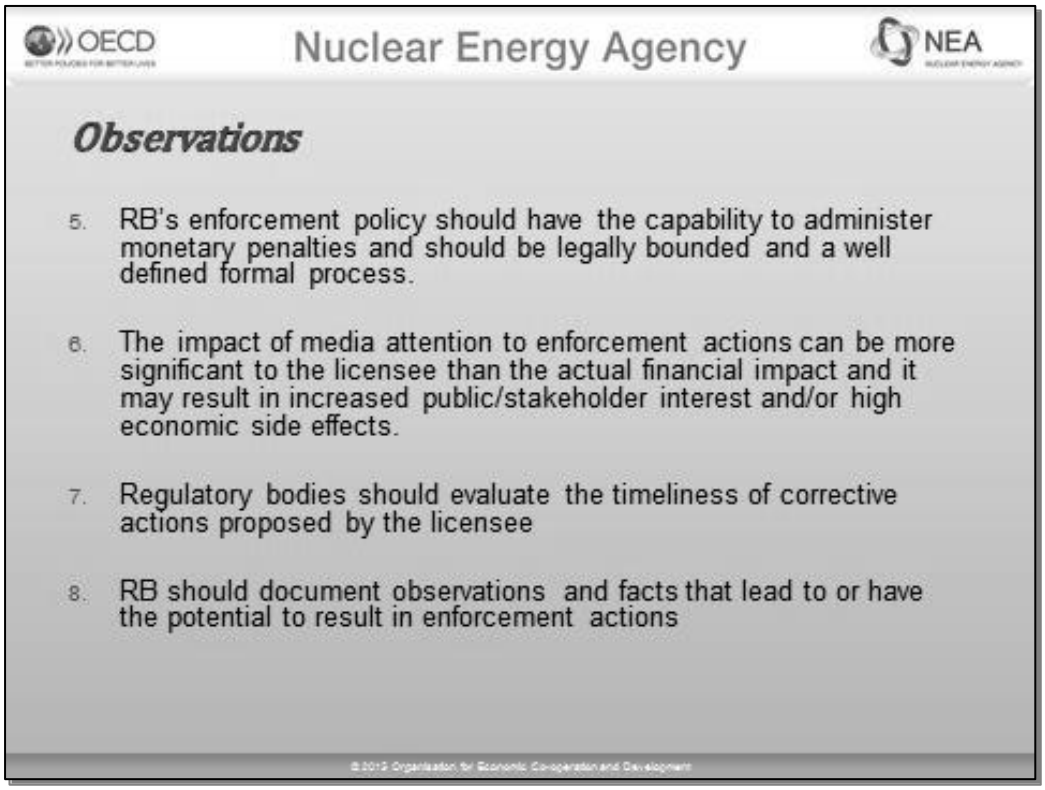
Observations
1. RB should have effective enforcement tools available to carry out enforcement actions
2. RB should have a evaluation of effectiveness of RB's enforcement actions (internal/external)
3. Although it is understood that safety is licensee's prime responsibility, inspectors should have the authority to direct actions when confronted with conditions that pose imminent danger.
4. RB should have the authority to require licensee to address emerging safety issues with implementation within appropriate timeframe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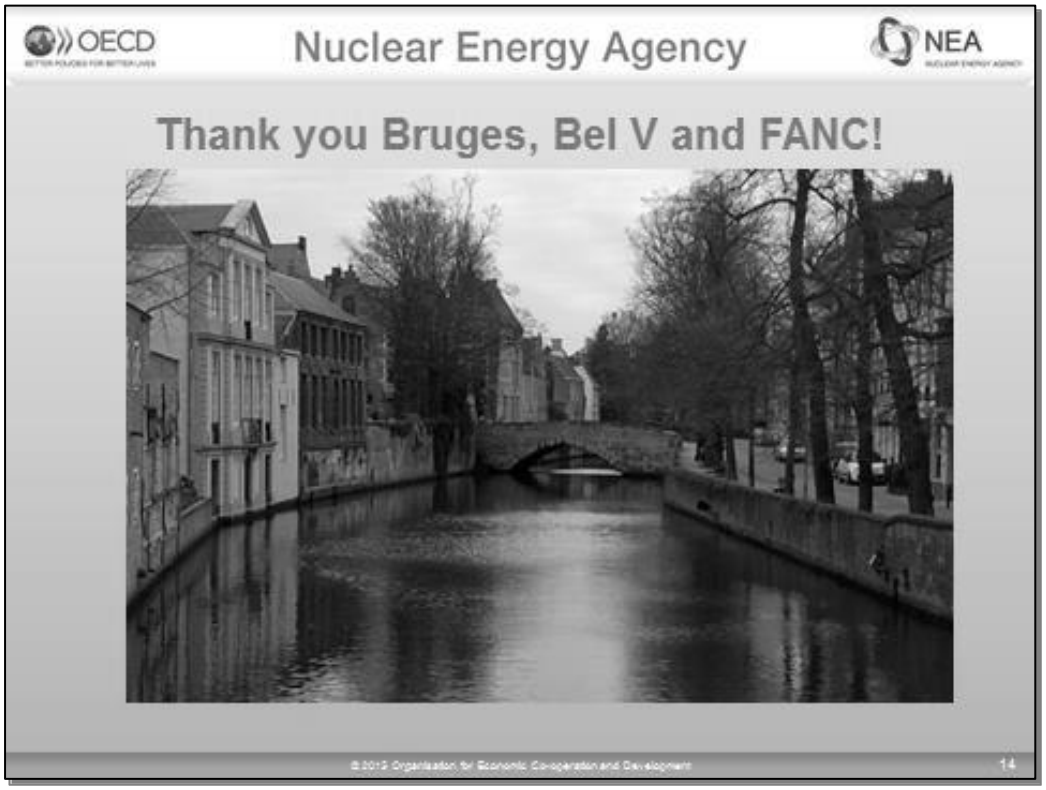
Observations
5. RB's enforcement policy should have the capability to administer monetary penalties and should be legally bounded and a well defined formal process.
6. The impact of media attention to enforcement actions can be more significant to the licensee than the actual financial impact and it may result in increased public/stakeholder interest and/or high economic side effects.
7. Regulatory bodies should evaluate the timeliness of corrective actions proposed by the licensee
8. RB should document observations and facts that lead to or have the potential to result in enforcement actions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Thank you Bruges, Bel V and FANC!
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