



U pdate on the Use of International **Operating Experience Feedback** **for Improving Nuclear Safety**

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Organisation de Coopération et de Développement Économiques
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**NUCLEAR ENERGY AGENCY
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES**

NEA/CNRA/R(2015)1
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**Update of the Use of International Operating Experience Feedback for Improving Nuclear Safety
Working Group on Operating Experience (WGOE)**

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The mission of the NEA is:

- to assist its member countries in maintaining and further developing, through international co-operation, the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes;
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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 effective exchange of safety-relevant information and experience among regulatory organisations. To the extent appropriate, the Committee shall review developments which could affect regulatory requirements with the objective of providing members with an understanding of the motivation for new regulatory requirements under consideration and an opportunity to offer suggestions that might improve them and assist in the development of a common understanding 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 accordance with the NEA Strategic Plan for 2011-2016 and the Joint CSNI/CNRA Strategic Plan and Mandates for 2011-2016, the Committee shall promote co-operation among member countries to use the feedback from experience to develop measures to ensure high standards of safety, to further enhance efficiency and effectiveness in 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 the regulatory aspects of existing power reactors, 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 (CSNI) in order 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 (CRPPH) and the Radioactive Waste Management Committee (RWMC) on matters of common interest.

FOREWORD

The main objective of the CNRA Working Group on Operating Experience (WGOE) is to share experience and knowledge, analyse and provide expert insights from operating experience (OE) to reach timely conclusions on trends, lessons learned and effective responses in the short to medium term, and to promote proposals for reassessment of safety, additional research, new or revised regulatory inspection practices, improvements in managing operations, and other actions to maintain and improve safety in the longer term.

The previous report *The Use of International Operating Experience Feedback for Improving Nuclear Safety*, [NEA/CNRA/R(2008)3] addressed the proposal made at the December 2006 CNRA Meeting for the WGOE to review existing international Operating Experience Feedback (OEF) processes and networks, their connections with national OEF systems, and provide recommendations for more effective use of international OEF to improve nuclear safety.

The 2006 Task Group included WGOE members and observers from both the International Atomic Energy Agency (IAEA) and European Commission (EC), and other consulted interested parties, including: CSNI, CRPPH, Western European Nuclear Regulators Association (WENRA), Institute of Nuclear Power Operations (INPO), International Nuclear Safety Advisory Group (INSAG) and World Association of Nuclear Operators (WANO). This Task Group was chaired by Kulvinder McDonald (United Kingdom), and the members included André Vandewalle (Belgium), Mary Jane Ross-Lee (United States), Pavel Bobaly (Slovak Republic), Remy Bertrand, Laurent Foucher (France) and Jacky Mochel (France), Michael Maqua and Matthias Bergener (Germany), Seija Suksi (Finland), Shigeo Tamao (Japan), Xavier Bernard-Bruls (IAEA) and Vesselina Rangelova (EC).

While the sharing and use of international OEF has improved since the Three Mile Island-2 accident, the Fukushima Dai-ichi nuclear power station accident in 2011 highlighted the importance of continuous improvement in event reporting, coupled with suitable programmes to ensure that the lessons learned from previous events are adequately captured, widely applied and appropriately documented.

In response to WGOE action items to revise the generic portion of R(2008)3, and to update the Appendix A with current inputs from member countries, a new Task Group was convened to revise the report. The 2013 Task Group was led by Benoit Poulet (Canada) and Peter Corcoran (Canada). Members included Kenneth Broman (Sweden), Henk van der Veen (Netherlands), Fuming Jiang (IAEA), and Benoit Zenger (EC).

The revision includes:

- the update and clarification of the general information in the R(2008)3 report;
- **the update of Appendix A with new information on national OEF programmes submitted by member countries;**
- the standardisation of language in the document for consistency; and
- the addition of notable OEF progress made to date and guiding principles to continually improve national OEF programmes among the member countries with respect to international best practices.

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Sections 3 and 4 containing the 2006 Task Group conclusions and recommendations were left intact to preserve the historical record of the R(2008)3 report.

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EXECUTIVE SUMMARY

The CNRA report on Regulatory Challenges in Using Nuclear Operating Experience [1] noted the following regarding OE:

As the nuclear programmes in OECD countries have matured over the four decades of commercial nuclear power operation, this maturation has brought steady improvements in the operational safety of nuclear power plants. This improvement is demonstrated by several performance indicators, but most notably by the reduced frequency and severity of accident precursor events relative to the events of, say, ten to twenty years ago.

One of the major reasons for this improved performance has been the extensive use of lessons from operating experience to backfit safety systems, improve operator training and emergency procedures, and to focus more attention on human factors, safety culture and nuclear quality management systems. Indeed, a prominent lesson from the TMI-2 accident in 1979 was the need for systematic evaluation of operating experience on an industry-wide basis, both by the nuclear industry, which has the greatest direct stake in safe operations, and by the nuclear regulator.

The practice of collecting, analysing, and implementing OE information has grown in depth and sophistication over the years, and by now there is extensive literature on the methodology for collecting, analysing, and implementing OE. In general it can be stated that nuclear operators and regulators are familiar with these methods.

In developing an international OEF process and a network for implementing this process, it is important to note that writing reports and collecting data is meaningful only when there is a link to risk reduction and the enhancement of operational safety. A general goal of the international OEF process is to help prevent recurrence of events involving serious potential hazards. There is evidence to show that lessons have been learned from many events, both within and outside the nuclear industry, and corrective actions implemented to improve nuclear safety.

In discussing the role of the regulator, it is important to note that the operator has the prime responsibility for safely operating the nuclear facilities. The regulator should never diminish, dilute or interfere with that basic responsibility for safety. Likewise, the collection of information on OE is the responsibility of the operator and as stated in many previous conferences and in many documents, national OEF is the basis for international OEF. Accordingly, without high quality national OEF it is not possible to have effective international OEF.

OE of general interest is not limited to events, incidents and accidents, but also covers conditions, observations and new information that could affect nuclear safety. An effective international OEF process must capture any experiences, including near misses that have led to significant corrective actions in human performance, hardware or safety management practices. Likewise, it must provide information on safety research programmes to resolve a new safety concern, even if the concern was raised for reasons other than an incident at a nuclear facility. In addition, information should be exchanged on good practices that have the potential to assist others with their safety-based programmes.

The scope of this report includes existing international systems, covering different nuclear facilities (e.g., IRS, FINAS and IRSRR), and not just those looking at nuclear power plant events.

Resources allocated to date to develop and maintain international OEF have been focused on the collection of event data. This provides a good foundation for further developments to enable event analysis and derivation of lessons learned, trends and other common features so as to make the system data usable for reducing the likelihood of event recurrence.

Using the main elements outlined in the IAEA Safety Guide NS-G-2.11 [2], adapted for international use, this report looks at the current state of national and international OE systems, the positive and negative aspects of existing international systems, assesses the regulatory objectives and makes proposals for enhancements to meet these objectives. Currently, this Safety Guide is under revision to take into account the most recent developments in the use of OE, such as trending of low level and near-miss events, and the effectiveness review of OE programmes.

The 2006 Task Group evaluation confirmed that existing international OEF systems had positive aspects against the majority of the NS-G-2.11 international OEF system elements. Some notable strengths included: availability of IRS, IRS RR web based event reporting systems and supporting infrastructure, international networks, conferences, workshops and guidance, and analysis of specific issues. The 2006 Task Group did, however, find the following areas to be particularly weak at the international level against identified regulatory objectives: lack of strategic international OEF oversight, inconsistent ability of current systems to capture lessons learned, lack of a web-based system for FINAS, lack of international OEF screening and international OEF trending for determining priorities and programmes of work.

Section 4 provides the full set of recommendations made by the 2006 Task Group. These recommendations cover national systems, given that robust national systems are a prerequisite for effective international OEF.

Another equally important finding by the 2006 Task Group was that the situation in 2006 for nuclear power represented a unique opportunity in relation to new build activities under consideration at that time by many NEA member countries. The establishment of an international OEF system that can meet the regulatory needs as stated herein would, in effect, establish a new, more reliable, effective and efficient knowledge base for lessons learned for current – and future – generation of nuclear power plants to be built, including the construction stage. The timing of this work may provide regulators with a ‘new start’, at least for the new builds, with the advantage of learning lessons from the past use of OEF.

1. THE IMPORTANCE OF OE FOR THE REGULATOR

1.1 Introduction

The CNRA report on Regulatory Challenges in Using Operational Experience [1] noted the following: *“One must keep in mind that the operator has the responsibility for safely operating a nuclear power plant, and hence it is important for the operator to have an active programme for collecting, analysing and acting on the lessons of operating experience that could affect the safety of his plant. It is the nuclear regulator’s responsibility to oversee the operator’s activities to assure the plant is operated safely.”*

IAEA Safety Requirements publication General Safety Requirements [3] on Governmental, Legal and Regulatory Framework for Safety states; *“The regulatory body shall make arrangements for analysis to be carried out to identify lessons to be learned from operating experience and regulatory experience, including experience in other States, and for the dissemination of the lessons learned and for their use by authorised parties, the regulatory body and other relevant authorities”* (Requirement #15).

Two areas drew considerable discussion at the Cologne OEF Conference in 2006:

- A need for better feedback of corrective actions and changes made in regulatory requirements.
- A need for the international OEF process to ensure that events involving serious potential hazards do not reoccur. To achieve this result, reporting on events need to be coupled with effective programmes to ensure that the lessons learned from previous events were widely applied. The main recommendations from the conference were the following:
 - Focus needs to be changed from just collection to an increased OE feedback on corrective actions taken. Current practice is too event oriented.
 - Further current programmes on precursor analyses/event analysis to encompass larger regional experience (e.g., EC, Asia).

1.2 Evolution of OEF Processes to Enhance Nuclear Safety

After many decades of commercial nuclear operations, both licensees and regulators are faced with continuing challenges to maintain and improve safety in the nuclear installations being operated, built and planned. During the formative years, nuclear safety involved plant design, defence-in-depth, technical competence, safety assessment, all of which were mostly derived from the work of nuclear scientists and physicists. It was not until the late 1970s that researchers and regulators began looking more closely at OE to derive lessons learned. In 1978, the CSNI approved setting up a system to collect international OE data. The accident at Three Mile Island (shortly after) added impetus to this initiative, which led to the start of the International Reporting system (IRS).

In the years since, national OE systems have evolved, numerous international systems have been added and the practice of collecting and analysing OE information has grown in depth and sophistication.

The CNRA publication [1] notes that *“One of the major reasons for this improved performance has been the extensive use of lessons from operating experience to backfit safety systems, improve operator training and emergency procedures, and to focus more attention on human factors, safety culture and nuclear quality management systems”*.

As noted in the CNRA publication [1] and at recent international conferences and meetings:

- It is questionable whether the lessons from OE are being used commensurate with their importance to safety.
- There is a need for improved processes to assure that OE is used systematically to promote safety.

The CNRA Operating Plan [4] states that feedback of worldwide operating experience has been inadequate and needs improvement to avoid events recurring for similar reasons.

One of the main weaknesses of current systems is their inability to provide follow-up information. As such, many have pointed out the need for improvements in the OEF process to better disseminate information on corrective actions and their implementation. Both national and international OE systems require large resources and *'It is clear that improved efficiency and effectiveness of national and international systems is needed in these areas and is likely to require additional resources. The scope of this report is limited to international operating experience systems and how these can be improved.'* [1]

The fundamental objective of nuclear safety regulatory bodies is to ensure that nuclear utilities operate their plants at all times in an acceptably safe manner. It follows that if OE plays a vital role in the regulator's oversight responsibility, then it is an important element in the regulators overall programme to ensure the health and safety of the public.

1.3 Task Group Mandate

Recognising the importance of the OE, the CNRA may direct the WGOE to focus on a particular issue or recommendation regarding the improvement of the international OEF process.

Based on the work of its Senior Level Task Group, observations from its WGOE, INSAG 21 [5], INSAG 23 [6] and results from the recent International Conferences [7], the CNRA, at its December 2006 meeting directed the WGOE to change its primary focus from analysis of OE information to advising CNRA on how to improve international OEF processes and networks and their connections with national OEF processes, including their status and approaches to meet current regulatory challenges.

The main objectives of the 2006 Task Group was to review existing international OEF processes, and provide recommendations on how to better organise the international network and/or outputs for more effective use of OEF to:

- ensure consistent and comprehensive capture of any OE which leads to significant corrective actions at any plant worldwide;
- ensure that the lessons learned from previous events are widely applied emphasizing exchange of good practices; and
- allow for corrective actions preventing occurrence.

1.4 Definition of OE

The 2006 Task Group adopted the definition of OE as: "all events, conditions, observations or new information that could affect nuclear safety". This broad definition of OE includes all of the following categories under its umbrella:

- 1) *actual operating events, typically plant transients accompanied by equipment failures, human errors or other anomalous behaviour;*
- 2) *actual failures of systems, structures or components, or human errors, that may or may not have caused a plant transient;*

- 3) *adverse safety conditions such as design weaknesses, degraded safety equipment or aging effects that could lead to failures of systems, structures or components;*
- 4) *external challenges such as vulnerability to severe weather, flooding, high winds or security threats;*
- 5) *organisational or human factor issues such as a degraded safety culture at a plant, high human error rates, weak Quality Assurance programmes, inadequate procedures, inadequate training or inadequate control of contractors at a plant site;*
- 6) *new information, such as research results or new safety analyses, showing a previously unknown weakness in a safety system or a fuel failure vulnerability; and*
- 7) *non-nuclear experience (e.g., aviation, railways, high risk chemical industries, etc.) such as equipment flaws or seismic effects on non-nuclear structures and equipment.*

2. EXISTING NATIONAL AND INTERNATIONAL OEF SYSTEMS AND ORGANISATIONS

2.1 National OEF Systems

The importance of OEF for enhancing nuclear safety is well recognised. At the national level, the primary responsibility for safety lies with the operator, and hence the collection of OEF is performed by the operators' organisation. The regulatory challenge is to assure that OEF is used effectively to promote safety.

Although many differences exist between countries (e.g. size, legislative framework, regulatory requirements, resources, domestic or non-domestic vendors), regulators, through their inspection programmes, reporting requirements and regular meetings with licensees, continuously provide oversight on licensees OEF programmes. While these regulatory systems vary, they all need to be informed by clear and consistent information from international OEF systems.

In order to capture the current situation, a number of member states provided short narratives outlining their national OEF practices in Appendix A.

2.2 Current International OEF Organisations, Systems and Expert Groups

There are three international organisations operating international OEF systems on events at nuclear installations. These organisations operate international OEF systems and organise expert meetings. The following sections provide an overview of the current organisations, systems and expert groups. Additional information on the systems and expert groups and their methods of operation and interactions is included in Appendices B and C (Note: Based on the regulatory focus of this report, additional information on WANO is not included).

2.2.1 International OEF Organisations

Following are the three international OEF organisations currently in operation today:

- OECD Nuclear Energy Agency (NEA);
- International Atomic Energy Agency (IAEA); and
- World Association of Nuclear Operators (WANO).

2.2.2 International OEF Systems

The systems operated by these organisations generally collect information with the intent to exchange lessons learned, are used mainly for reporting events information (and not technical analysis) and periodically issue reports on topical issues, safety guides, etc., based on the information obtained from the international systems and national programmes. Some of these systems are operated as proprietary data bases. Following are the major international OEF systems that exist today:

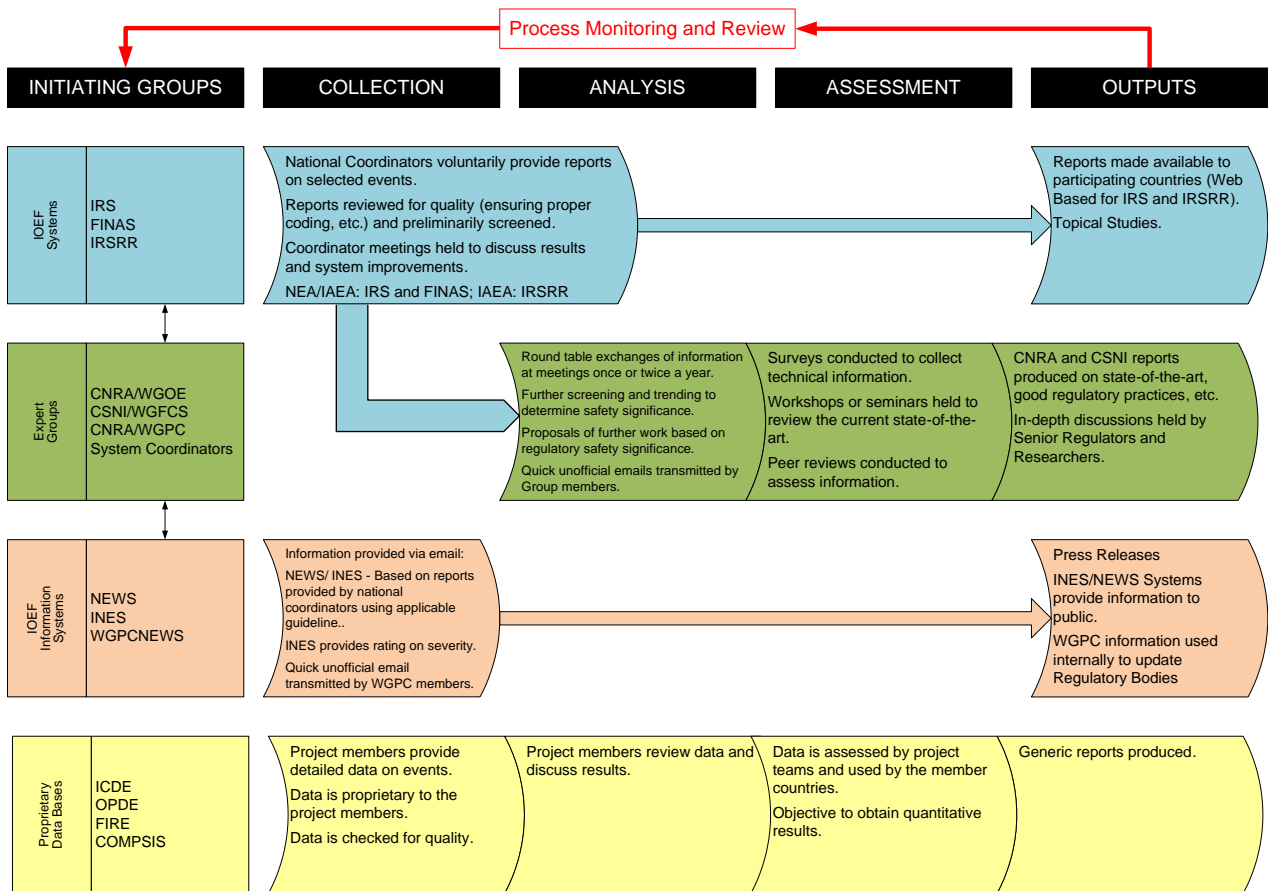
- IAEA/NEA IRS
- IAEA/NEA Fuel Incident Notification and Analysis System (FINAS)

- IAEA Incident Reporting System for Research Reactors (IRSRR)
- WANO
- IAEA/NEA International Nuclear Events Scale (INES)
- IAEA/NEA/WANO Nuclear Events Web based System (NEWS)
- NEA Nuclear Regulators' Information exchange network (WGPCNEWS)
- NEA International Common Cause Failure Data Exchange (ICDE)
- NEA Fire Project (FIRE)
- NEA Piping Failure Data Exchange (OPDE)
- NEA Computer Systems Important to Safety (COMPSIS)
- IAEA Emergency Notification and Assistance Convention (ENAC)

2.2.3 International OEF Expert Groups

Meetings of experts are held by the three organisations on a continuing basis on OE. In addition, these groups interact with other experts in assessing the safety significance. The major international expert groups that exist today include (ref. Chart 1 on the next page):

- OEF Groups include: NEA/CNRA Working Group on Operating Experience and the Working Group on Public Communicators for Nuclear Regulatory Organisations, IAEA/NEA Coordinator meetings for IRS and FINAS and INES. IAEA Coordinator meetings for IRSRR and NEA Projects.
- Regulatory Groups interacting with international OEF include; NEA/CNRA Working Group on Inspection Practices.
- Technical Support Groups interacting with international OEF include: NEA/CSNI Working Groups on Human and Organisational Factors, Risk Assessment, Structural Integrity, Accident Management and Analysis, Fuel Safety and Fuel Cycle Safety.



3. ENHANCING THE EFFICIENCY AND EFFECTIVENESS OF INTERNATIONAL OEF SYSTEMS

3.1 International OEF Task Group Methodology

IAEA Safety Guide NS-G-2.11[2] provides best OEF practice at the national level and gives the following elements as the basis of a good national OEF system:

- Reporting of events at plants;
- Screening of events — primarily on the basis of safety significance;
- Investigation of events;
- In-depth analysis, including causal analysis, of safety significant events;
- Recommended actions resulting from the assessment, including approval, implementation, tracking and impact evaluation;
- Wider consideration of trends;
- Dissemination and exchange of information, including by the use of international systems;
- Continuous monitoring and improvement of programmes for the feedback of safety related OE; and
- A storage, retrieval and documentation system for information on events.

Given the necessary interfaces between national and international OEF systems, the 2006 Task Group used the NS-G-2.11 framework to inform its evaluation of the features of a good international OEF system.

3.2 Task Group Evaluation

The 2006 Task Group initially assessed the efficiency and effectiveness of existing international OEF systems against the NS-G-2.11 framework, adapted as appropriate for international use. The outcome of this assessment is given in the following Table.

Table 1: Review of Existing International OEF Systems

INTERNATIONAL OEF SYSTEM ELEMENTS	CURRENT ARRANGEMENTS	POSITIVE ASPECTS	NEGATIVE ASPECTS
<p>1. General - International strategic role</p>	<p>Overview by NEA (CNRA) and IAEA (Reporting System Co-ordinators; e.g., FINAS, IRS,) as limited by their mandates.</p> <p>Development of technical guidelines, standards; etc (IAEA).</p>	<p>Network of OE experts</p> <p>Availability of guidance documents.</p> <p>International data bases – provide sources of event information to other countries</p> <p>IAEA.</p> <p>Review services provide added value and insights (e.g. IRRS).</p> <p>Countries are placing renewed focus and priority on international OEF.</p>	<p>No body or organisation setup that oversees international OEF.</p> <p>Lack of adequate coordination between different working groups and organisations.</p> <p>Variable participation by countries.</p> <p>Resource limited.</p>
<p>2. Reporting of events / good practices</p>	<p>IRS, IRSRR, FINAS, INES, NEWS.</p> <p>NEA (CNRA and CSNI Meetings), IAEA (TCM and Consultant Meetings).</p> <p>International Conferences.</p> <p><u>Proprietary and/or Limited</u></p> <p>NEA Databases (ICDE, OPDE, FIRE, COMPSIS)</p> <p>WANO.</p> <p>Different coding requirements between different systems.</p> <p>Quality review of reports by IAEA Staff.</p>	<p>A lot of information is collected and available.</p> <p>Web based System (for IRS and RSRR) has increased effectiveness and efficiency.</p> <p>Internet sources and electronic mail provide fast information to others.</p> <p>Data Bases provide useful storage and retrieval of technically verified information although inconsistencies exist.</p>	<p>Level of reporting (thresholds vary) and criteria is interpreted differently.</p> <p>Proprietary issues prevent widespread dissemination in some cases (e. g. NEA Data Bases) and especially in exchanging information with industry (WANO).</p> <p>Language (translation issues) differences exist in many countries.</p> <p>Timeliness.</p> <p>Resource limitations.</p> <p>Regulatory response and additional lessons learned is not usually available.</p> <p>Lack of web based systems (FINAS).</p> <p>All parts of the plant life cycle are not covered.</p> <p>Insufficient discussions and follow-up on good practices.</p> <p>No systematic international collection of OEF other than reportable events (e.g. good practices, low level events, research).</p>

INTERNATIONAL OEF SYSTEM ELEMENTS	CURRENT ARRANGEMENTS	POSITIVE ASPECTS	NEGATIVE ASPECTS
3. Screening of events - primarily on basis of safety significance	National level. Topical Studies by IAEA	Previous IAEA yearly report and Blue Book provided a general overview of OEF. Topical Studies by IAEA and Technical Reports by WGOE provide good insights (generic studies).	Loss of IAEA yearly highlights screening IRS (which could be extended to other data systems.) No systematic screening of OEF on an international level.
4. Regulatory Investigation and Analysis	National level. CNRA and CSNI Reports. IAEA Topical Studies. WGOE Reports. IAEA Prosper Missions. Workshops / Conferences.	Provides analysis in specific issues. Provision of international guidance. International conferences and workshop. Topical Studies by IAEA and Technical Reports by WGOE	Criteria for determining resource expenditure vary internationally. Limited co-ordination exists between international organisations. Limited resources available at the international level.
5. Regulatory Actions in response to events	CNRA, CSNI, IAEA Co-ordinator Meetings, on significant events. Proceedings, reports and studies generated by the above groups.	Information provided during round tables, in-depth discussions provide good source of information. Facility exists for reporting specific corrective actions and they are provided for specific plants (but not complete).	Current reports provide limited information on good regulatory practices. No follow-up on the regulatory actions taken following issuance of reports.
6. Wider consideration of issues / trends	<u>Issues</u> Topical Studies, Blue Books, Highlights, etc. <u>Trends</u> NEA Data Bases.	Issues derived from international meetings and exchanges of information. NEA Data Bases provide trending for the specific issues they are addressing (e.g. common cause data, etc.).	International OEF plays a minor role in determining the priorities and programmes of work for safety programmes in international organisations. Trend analysis is not being performed outside of the NEA Data Bases.
7. Dissemination and exchange of information	Reports - IRS, IRSRR, FINAS, INES, NEWS; Meetings, International Conferences and Workshops and Databases. NEA Data Bases provide proprietary information to the members of the data base	Web based reporting systems. Notification systems.	Information is not consistent in reporting. The proprietary nature of the NEA Data Bases severely limits exchange of information in these areas. Different notification systems not aligned with each other, duplicative in some areas and do not contain the same contacts.

INTERNATIONAL OEF SYSTEM ELEMENTS	CURRENT ARRANGEMENTS	POSITIVE ASPECTS	NEGATIVE ASPECTS
			<p>Dissemination is limited based on the national coordinator or national group member who receives the information.</p> <p>Feedback on the usefulness of information (e.g. event reports; SOARs, etc.) is not readily available to complete the feedback loop).</p> <p>Lack of web based FINAS.</p>
<p>8. Continuous Monitoring and Improvement of International OEF Processes</p>	<p>Reporting Systems Coordinators Meetings.</p> <p>WGOE, WGFCs.</p> <p>IAEA and NEA perform limited QA.</p>	<p>Input provided by Coordinators using the systems at yearly meetings.</p> <p>Network of OE experts.</p> <p>QA performed have enhanced the effectiveness of the WBIRS system.</p>	<p>Resources limit effectiveness</p> <p>Lack of QA has been detrimental in making improvements to FINAS and IRSRR systems.</p> <p>No overview of all international OEF systems.</p>
<p>9. Storage, Retrieval and Documentation Systems</p>	<p>Web Based - IRS, IRSRR NEWS, INES.</p> <p>FINAS paper documents.</p> <p>NEA Data Bases – Stored in NEA Data Bank (data bases are proprietary).</p>	<p>Web based system events reports are readily available.</p> <p>NEA Data Bank contains a lot of useful data on events.</p>	<p>FINAS event reports are not readily accessible.</p> <p>The proprietary nature of the NEA Data Bank limits the exchange of information.</p>

3.3 Regulatory International OEF Objectives and Proposed Enhancements

The 2006 Task Group reviewed the international OEF evaluation, considered shortfalls and proposed enhancements to address these shortfalls. The following Table and supporting text summarise the outcome.

Table 2: Regulatory International OEF Objectives and Proposed Enhancements

ELEMENTS OF INTERNATIONAL OEF SYSTEM	REGULATORY OBJECTIVES	PROPOSED ENHANCEMENTS
<p>1. General - International Strategic Role</p>	<ol style="list-style-type: none"> 1) Adequate international OEF systems and consistent participation by the member countries. 2) Overview of all international OEF systems. 3) Coordination between different working groups. 4) Quality reviews of the effectiveness of National Systems. 	<ol style="list-style-type: none"> 1) Effective national OEF system including sufficient resources is a prerequisite for having effective interfaces with international OEF systems. 2) Effective strategic oversight and co-ordination of international OEF is needed for nuclear facilities. 3) Services such as the IAEA IRRS or similar peer reviews provide advice on improving OE and should be used by the member countries.

ELEMENTS OF INTERNATIONAL OEF SYSTEM	REGULATORY OBJECTIVES	PROPOSED ENHANCEMENTS
2. Reporting of events / good practices	<p>1) Adequate international OEF systems accessible to all countries.</p> <p>2) Supporting criteria and guidelines for inputting information into international OEF systems for all parts of the plant life cycle.</p> <p>3) Consistent application of international OEF criteria and guidelines by member countries especially relating to the submittal, timeliness and input of follow-up actions.</p> <p>4) OEF reports on other than reportable events (e.g. good practices, low level events) for all types of nuclear facilities, if so, methods and/or criteria are needed.</p>	<p>1) All systems to be updated to the web-based system is a high priority</p> <p>2) Guidelines should cover the entire plant life cycle and be periodically reviewed and updated as needed.</p> <p>3) Senior regulators should ensure that reports are submitted in accordance with the criteria and guidelines in a timely manner with input of follow-up actions.</p> <p>4) International OEF systems to be updated to facilitate reports on other than reportable events.</p> <p>5) In order to facilitate coordination of overall international OEF it would be beneficial to make IRSRR a joint IAEA/NEA system.</p>
3. Screening of events - primarily on basis of safety significance	<p>1) Events screened to determine the safety significance of events, lessons learned, or generic applicability for the purpose of regulatory follow-up.</p>	<p>1) Screening of international OEF to allow for informed resource expenditure for input to plans of work.</p>
4. Regulatory Investigation and Analysis	<p>1) Prioritisation and timely investigation and analysis based on the results of international OEF screening.</p> <p>2) Receive technical or regulatory assistance on key issues identified for follow-up.</p>	<p>1) Inform the decision-making process for resource expenditure based on output of international OEF screening process</p> <p>2) Clarify the roles of the various international organisations</p> <p>3) Request technical (CSNI WGs) or regulatory support (CNRA WGs) from the appropriate expert group.</p>
5. Regulatory Actions in response to events	<p>1) Recommend changes to regulatory practices based on the results of the investigation and analysis</p> <p>2) Sharing best practices and lessons to other interested parties including industry.</p> <p>3) Follow-up on recommended actions.</p>	<p>1) Analysis and investigation reports (including lessons learned and best practices) should identify recommended actions.</p> <p>2) WGOE should periodically follow-up on usefulness of reports, and implementation of recommended actions.</p>
6. Wider consideration of issues / trends	<p>1) Input (including recurring events, causal factors, specific safety concerns etc.) for setting IAEA and NEA priorities and programmes of work (e.g., regulation, periodic safety reviews, determining research requirements, new build).</p> <p>2) Comprehensive input of national data to support trending</p>	<p>1) Establish ways to perform meaningful international trending to meet the regulatory objectives.</p> <p>2) Make recommendations based on outputs from trending.</p>
7. Dissemination and	<p>1) Need comprehensive information from</p>	<p>1) Ask IAEA and NEA to ensure member countries</p>

ELEMENTS OF INTERNATIONAL OEF SYSTEM	REGULATORY OBJECTIVES	PROPOSED ENHANCEMENTS
exchange of event information	all countries in international OEF systems. 2) Full participation by industry to enhance the exchange of OEF. 3) Use information from the NEA data bases (not including proprietary data) relevant to OEF 4) Consistency in the communication of information on events.	participate fully in international OEF systems. 2) Recommend NEA data bases provide regular non-proprietary summary reports to the appropriate CNRA and CSNI Working Groups. 3) Recommend ways in which communication systems can provide a more systematic consistent message.
8. Continuous Monitoring and improvement of International OEF Processes	1) Periodic reviews of individual international OEF programmes and quality assurance of the processes. 2) Periodic holistic overview of international OEF	1) IAEA and NEA Groups to perform periodic review of international OEF programmes. 2) Establish a means to implement change in international OEF systems.
9. Storage, Retrieval and Documentation Systems	1) Easy access (user friendly) to all relevant OEF information.	1) All systems should be updated to the web-based systems.

3.4 General - International Strategic Role

International systems need to supplement information obtained through national OEF systems. Therefore, effective national OEF systems, including insights on lessons learned and corrective actions taken are a prerequisite for effective international OEF.

The CNRA report [1] states the need to include events that may not be included in an operator's OEF programme, such as new research results, international OE, and broad industry trend information.

However, participation by member countries is inconsistent and differences exist between the various international OEF data bases, the level of reporting is mixed and resources allotted to OE are limited. Additionally, at the international level, there is no uniform and systematic, collection or sharing of information on good practices, trend analysis, low level events, etc.

Member countries that have or plan to receive services such as the IAEA Integrated Regulatory Review Service (IRRS) can benefit by implementing appropriate recommendations in the area of national OEF systems and interfaces with international OEF systems.

Hence, it is recommended that CNRA members should, as soon as possible:

- develop national OEF systems to meet best international practice (e.g., NS-G 2.11); and
- participate in international peer reviews (e.g., IRRS) and implement recommendations to enhance OEF.

WG OE should perform reviews every 2 years on the progress by the member countries in developing national OEF systems to meet the best international practice and from the results of international peer reviews.

Additionally, there is a need to have better strategic international OEF oversight, with transparent mechanisms for changing existing processes and for improved co-ordination between the various international OEF organisations and systems. Therefore, it is recommended that:

- Chairs of the International OEF Operating System Advisory Committees and the Chairs of the NEA Working Groups, CNRA/WGOE and CSNI/WGFCS shall form a Management Board to provide strategic oversight; clarify the roles of the various international OEF Organisations, improve co-ordination of work, and ensure the implementation of changes.
- The roles of international OEF Operating Systems (IRS, FINAS and IRSRR) and the corresponding roles of the NEA Working Groups (CNRA/WGOE and CSNI/WGFCS) should be clarified to establish a clear distinction between their activities such that:
 - a. The international OEF Operating Systems should concentrate on collecting high quality information on events.
 - b. The Working Groups should focus on analysing events and determining the safety significance from a regulatory viewpoint, in accordance with the proposal by the CNRA Bureau.

3.5 Reporting of Events and Good Practices

Currently, systems cover all the various types of nuclear installations (e.g., NPPs, Fuel Cycle, Research Reactors, etc.). Annual co-ordinator meetings, consultant meetings, and periodic international conferences are held to discuss OEF. Additionally, specific issue data bases exist and international reviews are performed to assess both national and international OE Systems.

The result is that a lot of information is collected, and advances in the internet and the use of web based systems has increased the efficiency and effectiveness of the data bases and enabled fast transmittal of information as events occur. However, not all systems are web based (notably, the FINAS paper based system) and have very limited value and result in low levels of event reporting.

Proprietary requirements for some databases, which are necessary to allow collection of detailed information, limit the dissemination of information. Language differences and resource limitations in some countries result in inconsistency in reporting or delays in the exchange of information. Due to unclear terminology and incomplete information, screening and reviewing of reports takes time and the relevance for own plants may be ignored. Some countries report only high safety significant events while others report events of lower significance. Practices for reporting differ from country to country and from region to region. Differences in coding requirements between systems make it difficult to merge information.

Current arrangements provide for the development of technical guidelines and standards and production of topical studies, but do not sufficiently address consistency in the completeness of reporting or in obtaining information on the implementation of corrective actions. Furthermore, information on regulatory responses to events is not usually available.

In order to obtain better understanding and perform analysis, more consistent reporting of OE from all countries (e.g. systematic application of guidelines) is needed. Terminology used in reports needs to be clear. Reports should also contain sufficient technical and generic information for regulators and operators to easily understand the safety significance and relevance of an event.

Additionally, submittal of OEF reports on matters other than reportable events (e.g. good practices, low level events) for all types of nuclear facilities should be provided by the member countries, recognising that this may require new methods and/or criteria for collection.

It is recommended that:

- International OEF system operation should be web based. This top priority should precede other system improvements such as providing a common platform for international OEF systems.
- International OEF Systems should be capable of receiving reports on good practices as well as reportable events and should be extended over the entire plant life cycle.

- To ensure balanced management and better efficiency, it is recommended that the IAEA and NEA agree to operate IRSRR jointly similar to the arrangements made for the already operating data base systems.

It is also recommended that CNRA members should ensure that their national reports are submitted in accordance with guidelines of international OEF systems in a timely manner with input of operator follow-up and regulatory actions.

3.6 Screening of Events – Primarily on the basis of safety significance

The regulator needs events to be screened to determine the significance of the lessons learned in relation to safety and issues of generic applicability, for these events and issues to be disseminated in a timely manner and to input to plans of work. Presently, events are mainly screened at national level. Therefore, national systems need to be effective to service and utilise international systems. There is no systemic screening of OEF at international level.

There are indications that preliminary screening of international event reports at national level is on the basis of safety significance and technical applicability (same plant type), disregarding the generic issues.

Previously, the yearly reports (Highlights – insights on past events to derive more generic lessons from grouped or similar events) on IRS and the Blue Book (which covers a 3 year period and is used to inform the industry and the public about the emerging trend of events reported to the IRS system) provided a good overview of international OEF. In addition, topical studies and technical reports produced by the IAEA, NEA and WANO offer good insights. The Highlights provide for insights on past events for more generic lessons from grouped or similar events.

It is recommended that:

- Events from international OEF systems should be screened on an annual basis to determine safety significance, lessons learned or generic applicability for regulatory follow up. This function should be provided by WGOE and WGFCs, with a view to informed resource expenditure to CNRA plans of work.

3.7 Regulatory Investigation and Analysis

Investigations are performed at the national level, not internationally. However, follow-up activities are performed by international organisations (e.g., WGOE Case Studies, IAEA Topical Studies, Workshops / Conferences, IAEA Prosper Missions. etc.), which provide added insights. These reports and conferences provide good analysis on specific issues, which can be used in the development of international guidance and for regulatory decision making. There has been a decrease in the number of these types of studies of the past year. These groups (e.g., WGOE, WGPC, IAEA TCMs, etc.) allow for networking between OE experts. However, the criteria and methodologies used vary and are not easily transparent or transferable. In addition, there is limited co-ordination between the groups. These ways of working are not sustainable given the limited resources available at international level.

The WGOE / WGFCs international OEF screening process should highlight areas for further regulatory investigation and analysis, which should be allocated to the appropriate international organisation.

Therefore, it is recommended that:

- In terms of further investigation and analysis, CNRA plans of work should be informed by outputs from WGOE / WGFCs periodic international OEF screening, with requests made for technical (CSNI WGs) or regulatory support (CNRA WGs) as appropriate.
- Roles of various international OEF organisations should be clarified.

3.8 Regulatory Actions in Response to Events

Currently, industry and regulatory actions as a result of significant events are reviewed at IAEA, NEA and WANO meetings, at round tables, in-depth discussions. etc. and during the annual co-ordinator meetings.

Some international OEF reporting systems (e.g. IRS) have the facility to incorporate corrective actions. However, details on corrective actions in initial reporting are inconsistent and, in most cases, follow-up on additional corrective actions, including changes in regulatory requirements is not provided. No information exists on whether similar corrective actions have been implemented at other plants or by regulators that could be also affected by the event. Also, current reports only provide limited information on good regulatory practices.

It is believed that the recommendations from the international OEF investigation and analysis process should inform changes to regulatory practices at the national level and identify best practices and lessons learned. This information should be shared in a timely manner between interested parties, including regulators and industry. Furthermore, there should be follow-up international OEF activity to monitor the usefulness of the information provided and the extent to which recommendations are implemented.

Therefore, it is recommended that:

- CNRA members review and, where appropriate, implement at the national level and in a timely manner recommended changes to regulatory practices from international OEF investigation and analysis reports (including lessons learned and good practices).
- WGOE and WGFCs undertake annual reviews of the usefulness of international OEF investigation and analysis reports (including lessons learned and good practices) and implementation of recommended actions.

3.9 Wider Consideration of Issues / Trends

Safety significant issues and trends could be used to inform the IAEA and NEA priorities and programmes of work. However currently, international OEF plays only a minor role in this context. Comprehensive data entry at the national level is needed to support trending.

Topical studies and reports prepared by the IAEA, NEA and WANO look at general issues evolving from OE (but limited to events). Both the NEA and IAEA co-ordinate work in this area. The IAEA and WANO exchange information on possible trends at their annual interface meeting. The specialised data bases look at trending. However, information collected in IRS is not arranged to support detailed trend analyses. More systematic consideration on data collection is needed if such analyses are to be performed.

Both national and international organisations have been able to use insights gained from OEF to set priorities and the NEA data bases enable trending of specific issues. Communications, meetings, and participation between the NEA and IAEA help improve co-ordination and eliminate duplications. However, trend analysis is not possible outside the NEA data bases and potential duplication exists between the industry (WANO) systems and the other (IAEA/NEA) systems.

It is recommended that:

- WGOE and WGFCs should establish methodology such that meaningful international trending can be performed (either through existing systems or other means) and will be available as a good knowledge base for lessons learned for the new generation 3+ nuclear power plants to be built, including the construction stage.
- WGOE and WGFCs should make recommendations to inform IAEA and NEA priorities and programmes of work based on the results of their trending processes.

- CNRA and CSNI should undertake periodic (possibly annual) reviews to close out issues which are no longer safety relevant.
- Roles of various international OEF organisations should be clarified with respect to sharing issues and trends.

3.10 Dissemination and Exchange of Information

Effective international OEF information exchange requires all member countries to participate fully in international OEF systems and look for ways to increase participation by industry to enhance the exchange of OEF between regulators and industry.

Information is currently disseminated through access to the international OEF systems (limited), issuing reports and studies, international workshops and conferences, training, etc., by the different systems and NEA and IAEA groups. Regular reporting by the working groups (e.g., WGOE, WGFCs) to CNRA and CSNI is acknowledged as beneficial. Overlap in the reporting of events exists between the different systems.

The upgrade to web based systems along with the various notification systems has improved dissemination of information. These systems will also include the possibility for providing feedback in the future.

Proprietary (e.g. for NEA databases) and security issues limit the information that is provided. The information notification systems are not aligned with each other and have different lists of contacts. Hence, duplication and differences exist in the information provided. For some systems, e.g. IRS and INES, there are processes for capturing feedback on the usability of the systems and for initiating improvements. Finally, delays in the implementation of web based system for FINAS have been detrimental for disseminating information of events in the fuel cycle facilities.

It is recommended that:

- CNRA members ensure their full participation (regulators and industry) in international OEF systems.
- WGPC, NEWS, INES and the other communication systems should meet every three years together and formulate ways to provide clear, consistent, quick information on events and incidents to both the regulatory authorities and the public.
- Information (including topical studies, generic reports, etc.) derived from national OEF systems, international OEF systems and international OEF Expert groups should be disseminated as broadly as possible (without releasing proprietary data).

3.11 Continuous Monitoring & Improvement of International OEF Processes

Quality assurance and periodic reviews of individual international OEF systems are important to ensure their effective operation. There is also a need for a periodic holistic overview of international OEF systems to provide confidence that together the systems are continuing to meet regulatory objectives.

The work of the international organisations, yearly meetings of national co-ordinators, quality assurance on event reporting (albeit limited in nature), and yearly meetings of working groups provide for continuous monitoring of international OEF systems. However, there is no clear mechanism for oversight of the overall international OEF picture or a means of implementing change in international OEF systems, e.g. moving FINAS to a web based system.

In addition, the yearly meetings provide for establishing a network of experts in each system. The system Advisory Committees, NEA Standing Committees and NEA Project Boards monitor the activities

of their respective systems. The results of these meetings are not widely distributed and limited resources impact their effectiveness.

It is recommended that WGOE carry out a holistic overview of international OEF systems, initially on an annual basis.

3.12 Storage, Retrieval and Documentation Systems

Easy access to relevant OEF information is necessary and, as such, user friendly systems and data bases (e.g. easier downloading of documents, keyword searchable, allow attachments to existing reports, etc.).

IRS, IRSRR, INES, and NEWS are web based systems that provide easy access, whilst FINAS is still a paper based system. The NEA data base information is stored and retrievable on a proprietary basis, to subscribing members. Reports produced by the IAEA and NEA are generally open to the public through subscribing members.

Collection, storage and retrieval of IRS and IRSRR event information are readily available to the member countries through national coordinators. However, information on fuel cycle events input to FINAS are not readily available, severely affecting the potential usability of FINAS. Access to IRS and IRSRR topical studies are accessible on WBIRS, however due to the proprietary nature of NEA data bases, this limits the exchange of information.

It is recommended that CNRA members support updating by IAEA of all international OEF systems to web based systems as a matter of urgency using the chairs of the Advisory Committees for the international OEF operating systems and the chairs of the NEA Working Groups WGOE and WGFCS as the mechanism for implementing this change.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 2006 Task Group conclusions and recommendations

The 2006 Task Group evaluated the effectiveness and efficiency of international OEF systems against the IAEA Safety Guide NS-G-2.11 [2].

The 2006 Task Group considered effective national OEF systems to be a prerequisite for international OEF effectiveness.

The 2006 Task Group evaluation confirmed that existing international OEF systems had positive aspects with respect to the majority of the above international OEF system elements. Some notable strengths include:

- Availability of IRS, IRS RR web based event reporting systems and supporting infrastructure.
- International networks, conferences, workshops and guidance.
- Analysis of specific issues.

The 2006 Task Group did, however, find the following areas to be particularly weak at international level against identified regulatory objectives:

- Strategic international OEF oversight.
- Lack of a web-based system for FINAS.
- Do not capture lessons learned.
- Screening.
- International OEF trending for determining priorities and programmes of work.

In order to meet regulatory objectives, the 2006 Task Group proposed the following recommendations for enhancement of existing international OEF systems.

General – International strategic role

1. Given the necessary interfaces between national and internal systems, CNRA members should as soon as possible develop national OEF systems to meet best international practice (e.g., NS-G 2.11).
2. CNRA members should as soon as possible undertake to participate in international peer reviews (e.g., IRRS) and implement recommendations to enhance OEF.
3. WGOE should perform reviews every 2 years on the progress by the member countries in developing national OEF systems to meet the best international practice and from the results of international peer reviews.
4. The Chairs of the International OEF Operating System Advisory Committees and the Chairs of the NEA Working Groups, CNRA/WGOE and CSNI/WGFCS shall form a Management Board to

provide strategic oversight; clarify the roles of the various international OEF Organisations, improve co-ordination of work, and ensure the implementation of changes.

5. The roles of international OEF operating systems (IRS, FINAS and IRSRR) and the corresponding roles of the NEA Working Groups (CNRA/WGOE and CSNI/WGFCS) should be clarified to establish a clear distinction between their activities such that:
 - The international OEF operating systems should concentrate on collecting high quality information on events.
 - The Working Groups should focus on analysing events and determining the safety significance from a regulatory viewpoint. Accordingly, the 2006 Task Group agrees with the proposal by the CNRA Bureau that WGOE should focus on regulatory responses to events.

Reporting of events / good practices

6. The first priority concerning international OEF system operation is that all should be web based. This priority should precede other system improvements such as providing a common platform for international OEF systems.
7. International OEF systems should be capable of receiving reports on good practices as well as reportable events and should be extended over the entire plant life cycle.
8. To ensure balanced management and better efficiency it is recommended that the IAEA and NEA agree to operate IRSRR jointly similar to the arrangements made for other operating systems.
9. CNRA members should ensure that their national reports are submitted in accordance with guidelines of international OEF systems in a timely manner with input of operator follow up and regulatory actions.

Screening of events – primarily on basis of safety significance

10. WGOE and WGFCS should annually screen events for safety significance, lessons learned and applicability of regulatory follow-up.

Regulatory investigation and analysis

11. In developing its plans of work, CNRA should review outputs from WGOE / WGFCS periodic international OEF screening, with requests made for technical (CSNI WGs) or regulatory support (CNRA WGs) as appropriate.
12. International OEF organisations should provide technical experience and assistance (resources) to enable better quality reporting and to assist countries to start or increase their reporting of events.

Regulatory actions in response to events

13. CNRA members should review and, where appropriate, implement at national level in a timely manner recommended changes to regulatory practices from international OEF investigation and analysis reports (including lessons learned and good practices).
14. WGOE and WGFCS should undertake annual reviews of the usefulness of international OEF investigation and analysis reports (including lessons learned and good practices) and implementation of recommended actions.

Wider consideration of issues / trends

15. WGOE and WGFCS to establish methodology such that meaningful international trending can be performed (either through existing systems or other means) and will be available as a good knowledge base for lessons learned for the new generation 3+ nuclear power plants to be built, including the construction stage.

16. WGOE and WGFCs should make recommendations to inform the IAEA and NEA priorities and work programmes based on the results of their trending processes.
17. CNRA and CSNI should undertake annual reviews to close out issues which are no longer safety relevant.

Dissemination and exchange of information

18. CNRA members should ensure their full participation (regulators and industry) in international OEF systems.
19. WGPC, NEWS, INES and the other communication systems should meet every three years together and formulate ways to provide clear, consistent, quick information on events and incidents to both the regulatory authorities and the public.
20. Information (including topical studies, generic reports, etc.) derived from national OEF systems, international OEF systems and international OEF Expert groups should be disseminated as broadly as possible (without releasing proprietary data).

Continuous monitoring and improvement of International OEF processes

21. WGOE should undertake a holistic overview of international OEF systems, initially on a 3-yearly basis.

4.2 WGOE Guiding Principles for the Path Forward

Progress has been made since the R(2008)3 report, and the 2013 Task Group has identified the following notable improvements:

1. The IRS guidelines have been revised in 2010, and the enhancement of the IRS database allows input on follow-up actions to the events reported and the implementation of advanced search capability.
2. The establishment of a Working Group on the Regulation of New Reactors (WGRNR) and the construction experience program database (CONEX).
3. The establishment of the European Clearinghouse on OEF for nuclear power plants in 2008 with the objectives to facilitate efficient information sharing and implementation of OEF to improve the safety of nuclear power plants (refer to Appendix C for details).
4. The establishment of a web-based system for FINAS in 2008.

Acknowledging the progress made, and recognising the need for ongoing improvement, the WGOE reaffirms its commitment to the following guiding principles:

1. Continuous improvement in the development and integration of national OEF programs and international OEF processes and networks.
2. Broad dissemination of information (including topical studies, generic reports, etc.) derived from national OEF systems, international OEF systems and international OEF expert groups to member countries through workshops, meetings, seminars, and similar fora.
3. Continuous sharing of significant OE events, as well as the progress that member countries have made in their national OEF programmes through:
 - screening of safety significant events and emerging trends reported to the IRS, and communicating significant events to the public through the publication of the Blue Book;
 - sharing of OE events and topics of interest at WGOE meetings and international fora; and
 - presenting National OEF programmes' progress by member countries.

5. REFERENCES

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6. International Atomic Energy Agency, INSAG-23.
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8. NEA Web Site Address: <http://home.nea.fr/jointproj/>

6. ACRONYMS

CNRA	Committee on Nuclear Regulatory Activities
CONEX	Construction Experience Program Batabase
COMPSIS	Computer System Important to Safety
CRPPH	Committee on Radiation Protection and Public Health
CSNI	Committee on the Safety of Nuclear Installations
EC	European Commission
ENAC	Emergency Notification and Assistance Convention
FINAS	Fuel Incident Notification and Analysis System
FIRE	Fire Project
IAEA	International Atomic Energy Agency
IAGE	Working Group on Integrity of Components and Structures
INES	International Nuclear Events Scale
INPO	Institute of Nuclear Power Operations
INSAG	International Nuclear Safety Advisory Group
IRS	Incident Reporting System
IRSRR	Incident Reporting System for Research Reactors
IRRS	International Regulatory Review Service
JRC	Joint Research Centre (European Commission)
NEA	Nuclear Energy Agency
NEWS	Nuclear Events Web-based System
NPPs	Nuclear Power Plants
OE	Operating Experience
OECD	Organisation for Economic Co-operation & Development
OEF	Operating Experience Feedback
OPDE	Piping Failure Data Exchange
RB	Regulatory Body
SOARS	State-of-the-Art Reports
TECDOC	IAEA Technical Document

TSO	Technical Support Organisation
WANO	World Association of Nuclear Operators
WBIRS	Web Based IRS
WENRA	Western European Nuclear Regulators Association
WGFC	Working Group on Fuel Cycle Safety
WGIP	Working Group on Inspection Practices
WGHO	Working Group on Human and Organisational Factors
WGOE	Working Group on Operating Experience
WGPC	Working Group on Public Communications of Nuclear Regulatory Organisations
WGRNR	Working Group on the Regulation of New Reactors

APPENDIX A: NATIONAL OEF SYSTEMS

A.1 Belgium

Regulatory requirements and framework with regard to OEF

Regulatory requirements for OEF are set forth in the Royal Decree of 30 November 2011 on the Safety Requirements for Nuclear Installations, which is the result of the WENRA harmonisation activities with respect to nuclear regulation. The regulatory requirements for OEF are therefore essentially based on the WENRA Reactor Safety Reference Levels issue J (System for Investigation of Events and Operational Experience Feedback). These regulatory requirements are supplemented by regulatory guidelines, issued by the Federal Agency for Nuclear Control (FANC), which define the applicable event reporting criteria and stipulations.

It is the licensees' responsibility to assess operational events and implement appropriate corrective actions. The licensees' OEF processes are examined by the FANC and Bel V as part of their inspection activities. Review and investigation of operational events is part of the regulatory oversight of operational safety, exercised by FANC and Bel V together.

Role of Bel V in the OEF process

Bel V is, as technical support organisation (and part of the Belgian Regulatory Body together with FANC), mandated by the FANC to operate the Belgian Regulatory OEF process for NPPs and other important nuclear installations. This mandate includes the screening and analysis of domestic and foreign OE, the collection of OE in appropriate databases, the dissemination of relevant OE information to stakeholders (within FANC and Bel V as well as to licensees), the issuing of formal action requests to licensees (when felt appropriate as a result of the OE analysis) and the follow-up of licensee responses to these requests. Bel V may be requested by the FANC to deal with specific OE with the highest priority. As national coordinator for the IRS, FINAS and IRSRR, Bel V is also responsible for issuing the Belgian reports to these international event reporting systems.

Objectives of the OE Feedback Process at Bel V

The main objectives of the OEF process at Bel V are:

- to ensure that licensees take all necessary actions to prevent recurrence of safety significant events by improving the design and/or the operation of their installations;
- to identify safety relevant lessons learned from events that occurred in Belgian and foreign nuclear facilities and to assess their implications for the Belgian installations;
- to inform licensees of relevant safety significant events that require their attention;
- to address questions for clarification or formal action requests to licensees as a result of the analysis of domestic or foreign events;
- to disseminate safety relevant OE information to the Bel V staff (inspectors and technical experts) and to the FANC;

- to create a useful knowledge and data base to be used in the safety assessment of existing nuclear facilities and future nuclear projects; and
- to report selected events to international organisations (IRS, IRSRR, FINAS).

Scope of the OEF process at Bel V

The main inputs used for the OEF process at Bel V are the following:

- Licensee event reports and INES notifications established by the Belgian licensees
- Relevant OE information provided by Bel V and FANC inspectors and identified through inspection and control activities
- Event reports provided by the IRS, FINAS and IRSRR
- Bulletins, Generic Letters and Information Notices published by the USNRC
- Quarterly and topical OE reports issued by the EU Clearinghouse
- OE information and reports available on ASN and IRSN websites
- WGOE, WGFCs and WGIP reports and presentations
- Reports and presentations of the meetings of the Technical Committee of National IRS Coordinators, the Joint IAEA/NEA FINAS National Coordinators meetings and the IAEA Technical Meetings on IRSRR
- Events posted on the NEWS website

Overall approach and organisation

The co-ordination of the OEF process at Bel V is assured by an overall OEF process co-ordinator, who chairs Bel V's Operating Experience Feedback Committee and is assisted by dedicated domestic and foreign OEF Co-ordinators (OECs). The OEF activities are integrated in a specific sub-process of the Bel V Management System.

The OECs are responsible for the screening and selection of events that warrant further investigation, for co-ordinating the review and in-depth analysis of events within Bel V, for coding the events in dedicated data bases and for managing the related OE documentation, for presenting event analysis results (more specifically the lessons learned and proposed event follow-up actions when felt appropriate) for validation to the OEF Committee and for discussion and exchange with the inspectors at Bel V (during quarterly held OEF exchange meetings), for co-ordinating the issuing of reports to IRS, FINAS and IRSRR.

The OEF Committee decides which events are the subject of in-depth analysis, agrees about the experts which should be involved in the analysis, validates the event review and analysis results, monitors the follow-up of agreed actions and decides which domestic events will be the object of a IRS, FINAS or IRSRR report.

The OEF Committee chairman directs the implementation of the OEF process as defined in internal quality management procedures, approves OE Information Letters and OE Examination Request Letters to be sent to licensees, co-ordinates the issuing of quarterly OEF summary reports (for dissemination of OEF process status and results to Bel V and FANC staff), reports about the OEF process performance to the process manager within Bel V and proposes and implements process improvement measures. The Chairman acts as liaison for co-ordination of all OEF related activities with the OEF co-ordinator at the FANC, including the organisation of half-yearly OEF exchange and process evaluation meetings.

This OEF process is supported by plant inspectors at Bel V, who provide domestic OE information to the OECs, co-ordinate reactive inspections and event follow-up activities (including review of

implementation of corrective actions) and assist when required to the event review and analysis. They also take part in the inspections of OEF processes that are put into place by licensees. The OEF process is also supported by technical experts at Bel V for the in-depth analysis of selected events and for the formulation of recommendations for further event follow-up actions as a result of this analysis.

A.2 Canada

Authority

The authority for sharing OE of nuclear power plants in Canada is the Canadian Nuclear Safety Commission (CNSC). The CNSC provides regulatory requirements and guidance to the licensees regarding reporting requirements through the Power Reactor Operating Licence and Regulatory Documents.

Regulatory Requirements

The Power Reactor Operating Licence and Reporting Requirements for Nuclear Power Plants, REGDOC-3.1.1 contains descriptions of situations and events for which reports or notifications must be made to the Commission.

A Preliminary Report (PR) may be made orally, or in writing, and shall be made to the designated CNSC contact, in accordance with the license and REGDOC-3.1.1.

For various situations or events where a PR has been made to the CNSC, a follow up Detailed Report must also be filed with the CNSC. Typically, this Detailed Report will be a complete report that, once filed, satisfies the relevant regulatory requirement to report. This report is provided in writing (hard copy).

National OE System

Events are processed in accordance with CNSC procedure "Processing Event Reports under REGDOC-3.1.1." This procedure provides guidance on determining the urgency of an event based upon the relevant REGDOC-3.1.1 clause for the report. The Designated Contact Person, in consultation with the site supervisor, assigns an inspector to the event and identifies the relevant Safety and Control Areas so that appropriate CNSC specialist staff members can be consulted. The Designated Contact Person would initiate the CNSC emergency protocol as required for any report involving a serious accident at a nuclear facility.

The CNSC maintains an electronic event database called the Central Event Reporting and Tracking System (CERTS) to record, code, and track all of the events reported by Canadian nuclear power plant licensees (Darlington, Pickering, Bruce, Gentilly-2, and Point Lepreau) and the Chalk River Nuclear Laboratories research facility.

International OE System

The primary sources utilised to gain OE from the international community is the International Reporting System for Operating Experience (IRS) reports and the International Nuclear Events Scale (INES) reports attained through the IAEA Nuclear Event Web-based System (NEWS) system. All international reports are reviewed by the Compliance Monitoring Division and the OPEX Clearinghouse to determine relevancy to CANDU reactors and identify CNSC divisions that may benefit from the report. The CNSC has a mature, well defined process for receiving licensee reports and promptly entering them into the event database. The Canadian nuclear power plants event reporting criteria are sensitive to many types of events as the reporting threshold is very low. This effective event reporting framework, along with the presence of resident inspectors at all Canadian nuclear power plants, constitutes one of the major strengths of the CNSC Regulatory oversight capability.

In addition, all CNSC resident inspectors meet at head office approximately every six months to present selected internal and external events and to discuss the lessons learned.

Reporting incidents significant to safety

Licensees use station condition records or event reports to provide information on unplanned events that are considered significant in the operation of the nuclear power plants. The licensees determine the significance of these events using specific operating procedures. During the reporting period, the licensees report safety-significant events to the CNSC in a timely manner and in accordance with the requirements of the CNSC Regulatory Document, Reporting Requirements for Operating Nuclear Power Plants (REGDOC-3.1.1), which is cited in the existing licenses to operate nuclear power plants.

Both licensee and CNSC staff have the capacity to rate reported events in accordance with the INES, however the CNSC does not rate nor require Canadian licensees to rate all of the events reported to the CNSC. The capacity to rate events using the INES is used on an “as needed” basis based on the need to quickly disseminate information.

Canada is also committed to reporting to the IRS, operated by both the IAEA and the NEA, on significant events occurring in Canadian nuclear power plants. Canada appoints a member of the CNSC staff as a national coordinator to collect, analyse and submit information on events occurring in Canada. Actions taken in Canada to address events reported internationally are presented annually by Canada through its delegates to the appropriate fora, such as the IRS Technical Committee and/or the NEA Working Group on Operating Experience.

Issues arising from experience, other than events, are reported in different fora. At the CNSC, such issues are disseminated at management meetings and via inspection reports. The screenings of those issues that are to be shared with the public and international fora are performed as part of the preparation of event initial reports, which are submitted to the Commission members. Guidance for screening are developed during the reporting period and is currently being revised. At all nuclear power plants, the significance of discoveries other than incidents (e.g., unexpected degradation of equipment, design weaknesses, and management issues raised through various means including World Association of Nuclear Operators (WANO) peer reviews,) are rated using criteria in the corrective action programme.

OEF

The nuclear power plant licensees conduct analysis and trending of events with relatively small safety significance, in order to help prevent the occurrence of events with more significant consequences. The licensees have active OE programs facilitated by the CANDU Owners Group Inc. (COG), WANO and the Electric Power Research Institute (EPRI). At the CNSC, information obtained from the IAEA IRS and the NEA Working Group on Operating Experience, as well as other sources, is systematically disseminated. Problems or issues that arise from event reviews that may be applicable to other nuclear power plants are identified and brought to the attention of CNSC site inspectors and different specialist groups in the CNSC. They use this information to determine the appropriate course of action and assess the licensee’s submissions regarding the particular event.

CNSC staff incorporates results of root-cause analyses in its reviews and assessments of a licensee’s corrective actions in response to a certain event. Further actions are requested if the corrective actions undertaken by the licensee are considered inadequate. In addition, the CNSC site inspectors review the status of corrective actions to make sure that they have been completed expeditiously.

CNSC inspection teams consult the OE in the CERTS database when planning strategies for their audits and in identifying problem areas in operation or maintenance, such as procedural non-compliance, procedural deficiencies and use of non-standard components. Similarly, assessments conducted by CNSC specialists often utilise the OE recorded in this database. As part of the inspection baseline, CNSC inspectors check the licensees station condition records or event reports, along with system health reports, to ensure that OE and the extent of condition have been applied to the systems by the licensees.

At the CNSC, OEF is accomplished through the OPEX Clearinghouse. The CSNC OPEX Clearinghouse, consisting of all CNSC technical specialist directorates and reactor site inspectors, reviews all domestic and international events to identify lessons learned and trends. These lessons learned and trends are then used to determine whether any modification is required in procedures and/or inspection practices.

A.3 Finland

Responsibilities and roles of licensees and regulator in OEF process in Finland are the same as generally accepted within nuclear: It is Licensees' responsibility to assess the operational events and implement appropriate corrective actions. The Finnish Radiation and Nuclear Safety Authority (STUK) controls the Licensees' OEF arrangements and implementation as part of its inspection activities. In addition to this STUK performs its own assessment of the OE. Review and investigation of operational events is a part of the regulatory oversight of NPP's operational safety.

Role of STUK in OEF process

The role and responsibilities of STUK in the area of OE are the following:

- preparation of regulatory requirements concerning OEF,
- review and assessment of the Licensees OEF-processes and procedures presented in QA-manual system,
- review and assessment of event reports and period reports on OEF-process implementation,
- perform periodic inspections targeted on Licensees OEF-processes,
- perform event inspections of significant events reported to STUK or investigations for observations, shortcomings or deviations deemed to have special importance to assure that the Licensee has found the real root causes, and the corrective actions are focused on the right issues for improvement.

STUK is the national co-ordinator of IRS reports. STUK has a dedicated group that works on international OEF. and the nominated experts of the group review and assess the IRS-reports disseminated through IAEA and other information or reports received from international organisations or directly from foreign regulators and operators. The international OEF group suggests to STUK's management if any actions would be needed from Finnish utilities based on foreign events. STUK also prepares the IRS-reports on national events.

The goal in these regulatory activities is to foster the Licensees to use OEF in the most effective way to maintain and enhance the safety of the plants, and to assure that STUK is able to fulfil its obligations in informing other countries and IAEA, as well as duties concerning public information on the use of nuclear energy as required in the national and international level.

Regulatory requirements

Regulatory requirements for OEF are set forth in the Nuclear Energy Act, in the Government Decree on the Safety of Nuclear Power Plants, and in STUK's regulatory requirements, YVL Guides. Government Decree defines the main requirements for the OEF as follows:

- OE from nuclear power plants as well as results of safety research shall be systematically followed and assessed.
- Safety-significant operational events shall be investigated for identifying the root causes and defining and implementing the corrective measures.

- For further safety enhancement, actions shall be taken which can be regarded as justified considering OE and the results of safety research as well as the advancement of science and technology taking into account the principles of Nuclear Energy Act: SAHARA, and Graded Approach.

STUK sets the criteria for collecting information, analysing it and reporting to regulatory authority in the YVL-guides. In December 2013 published Guide YVL A.10, OEF of a nuclear facility, combines the requirements in former guides for NPP's OEF (YVL 1.11), reporting (YVL 1.5), and INES classification (YVL 1.12). The Guide sets for criteria and detailed requirements for NPP's event reporting, OEF process, analysis and investigation of events, trending and review, corrective actions, utilisation and dissemination of information, and reviewing of effectiveness of the OEF process and corrective actions. The guide includes processing of the own events (internal OE) and events at the other nuclear facilities (external OE).

STUK is using IAEA standards and WENRA Reactor Safety Reference Levels to prepare national requirements. In preparing STUK's Guide YVL A.10 on OEF the IAEA's latest guidelines on OEF (SSR-2/1 and NS G 2.11) were used as well as WENRA Reactor Safety Reference Levels J (System for Investigation of Events and Operational Experience Feedback) incorporated as such into the guide.

Review and assessment of the licensees OEF-processes

The Licensees OEF-processes are described in the licensee's Quality Assurance manuals and administrative procedures. In Finland the higher level documents e.g. QA-manual, are submitted for STUK's approval. All the other related, more detailed documents about the OEF-process are submitted for information. STUK is reviewing and assessing the adequacy of these processes and procedures. In Finland safety significance is defining the depth of regulatory handling. Safety significance event reports (license event reports, LER) are submitted for approval and operational reports are submitted for information. STUK has inspectors looking at human and organisational factors (HOF) related to events within this review process for better understanding of the organisational and human aspect.

Inspection activities

STUK verifies that the Licensees operate their nuclear installations in compliance with the legislation and regulatory requirements by performing inspections targeted both to national and international OEF-activities of the Licensee. The inspections are usually conducted in the team wise and the topics are covering for example organisation, procedures, resources, open corrective measures and recurrent events. Inspection criteria are set forth in the regulations, IAEA guides and Licensees QA-manual. Inspections of national and international OEF activities are normally conducted once a year.

Regulatory Role in OEF Activities in International Level

STUK is the national coordinator for IRS-reports. STUK has a systematic method to review and assess IRS reports and other reports received from international organisations, foreign regulators or operators (process chart below). STUK has an international OEF group reviewing the reports and making suggestions to the line organisation of the Regulatory authority. The group meets monthly. The principal advisor of the division of Operating NPPs is the chair and project assistant the secretary of the group. The deputy director of Nuclear Reactor Regulation department STUK's IRS co-ordinator and the information technician who manages the international OEF database of STUK are permanent members of the group. In addition, the group has 16 rotating experts in different technical disciplines who are responsible for assessment of the reports assigned to them.

STUK has its own Access-based database, where every IRS report received through IAEA WBIRS is recorded. International OEF group expert writes a short event description (in Finnish) into database sheet and makes the categorisation of the IRS report: 0 = No further actions; 1 = Applicability on information / Particular issues need clarification; 2 = Lessons learned need to be taken into account in certain activities;

3 = Actions required in Finland; 4 = Good practice in Finland. At this stage expert may start discussions with the utilities to check the situation at their plants and to strengthen his/her judgment. Also justification for STUK's position needs to be recorded for each report. Based on the expert memos, the group assesses whether there is a need for regulatory or licensee measures on the basis of lesson learned. As needed, the group proposes requests to be made to the licensees on their actions. Results of the assessment by the group are also used to focus the regulatory inspections. Progress of clarifications or licensees' actions, if required, is followed in monthly meetings of STUK's international OEF group. Summary of actions needed or already performed at Finnish NPPs is written (in Finnish and in English) for each report categorised to class 1 or higher.

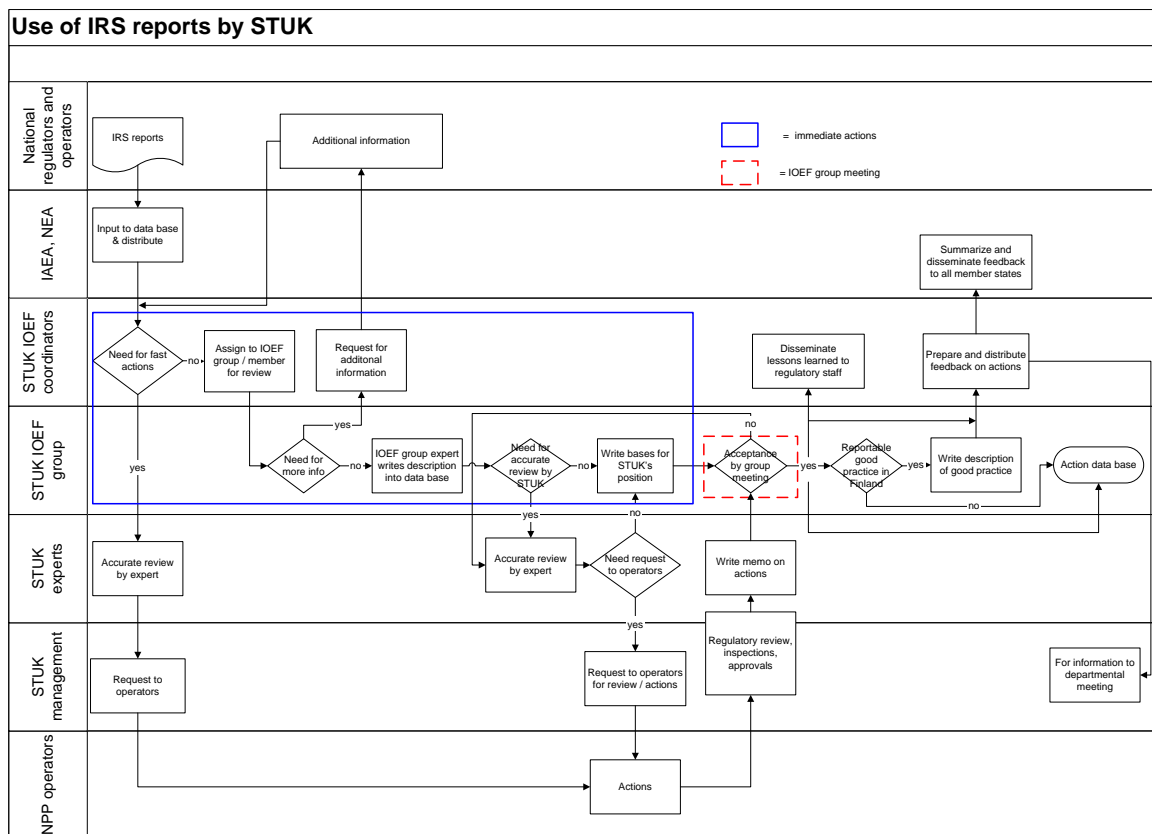
STUK has developed a separate process for the prompt response on NEWS and other urgent information.

Bilateral and multilateral cooperation

Cooperation between regulatory authorities has been found to be a very effective and fast way to exchange experiences between countries. Regular meetings are also creating personal contacts with foreign colleagues which are lowering the threshold to contact in a case there is need for information exchange. Countries are usually exchanging their experiences in meetings that are held twice a year. Finland and Russia have bilateral cooperation where operational experiences of Kola, LAES and Loviisa NPP are reported twice a year.

VVER-Forum's working groups are found also very effective to exchange experiences and to benchmark practices in each countries. Cooperation should not be limited to any specific area of supervision but it should cover all issues related to nuclear and radiation safety of NPPs.

STUK is a member of European Clearinghouse which is the European Network on NPP's Operational Experience Feedback. STUK utilises Clearinghouse services (database, review of draft IRS-reports) and outputs, such as Quarterly Operational Experience reports on worldwide recent significant events in NPPs (OEF Newsletter), and Topical Operating Experience Reports (TOER) providing in-depth assessment of preselected subjects.



STUK's international OEF process for IRS reports and other international reports or information.

A.4 France

National OEF

The objective of the French Safety Authority (ASN) is to assure that the nuclear utilities operate their plants in an acceptable safe manner. In order to be sure that the OE is used effectively to support the objective of safe operation, the French regulator requires from the operators:

- To have an appropriate organisation permitting to collect and analyse OE information.
- To carry out analysis of root causes and, actual and potential consequences.
- To provide event minutes.
- To present corrective actions.

The French context is very specific: one organisation operating a large number of identical or similar reactors. This context permits to have a considerable mass of consistent data, which is a huge advantage for OEF.

Events notification

The operator, considered to be the responsible for the safety of the plant has obligation to report significant events.

As the extent of the French NPP, the operator EDF reports each event in a database called SAPHIR, common to all the PWR. Among these events, those having impact on safety but not in a serious manner are called Events of Interest for Safety (EIS). For the EIS, EDF sends information to the ASN and to its technical support IRSN. This information is sent by an event file extracted from the database SAPHIR. The criteria permitting to classify an event as an EIS were established by the operator in agreement with the ASN. The number of EIS declared is about 15 000 a year.

The events presenting a more significant stake for safety are the subject of a specific notification to ASN. These events are called Safety Significant Event (SSE). An event is classified as SSE if it meets one of the following criteria established by ASN:

1. emergency shutdown, except in the context of a deliberate scheduled action or defects affecting the turbine,
2. actuation of an engineered safeguard system, except in the context of a deliberate scheduled action,
3. non-compliance with the Operating Technical Specifications (OTS) or any incident that could have led to a non-compliance of the OTS, had the plant been in a different state,
4. long-term unavailability or multiple inoperability,
5. overshooting certain thresholds or authorised values,
6. actual or potential common mode failure (fire, onsite flooding, system interaction, design or construction error liable to concern several sets of equipment or several plants units...),
7. external hazard: earthquake or plane crash, for example,
8. real or assumed malevolent act,
9. fall-back of the unit according to the OTS or accidental procedures following an unforeseen behaviour of the plant,
10. event resulting or possibly resulting in multiple failures or affecting redundant trains,
11. event or anomaly affecting main primary or secondary circuit,
12. design manufacturing, on site assembly anomalies related to not above mentioned equipment that could lead to operation conditions not taken into account nor by design nor by operating procedures, and
13. any other event deemed sufficiently important by the operating or safety authority.

Actually about 800 SSE are reported each year for 58 units, in which the radiation protection, environment and transport events account for 212 incidents.

For a SSE, the operator has to provide to ASN and to its technical support IRSN early information within 2 days (information provided by Fax) and a report, within 2 months, containing event analysis and corrective actions to be taken.

Role of the ASN

The incidents are subject to an immediate declaration by the owner and analysed by ASN. The main function of the OE group of ASN is to:

- collect all reactors incident in a database and elaborate a global view of events at the national level,

- to manage data needed for ASN communication regarding NPP incidents (qualitative and quantitative),
- to coordinate analysis of OE at national level,
- to inform inspectors on recurring events,
- to identify topics to be considered more in depth and to participate to advisory committee,
- to maintain consistency in processing and analysis of incidents, and
- to identify generic events.

The final classification of incidents on the INES scale is carried out by ASN.

These incidents are subject of direct information to inspectors for the definition of the continuations to be given (complementary requests, adjustment of corrective actions, inspections).

For events beyond level 1 on the INES scale, information of the public is published on the internet site of ASN.

In complement of this analysis, a quarterly systematic meeting is programmed with the operator to look further into the analysis of outstanding events and to examine the taking into account by the operator of the international experience feedback.

Finally the decennial appointment of the periodic safety reviews and the revaluations of safety is an occasion, for again, to adopt an interrogative attitude with respect to the experience feedback of incidents.

IRSN OE analysis

Continuously, the IRSN carries out a thorough analysis of the significant events which occurred on the nuclear installations. The objectives of the event analyses is:

- the detection of precursor events,
- the identification of design and operating weakest points of NPPs, and
- to examine if the corrective actions implemented by the operator are sufficient.

Moreover, IRSN examines OEF in the framework of the:

- definitive start up authorisation,
- the ten yearly periodic safety review, and
- the periodic examination of OEF(every 3 years) by the Advisory Committee for Reactor Safety (GPR).

In additions, IRSN carried out:

- trend analyses that are facilitated by the similarity of the French NPPs, and
- probabilistic quantification of precursors.

IRSN operates the relevant international systems IRS, IRSRR and FINAS.

SSE analysis:

After the receipt of the SSE early notification, within a week, IRSN:

- checks the content of the fax report (is the information provided complete and correct),

- updates the IRSN database used to collect the SSE. These database is called SAPIDE,
- asks more information to the operator, if needed, and
- holds a first meeting to identify outstanding or precursor events. The most important of these events are the subject of a probabilistic quantification to estimate the conditional probability of core damage.

After the receipt of the SSE report, IRSN:

- carries out an analysis to examine how the event took place, which safety functions were implicated, how operators and equipment behaved, what the consequences were, together with knowledge of any similar incidents which have occurred. In addition, it is examined if, in other circumstances, the same accident would have had far more severe consequences,
- identifies the root causes of the event and examine if the same root causes applied to other equipment or systems can induce different sequences which consequences could be potentially serious,
- looks for additional information for the most significant events. Despite the quality of the event report, the information supplied usually has to be supplemented by direct contacts with the plant or the relevant EDF head office departments and, in many cases, by inspection of the building and equipment concerned,
- completes the updating of the SAPIDE database. Moreover the engineer in charge of the site safety assessment carries out the first event analysis, and
- holds every week a meeting, attended by all the engineers in charge of site safety assessment, for reviewing all the SSE reports received during the preceding week. The purpose of this meeting is to:
 - inform all engineers responsible for assessing site safety of events occurring in the reactors and incite a debate on the issues raised by these events, and
 - decide on the next steps in terms of in-depth analyses and IRS declarations.

EIS analysis:

The access to the EIS constitutes an important contribution for the assessment of safety of nuclear installation. It makes it possible to perform trends analysis, to detect the persistence of operational difficulties or the emergence of new issues. In addition, the databases are used to calculate reliability parameters and to feed the RECUPERAE tool developed by IRSN. Within the framework of its mission of evaluation of safety, IRSN addresses each quarter to the ASN an analysis announcing the events of the past period which deserve according to him a detailed attention and a treatment by EDF. This opinion also relates to the treatments implemented by EDF within the framework of the safety analyses. A quarterly technical meeting between ASN, IRSN and EDF allow exchanges on this subject.

Periodic examination by the Advisory Group for Reactor Safety

Every 3 years a meeting of experts from the Advisory Group for Reactor Safety (GPR) is organised in order to examine the significant incidents of this period. The objectives of this meeting are to put forward operating measures or modifications of materials which result from complex studies resulting from in depth analysis of incidents (safety studies...). The choice of the topics handled at this meeting is fixed by the ASN after consultation of IRSN. The preparation of this meeting requires a technical instruction of the

topics between EDF and the IRSN. At the end of this instruction, IRSN issues a report that is used to support the GPR meeting. This report carries out an in-depth analysis of significant events. It analyses the files transmitted by the licensee and evaluates acceptability, with respect to safety, of the position of the owner and the possible provisions which it proposes. It generally concludes with recommendations that are frequently adopted by GPR and reformulated by the ASN as requests to the operator.

At the exit of the GPR meeting, the GPR members give an opinion on the safety of the operation of the NPPs and, if necessary, make recommendations.

International OEF

EDF examines the events reported by other operators and gathered in the WANO database as well as the IRS reports.

- Besides, ASN and IRSN also exploit other international feedback sources such as:
- IRS reports,
- Information Notices and Regulatory Guides produced by the American Nuclear Regulatory Commission (NRC),
- events declared in the International Atomic Energy Agency (IAEA) NEWS database, and
- information exchanged in the context of international co-operation.

IRSN systematically analyses all the documents in its possession as a way of exploiting international feedback. The conclusions of this survey are gathered in a document submitted to the ASN, outlining briefly the main points to be noted from events occurring outside France. This document is succinct but does highlight in particular events that may be transposed to the EDF PWRs. These events are discussed during the quarterly meetings devoted to the OE. If it is considered that an event may be transposed directly or when the mechanism causing the event is likely to affect the French PWRs, an investigation into whether or not EDF should perform an in-depth analysis and possibly implement preventive measures is carried out.

Moreover, during the GPR meeting devoted to the examination of OEF, the international OE is taken into account.

A.5 Germany

In the Federal Republic of Germany the competence for nuclear safety and radiation protection is assigned to the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The individual federal states (*Länder*) are responsible for the licensing and supervision of the nuclear power plants. The execution of the Atomic Energy Act by the *Länder* with oversight by the Federation is called “federal executive administration”, which means administration by the *Länder* on behalf of the federation.

National Regulatory Requirements

An obligation to report events significant to safety to the competent supervisory authority is been specified in the Atomic Energy Act. The obligation of the operators to report accidents, incidents or other events relevant to safety to the competent supervisory authority is legally formalised at the level of an ordinance (the Nuclear Safety Officer and Reporting Ordinance (AtSMV) including the annexes and the reporting criteria for the nuclear power plants).

The reporting criteria include, in addition to incidents, events such as an unexpected adverse effects to safety features, e.g. by functional disturbances in the safety system or in systems or components relevant to

safety. In addition, indications of systematic faults or deficiencies in this regard and deviations from specified conditions due to technical and construction-related deficiencies are reported.

Reportable events are categorised by means of reporting criteria.

Reporting criteria and reporting procedures

Reportable events are assigned to one or several reporting categories through by means of the reporting criteria based on an initial engineering assessment of the cause of the event. This approach particularly takes into account that the authority has to be able to take precautionary measures even before an in-depth safety review of the event.

- Category S (immediate report – without delay)
- Category E (quick report – within 24 hours)
- Category N (normal report – within five working days by means of a reporting form)
- Category V (prior to commissioning – within ten working days by means of a reporting form)

The reporting form has the following four distinct parts:

- General information on the nuclear installation and on the event
- Information on the causes and impacts
- The description of the measures for eliminating the consequences
- The description of the provisions to prevent a repeat

Any event that is categorised as reportable in accordance with the corresponding reporting criteria is reported by the plant operator to the competent Land supervisory authority.

The plant operator has the responsibility that the report is presented within the time period stipulated and that it contains the correct and complete information on the reportable event. The supervisory authority, in turn, after its initial evaluation of the circumstances, will report the event to the BMUB and, in parallel, to the Federal Office for Radioprotection (BfS) as central registration agency and to GRS, the expert organisation working on behalf of the BMUB. The categorisation of the event is reviewed again by the BfS at federal level.

Reportable events are evaluated by the operators, the authorities, authorised experts and in part by the manufacturers. This multiple-level and independent analysis ensures that each reportable event is evaluated properly and correctly.

INES

Additional to the regulatory reporting procedure in accordance with the Reporting Ordinance, the plant operator also categorises the reportable events according to the seven levels of the International Nuclear and Radiological Event Scale (INES) of the IAEA.

The INES classification is reported together with the report according to the Nuclear Safety Officer and Reporting Ordinance. The plant manager is responsible for it.

The INES Officer appointed by the BMUB checks every report for correctness of the INES classification. The final decision on the classification is taken by the BMUB and the INES Officer. Since the introduction of INES, the position of the INES Officer has been held by a GRS staff member on behalf of the Federation.

Evaluation of national and international operating experience by the supervisory authorities

Through the regular supervision, the nuclear regulatory authorities and their authorised experts are informed about the actual operating condition and the basic operating processes. The plant operators inform the competent nuclear supervisory authority, to some extent irrespective of their obligation to report, about findings from their plants below the reporting threshold and about findings outside their plants that may be of relevance with regard to safety-related issues. The nuclear supervisory authority evaluates these experiences principally with the methods also applied for reportable events with the objective to achieve, where possible, measures against recurrence of negative operating experiences in the plants of their jurisdiction. As far as these operating experiences or other findings made by the experts may also be of interest for the supervisory authorities in other Länder, appropriate information is made available. First, information is generally forwarded within the authorised expert organisations. The expert organisations informed this way, then check the findings for applicability to the plants for which they are competent as authorised expert and inform, where necessary, the respective nuclear authority by means of recommendations.

Against the background of all findings from regulatory supervision, however, the reportable events are the most important basis for the evaluation of operating experience by the authorities, in particular to assess safety deficiencies and to check applicability to other plants.

The Land supervisory authority and its expert organisation primarily analyse a reportable event regarding its safety significance and the corrective measures to be taken at the affected plant. In a second step, the Land authority and its expert organisation investigate the significance of the event for other plants in their area of supervision. In order to allow for an evaluation at national level beyond the borders of the Länder, the Länder supervisory authority forwards information about the reported event to the BMUB, the BfS and GRS.

Evaluation of national and international operating experience on behalf of the BMUB

Incident Registration Centre of the BfS

On behalf of the BMUB, the BfS performs the central collection and documentation of information on all reportable events. The BfS performs an evaluation of the reported events including their categorisation, reports on it to the BMUB every month (monthly reports) and informs all nuclear authorities of the Länder, the expert organisations involved, the manufacturers and the operators of nuclear power plants in quarterly reports as well as the general public in monthly and annual reports, published on the BfS website, about all reportable events in nuclear power plants, research reactors and other nuclear installations. The database of the reportable events at the BfS is accessible to the nuclear supervisory authorities of the Länder, the BMUB and GRS.

Evaluation of operating experience by GRS

All reportable events from German nuclear power plants are subjected to an evaluation by a GRS expert team. For this purpose, expert discussions are also conducted at regular intervals.

In addition to German operating experience, international operating experience is another important source for the feedback of experience. For this reason Germany participates actively in the International Reporting System on Operating Experiences (IRS) of the IAEA and the OECD/NEA. The reported events are systematically evaluated by GRS on behalf of the BMUB regarding potential applicability to German plants and compiled in monthly reports. These monthly reports – together with the corresponding original reports by the IRS – are sent to the supervisory authorities and expert organisations of the Länder and to the operators and other competent institutions. The operators check these reports additionally with regard to any possible applicability to their own plants.

Review of applicability to other plants

On behalf of the BMUB, GRS prepares information notices for all those events in German and foreign nuclear power plants where the in-depth analyses show a current or potential significance and applicability to the safety of other plants. These information notices are submitted to the supervisory authorities and expert organisations, the plant operators, the manufacturers and other institutions. The information notices cover a description of the circumstances of the event, the results of the root cause analysis, an evaluation regarding safety significance, a description of the measures taken or planned and, as an essential element, recommendations regarding investigations and, where appropriate, corrective measures to be taken at other plants. The plant operators prepare a comment on each information notice for the competent supervisory authority with special emphasis on the implementation of the recommendations. These comments are evaluated by authorised experts on behalf of the competent supervisory authorities. The Länder provide plant-specific information feedback to the BMUB, reporting on the implementation of the recommendations given in the information notices. GRS collects all comments on the information notices and prepares an assessment with particular regard to additional findings. These findings, again, are usually made available to the above addressees of the information notices by means of an annual report.

If special events occur in nuclear power plants abroad, GRS – on behalf of the BMUB – prepares statements at short notice on the safety significance and possible applicability to German nuclear installations. In cases in which events might require immediate action, the BMUB informs the authorities of the Länder directly. The BMUB reports regularly to the Federation/Länder Committee for Nuclear Energy, Working Group on Supervision of Reactor Operation, about events in foreign nuclear installations that are classified as INES \geq Level 2.

Moreover, GRS performs a generic assessment of German and international operating experience on behalf of the BMUB and takes part in international data exchange projects of the OECD/NEA on specific issues, such as common-cause failures (CCF), fire, and leaks. Here, Safety issues not assigned to a single event but to a group of events (event collective) and general safety issues arising from an event are subjected to an in-depth analysis. The results and conclusions from the generic assessments are documented in reports that are distributed to the same circle of recipients as the information notices. The plant operators then perform a plant-specific evaluation of these reports and, if applicable, implement the issue. In addition, GRS operates a database in which generic issues (national and international) are collected and the relevance for German installations is assessed (GeSi database).

The generic evaluations also include systematic precursor analyses performed for reportable events in German plants by GRS on behalf of the BMUB. The purpose is the identification of weak points by probabilistic methods. Further the analysis shall improve the precursor/ probabilistic methods.

Exchange of experience

The operators as well as the authorities and their expert organisations have different working groups meeting regularly for discussion of the operating experience and of the conclusions drawn with respect to safety and to the general applicability of plant-specific evaluations. Moreover, the reports of the operators on plant operation and experience evaluation as well as the information notices and evaluations of GRS on events in Germany and abroad are also discussed regularly by the Reactor Safety Commission (RSK).

International databases

Special events at German nuclear power plants being also of interest for the safety of nuclear power plants in other countries according to the INES and IRS manual, are reported to the IAEA by GRS in coordination with the BMUB, the competent Länder authority and the plant operators. Events classified INES Level 2 and higher are to be reported to IAEA-NEWS in the short term (within 24 hours as specified). Reports with INES classification below Level 2 should be forwarded if the events are of public, international interest. INES Level 2 events that occur in nuclear power plants abroad are immediately

reported to the BMUB by GRS. The Länder receive additional in-depth information from the BMUB in the Working Group Supervision of NPP Operation.

Regulatory supervision

The regulatory procedures for recording, processing, assessing and forwarding safety-relevant operating experience from German nuclear installations have proven to be effective. They constitute good practice at the international level. However, experiences also show that regular review and enhancement of the procedures are important to ensure that, in the long run, new sources of knowledge are considered in the experience feedback and knowledge gaps identified can be closed.

The independent review by different parties involved is to ensure the high quality of the safety assessment.

Programmes for the exchange of experience

With some countries there is also a direct bilateral cooperation. This includes an intensive exchange of operating experience between the respective experts.

A.6 Hungary

The responsibilities and roles of the regulator and licensee are the same as generally accepted in international community: The Licensee is responsible to assess the events, arrange and implement corrective actions to the detected failures. The regulator reviews the individual assessments and their corrective actions and the operation experience feedback process of Licensee in whole.

Role of Hungary Atomic Energy Authority (HAEA) in OEF Process

The duties of HAEA in OEF are the following:

- Preparation of regulatory requirements concerning OEF,
- Review and assessment of the Licensee OEF-processes and procedures presented in QA-manual,
- Review and assessment of event reports and periodic reports on OEF-process implementation to make sure, that the root cause was found and effective corrective actions were made by licensee,
- Performing inspections targeted on Licensees' OEF processes, and
- Conducting event inspections of significant events reported to the regulator.

The Licensee by legislation shall:

- Have appropriate organisation to collect and analyse experience on events.
- Conduct root cause analysis and determine corrective actions.
- Submit event investigation reports to HAEA.

HAEA is the national co-ordinator of IRS reports. The HAEA's Safety Assessment Group reviews and assesses the reports received directly from foreign regulators or through international organisations. This group suggests the HAEA management, if there are actions needed at the facilities or at the regulator on base of these reports.

The goal of these regulatory activities is to foster the Licensees to use operation experience feedback in the most effective way to maintain and enhance safety of the plant, and to assure that the HAEA is able to fulfil its obligations in informing other countries and IAEA, as well as duties concerning public information on the use of nuclear energy as required in the national and international level.

Regulatory requirements

Governmental Decision 118/2011 and HAEA Guides have set the main requirements that are:

- OE from nuclear power plant as well as results of safety research shall be systematically followed and assessed.
- For further safety enhancement, actions shall be taken which can be regarded as justified considering OE and the results of safety research as well as the advancement of science and technology.

The HAEA defines the criteria for collecting information, analysing it and reporting to regulatory authority in the HAEA guides 1.24 and 1.25. The guides also give detailed requirements for the content of the event and periodic reports. In addition the regulatory requirements are covering the resources, competence and organising of the OEF processes in the Licensee's organisation. The HAEA uses IAEA guides and guides of some relevant foreign regulators – if available - to prepare national requirements.

Review and assessment of the licensee's OEF process

The Licensee's OEF processes are described in the Quality Assurance manuals and administrative procedures. The safety significance of the event determines the way of handling, first the length of time invested into event assessment at the regulator. There are two groups of the events: reportable events, non-reportable events (assessed by the relevant technical branch of the licensee's organisation. All the events in the former group and approximately the half of the latter are in the scope of the regulatory assessment process. The investigation reports of the former ones are submitted for approval. The reports of the latter ones are required to submit on base of ad-hoc decisions.

Inspection activities

The HAEA verifies by performing inspections targeted to both national and international OEF activities of the Licensee that the Licensee operates the nuclear installations in compliance with the legislations and regulatory requirements. The inspections are usually conducted by team and the topics cover i.e. organisation, procedures, resources, open corrective measures and recurrent events. Inspection criteria are set in the regulations, HAEA's procedures and Licensee's procedures. Inspections of national OEF activities are normally conducted once a year within the frame of comprehensive inspection and two or three times in ad-hoc inspections targeting a given event's details. The inspections on international OEF activities are performed within the frame of comprehensive inspection.

Regulatory role in OEF activities in international level

The HAEA is the national IRS coordinator. The HAEA does not have a systematic method yet to review and assess the reports received from IRS and foreign regulators or operators. The HAEA started to develop a database of the domestic events. This database includes the IRS coding of the events. This way, screening of IRS database for OEF useful in Hungarian events will be easier. The evaluation of the domestic events will be performed on base of IRS code instead of the present one code from 2015 on.

A.7 Japan

Outline of regulators OEF System in Japan

1. Incidents and failures at the domestic nuclear plants

The Reactor Regulation Act requires license holders to report the situation and measures taken to the incidents or failures occurred in commercial power reactors to the regulatory authority, the Nuclear Regulation Authority or NRA.

The NRA makes press release of the incidents or failures immediately upon receiving the report from the licensee. The licensee investigates the causes of the occurrence and establishes the countermeasures and/or corrective actions and report to the NRA. The NRA evaluates the licensee's report if it is acceptable. Sometimes, if the NRA concludes that their own investigation is necessary other than the licensee, the NRA will do so by itself in parallel with the licensee.

When the event investigation is finalized, the NRA makes final press releases to the public with the event cause and countermeasures. The NRA also evaluates if the corrective actions are also necessary to the other nuclear power plants. If it is concluded to be so, the NRA requires the other licensees to feedback the corrective actions and follows their status.

2. Incidents and failures at the overseas nuclear plants

The NRA has a database system to collect domestic and overseas safety information including incident and failure data. The overseas information is from the international organization such as IAEA, OECD/NEA and from national regulatory agencies like US NRC. The NRA staff in charge of operating experience feedback activities evaluates and performs screening of the incident and failure reports. The staff prepares proposal regulatory actions for the screened issues cooperating with regulatory staff and technical staff in the NRA. Proposal regulatory actions are discussed at the "Technical Information Committee Meeting". One commissioner and senior management level officials of the NRA constitute the meeting. The Technical Information Committee Meeting is held every one or two months. At the meeting, it is discussed if those overseas incidents would affect to the domestic plants or if any regulatory actions should be taken to the domestic plants. When it is concluded to take regulatory actions, the issues is reported to the NRA Commission and then regulatory actions are implemented after the decisions by the NRA Commission. Furthermore, if the issue requires to amend or to establish codes and standards, it is discussed with the industries and the societies. In May, 2014, the NRA established the Reactor Safety Examination Committee and the Nuclear Fuel Safety Examination Committee to provide advice on whether to take action or not based on the analysis of collected information. The meetings of both committees are held periodically.

A.8 Netherlands

General info

The Netherlands has one operational NPP and one NPP that is in a permanently shutdown state. There are other nuclear installations in the Netherlands, like two research reactors, a uranium enrichment plant and a depository for radiological waste.

On 1 January 2015, the expertise in the area of nuclear safety and most of the expertise on radiation protection have been brought together in a single new Regulatory Body, which is the Authority for Nuclear Safety and Radiation Protection (Autoriteit Nucleaire Veiligheid en Stralingsbescherming, or ANVS). The ANVS falls under the responsibility of the Minister of Infrastructure and the Environment. Within the ANVS two employees are assigned to specific OEF activities like investigating and reporting events.

Reporting of events at plants

The plants report their events to the ANVS. The license of each nuclear installation contains explicit requirements for the reporting of events as well as the requirement for keeping abreast of events worldwide at similar nuclear installations. The Safety Technical Specifications of each nuclear installation contain the reporting requirements at different levels (immediate, within 8 hours, written report within 14 days; written report within 30 days and by periodic reporting).

Screening of foreign events

The screening of events that are relevant for the safe operation of installations in the Netherlands is done at three levels:

- by the operator on the basis of his own requirements;
- by the ANVS on the basis of international information received (e.g. IRS, INES, IRSRR, FINAS, NucNet, LexisNexis Publisher, US NRC Information Notices, Clearinghouse); and
- by domestic and foreign contractors for specific nuclear installations.

Operators make an annual report of OEF efforts and the results obtained. This screening report is sent to the regulator for assessment and subsequent discussion.

The screening of foreign events by the ANVS is currently done only to a limited extent and for major events only like Fukushima and issues that are important for the NPP in the Netherlands, like 'hydrogen flakes in the reactor vessel hull'. An increase in screening activities is foreseen.

Investigation of events

Types of investigations carried out by the ANVS are:

- routine inspections of a specific component, system or administrative process related to the origin of the events;
- group inspections by two or more inspectors in case of a specific event requiring a multidisciplinary approach;
- audits of (certain aspects of) the quality assurance system of the operator; and
- group audits of complex systems or administrative processes (like safety culture or safety management).

Inspections and audits by the ANVS may be based on specific foreign or domestic events that have received more than average exposure.

Apart from investigations done by the ANVS useful OEF information can be derived from inspections by missions of multinational or international organisations (e.g. OSART, INSARR, IPPAS, IRRS, WANO missions).

In depth analysis

Both operators and the ANVS carry out various types of in-depth analyses. They include

- root cause analysis of a single event;
- analysis of the consequences of an event similar to a foreign event of major safety significance in their own domestic situation; and
- system response analysis in case of a major plant change.

Corrective actions

Based on the occurrence or reoccurrence of events corrective actions by the regulator can include:

- inspection reports with specific action points;
- letters with a requirement with a deadline;
- letters with a warning;
- letters with a potential administrative fine should a certain circumstance or event be repeated within a defined time frame;
- administrative prosecution; and
- Criminal Act prosecution.

Trending of events

The NPP operator in the Netherlands performs extensive trending. Examples of trend records are:

- number of events registered in the work order system due to malfunctioning of components or systems;
- number of registered low level, near miss and industrial safety events;
- number of event reports;
- number of events reported to the regulatory body;
- distribution of human performance and equipment related aspects of analysed events;
- distribution of equipment related root causes;
- distribution of human performance related root causes;
- trending of HPES related root causes like personnel work practices;
- trending of low-level events and near misses;
- trending of recurring events;
- trending of investigations and corrective actions in progress; and
- incoming external operating experience documents.

The ANVS, at this time, just performs limited trending. An increase in trending activities is foreseen.

Publication of events

The ANVS prepares annual reports on events in the Dutch nuclear facilities for the Dutch parliament and public dissemination.

The ANVS publishes the main reportable events on its website shortly after the occurrence of the event.

Cross border dissemination of information

The ANVS prepares some three reports on relevant Dutch events on a yearly basis for uploading to the international databases (IRS, INES, IRSRR and FINAS).

Dissemination of OEF information from abroad is done mostly electronically. The national number of recipients of various reports is roughly as follows:

- IRS > 50
- INES > 70

- IRSRR > 10
- FINAS > 10

The ANVS is actively participating in the regular meetings of these IAEA and NEA databases.

Relevant information about good practices that can be found in IAEA mission reports, WANO reviews and group audits are at the moment not actively (re)distributed but passively made available by providing published reports.

Documentation and knowledge management, continuous improvement

Within the ANVS information about Dutch and foreign events is documented, distributed and discussed with relevant experts. Some inspectors are trained for and dedicated to OE activities.

Knowledge management is currently being developed further. A strategy document has been made.

A self-assessment done by the Netherlands, related as a preparation for a recent IRRS mission identified weaknesses in the OE process. Improvements are foreseen in revitalising and structurally implementing operational experience feedback, including the areas of Radiation and Transport, further to the strategy document. The PDCA cycle should be applied in this regard. This includes developing better processes for a adequate connection between OEF activities and regulation, licensing and inspection. Another focus is on creating and maintaining an infrastructure dedicated to OEF activities.

A.9 Russia

Russian OEF system

Legislative basis

In Russian Federation the process of exchange of information about operational events at NPPs is established by the following documents:

1. The Convention on Nuclear Safety;
2. Federal Law № 170-FZ «On the Use of Atomic Energy» from 21 November 1995;
3. The RF Government Decree of 30.07.2004 No.401 «About The Federal Environmental, Industrial and Nuclear Supervision Service»;
4. Federal Codes and Regulations in the Field of Atomic Energy Use «Provision on the Procedure of Investigation and Accounting of Operational Occurrences at Nuclear Power Plants», NP-004-08;
5. Provision on the annual reports on assessment of safety operation condition of NPPs. CTO 1.1.1.04.001.0143-2009. Standard of Utility;
6. Safety guide «Assessment of efficiency of corrective actions on operational events at NPPa and research reactors and analysis of information on operational experience of NPPs and research reactors», RB-080-13; and
7. IAEA SSG «A System for the Feedback of Experience from Events in Nuclear Installations Safety Guide», NS-G-2.11.

The main document which establishes categories of NPP operational events, principles of setting up a Commission for investigation of an operational events, order of submission of information on events, procedure of accounting, investigation and reporting events, is the Rostechnadzor document NP-004-08 «Provision on the Procedure of Investigation and Accounting of Operational Occurrences at Nuclear Power Plants». This document determines main goals of investigation and accounting of NPP operational events:

- to identify the causes of event;
- to identify the category of event; and
- to develop corrective measures to prevent repetition of a similar event.

Also 14 categories of operational events at NPPs are established by the Rostechnadzor in NP-004-08. Among them 4 categories for accidents and 10 categories for incidents. For each category of accidents or incidents features and consequences are determined. The mentioned above categories operational events with features and consequences are presented in tables 1 and 2.

Table 1. Accident categorisation

Accident category	Features and consequences of accidents
A01	Release of radioactive substances to the environment in the severe beyond design basis accident, as a result of which acute radiation damages of the NPP employees (personnel) and public, severe injury to health, contamination of large territories by radioactive substances are possible. Transboundary transport of radioactive substances is possible. Long-term radiation effect on the environment.
A02	Releases of radioactive substances to the environment as a result of which level B of the criteria for taking urgent decisions at the initial period of emergency in accordance with radiation safety regulations has been achieved or exceeded: the forecast radiation dose over the first 10 days is 500 mGy for the whole body or 5000 mGy and more for thyroid gland, lungs, skin.
A03	Releases of radioactive substances to the environment as a result of which level A of the criteria for taking urgent decisions at the initial period of emergency in accordance with radiation safety regulations has been achieved or exceeded: the forecast radiation dose over the first 10 days is more than 50 mGy for the whole body or 500 mGy for thyroid gland, lungs, skin.
A04	Releases (discharge) of radioactive substances into the environment, which can result in any of the following consequences: <ul style="list-style-type: none"> – exceeding of the main dose limit of public radiation of 5 mSv/year; – single external and (or) internal exposure of some members of the personnel, the dose of which exceeds the potential dangerous doze (200 mSv). Damage of fuel elements, at which the limit of safe operation by number and significance of fuel element defects is exceeded, while the maximum design limit is not exceeded.

Table 2. Incident categorisation

Incident category	Features and consequences of incidents
P01	Penetration of radioactive substances into the premise (premises) of the personnel permanent attendance, NPP site or environment due to failures of the systems (components), drawbacks of the operating procedures, erroneous actions of the personnel resulting in any of the following consequences: <ul style="list-style-type: none"> – contamination of the premise (premises) of personnel permanent attendance by beta-active nuclides in amount of 10,000 particle/(min'cm²) and (or) alpha-active

	<p>nuclides 200 particle/(min·cm²).</p> <ul style="list-style-type: none"> – contamination of the control area leading to the radiation dose of 1-5 mSv/year. – single external and (or) internal exposure of some members the staff by the dose of 50 - 200 mSv.
P02	Violation of the safe operation limits (except for the radiation ones).
P03	Violation of the safe operation conditions.
P04	Failure of one or several safety system channels revealed during NPP unit operation, including regular trial run or inspection.
P05	Safety system channel actuation associated with the need to perform the safety function during the NPP Unit operation and accompanied by failures of safety system components beyond the single failure, additional to those considered in the design- basis accidents, and/or personnel erroneous actions.
P06	Safety system channel actuation associated with the need to perform the safety function during the NPP Unit operation and not accompanied by failures of safety system components beyond the single failure, additional to those considered in the design-basis accidents, and/or personnel erroneous actions.
P07	Safety system channel actuation not associated with the performance of the safety function, including that part of the fire extinguishing system, which provides for conditions of operation of the safety system.
P08	Shutdown of the reactor or disconnection of the NPP Unit without actuation of the EP (or other system for quick reactor shutdown) during the NPP operation caused by failure of the systems (components) and (or) personnel erroneous actions.
P09	Decrease of NPP unit thermal power by 25% and more of the directly preceding power level caused by the failure of systems (components) and/or personnel erroneous actions
P10	Drop and/or damage of the FA, fuel elements in the treatment of fresh or spent nuclear fuels caused by the failure of systems, components (including the NPP hoisting equipment used in the treatment of the nuclear fuel) and/or erroneous personnel actions (except for those, which are accompanied by features and consequences of the incidents of categories P01-P03).

In accordance with requirements of NP-004-08 information about the NPP operational events shall include the following:

- operational informing about event;
- preliminary information about event;
- report on event investigation; and
- additional report on event investigation (if it is necessary).

In accordance with requirements of NP-004-08 Utility should submit operational information about NPP operational event within 1 hour after it is revealed. Operational information contains the following data:

- NPP name and unit number;
- date and time of event;

- unit state before the event took place;
- brief characteristics of the occurrence, supposed reasons for the occurrence;
- unit state at the moment of information submission; and
- state of radiation situation at the Unit, in NPP site territory, in the control area and he radiation control area, as per the data of regular automated radiation monitoring systems.

The NPP shift supervisor is responsible for delivering the operational information. The NPP shift supervisor submits operational information about operational occurrences of all 14 categories to Rostechнадзор Headquarters and also to another organisations such as Situational Crisis Center of State Nuclear Power Corporation «Rosatom», Utility Crisis Center, man on duty of the Federal Medical and Biological Agency of Russia, on-site units of EMERCOM of Russia and other organisations and individuals.

The preliminary information about an NPP operational event shall be delivered within 24 hours after event detection and shall contain the following information:

- NPP name and unit number;
- date and time of event;
- unit state before the event took place;
- names of actuated safety systems;
- brief description of the way the occurrence emerged and progressed, supposed caused of the occurrence, measures taken to localise and eliminate occurrence consequences, information about the availability of safe operation limits and conditions;
- preliminary established event category;
- names of damaged systems (elements), place, character and possible reason for the damage and failure;
- state of the Unit and other NPP Units at the moment of information submission;
- radiation consequences of the occurrence; and
- preliminary assessment of the occurrence as per the International Nuclear Event Scale (INES).

Preliminary information of the NPP operational event shall be delivered to Rostechнадзор also.

Each of NPPs operational events, which relates to one of 14 categories, should be investigated within not more than 15 working days by special investigation Commission, whose composition is specified by NP-004-08 и depends on event's category (on event's importance to NPP's safety). The report on NPP operational event, prepared by the Commission, is submitted to the following organisations and individuals within not more than 5 working days after the completion of the work of the Commission:

- the State Corporation «Rosatom»;
- Utility;
- Rostechнадзор;
- corresponding Interregional Territorial Office for supervision over nuclear and radiation safety of Rostechнадзор;
- SECNRS (TSO of Rostechнадзор);
- EMERCOM;

- Federal Medical and Biological Agency of Russia (regarding the occurrences of A01-A04, P01 categories);
- head of the regional body of the Federal Medical and Biological Agency of Russia in the city at the territory of which the NPP is situated (regarding the occurrences of A01-A04, P01 categories); and
- department of NPP nuclear and radiation safety inspection.

The Commission formulates proposals for corrective measures for each NPP operational occurrence, while the operating organisation develops and obtains approval of the corrective measures to prevent repetition of the event. The list of corrective measures compiled by the operating organisation includes terms of their implementation and assigned responsible persons. The operating organisation submits a report on implementation of the corrective measures to Rostechndzor.

Utilities OEF system

The Operating Organisation, Rosenergoatom, organises and coordinates activities to ensure proper operations of the Industry-level System for Analysis and Use of Information on the OE of NPPs (SAI OE) with scientific and technical support provided by VNIIAES.

The nuclear industry-wide system for the analysis and use of OE includes:

- a system of Rosenergoatom documentation;
- a system of organising human resources; and
- an industry-level information and analytical system for the NPP operation experience; a financing system; a control and monitoring system (OIS OE).

The organisation of efficient data collection, storage, handling, analysis, exchange and distribution processes, as well as the formation of feedbacks on the OE is based on a systems approach. The key component in implementing this approach is the information system deployed at the industry and plant levels, which has a common information space and uses a common information medium. The OIS OE system of Rosenergoatom is intended for the collection, accumulation, storage, exchange and analysis of various structured information on the operation of NPPs and is part of the Corporate Information System of Rosenergoatom, including information on all operational occurrences at NPPs including potential precursors of severe incidents and accidents. The information coming from nuclear plants is used by VNIIAES for maintaining industry-level databases on subject areas of the OIS OE system.

VNIIAES staff publishes quarterly and annual reports on violations of normal operation conditions at Russian NPPs. These reports contain information (mostly statistic information) on assessment of safety operation condition of Russian NPP's units. These reports are not published in open sources, but are distributed to Rostechndzor and other interested organisations.

Role of Regulatory Body (Rostechndzor)

Rostechndzor and SECNRS staff carries out analysis of information, which contains in reports on NPP operational events sent by Utility. The following is analysed:

- correctness of event categorisation in accordance with NP-004-08;
- correctness of event categorisation in accordance with INES scale;
- accuracy of determination of root and direct causes of event; and
- sufficiency of corrective actions developed by Utility.

If during analysis it is defined, that at least one of the points, which are mentioned above, is not defined correctly or corrective actions developed by Utility are not sufficient, SECNRS staff submits to Rostekhnadzor a proposal on rendering regulatory influence on Utility on revision of report on NPP operational event or additional investigation of event causes.

Information about operational events at NPPs, which comes to Rostekhnadzor from Utility, is put into event database «ICI-Nadzor». This database exists since 1988 and contains information about more than 2500 operational events at Russian NPPs. Along with information coming through reports on NPP operational events, annual reports on assessment of safety operation condition of Russian NPP's units, directed by Utility to Rostekhnadzor, and also IRS database, «ICI-Nadzor» serves as a source of information OEF. Rostekhnadzor and SECNRS staff on a constant basis carries out analysis of information coming through reports on event investigation, and also of information which is contained in annual reports on assessment of safety operation condition of Russian NPP's units and event database

«ICI-Nadzor», with the purpose of:

- to reveal operational events at NPPs and conditions it it's work, which are precursors of serious degradation of systems and elements of NPP units, of organisation of operation, and can lead to the severe accidents;
- monitoring, identification and forecasting of tendencies of change of operational safety condition;
- identification of areas demanding special attention for ensuring NPP's safety operation;
- assessment of efficiency of measures on enhancement of NPP's operational safety; and
- development of recommendations for enhancement of NPP's operational safety, for regulation of NPP's safety.

Main goals of analysis of information coming through reports on event investigation, and also of information which is contained in annual reports on assessment of safety operation condition of Russian NPP's units carried out by Rostekhnadzor and SECNRS staff are assessment of current safety level of NPP's operational safety, identification of the weakest points in ensuring of NPP's operational safety for their accounting in regulatory activities.

In 2013 SECNRS developed safety guide RB-080-13 «Assessment of efficiency of corrective actions on operational events at NPPs and research reactors and analysis of information on operational experience of NPPs and research reactors», which contains recommendations of Rostekhnadzor to its TSOs on analysis of information on OE of NPPs and research reactors and on assessment of efficiency (sufficiency) of corrective measures for each NPP or research reactor operational occurrence. Recommendations of the following IAIE documents were taken into account during development of this safety guide:

- A System for the Feedback of Experience from Events in Nuclear Installations. Safety Guide No. NS-G-2.11, IAEA, 2006;
- Review of methodologies for analysis of safety incidents at NPPs. IAEA-TECDOC-1278. IAEA, VIENNA, 2002;
- Operational safety performance indicators for nuclear power plants. IAEA-TECDOC-1141. IAEA, VIENNA, 2000;
- Best Practices in the utilisation and Dissemination of Operating Experience at Nuclear Power Plants. IAEA-TECDOC-1580. IAEA, VIENNA, 2008; and
- Best Practices in Identifying, Reporting and Screening Operating Experience at Nuclear Power Plants. IAEA-TECDOC-1581. IAEA, VIENNA, 2007.

SECNRS staff publishes quarterly and annual reports with results of analysis of reports on event investigation and results of analysis of information about OE at NPPs for a certain period of time. These reports contain information about deficiencies in events investigations and reports on event investigation, deficiencies in corrective actions on NPP's operational events; deficiencies in safety operation of NPP; contains recommendations to Rostekhnadzor on rendering regulatory influence on Utility on revision of report on event investigation or additional investigation of event causes, on revision of the earlier accepted corrective actions, elimination of identified safety deficiencies. The specified reports are submitted to Rostekhnadzor, to Rostekhnadzor's Interregional Territorial Office for supervision over nuclear and radiation safety, to operation Utility for use in its work. Results of the analysis, which contains in SECNRS reports are used during regulatory review of safety justification documents; during compose of NPP's inspection programme; during revision of federal codes and rules and other regulatory documents on NPP's safety. Annual reports of Rostekhnadzor contain main conclusions on analysis of NPPs operational events, of deficiencies in organisation of NPP operation. The specified reports are in open access on Rostekhnadzor webpage: http://www.gosnadzor.ru/public/annual_reports.

International activity on OEF

In the Russian Federation unlike the standard international practice national coordinator of IRS and INES databases is representative of operator's technical support organisation - VNIIAES, instead of regulator. VNIIAES, while supporting Russia's participation in the IAEA information systems (IRS, PRIS, INES) and being a member of WANO's Moscow Center, receives and distributes in the nuclear industry the following information on foreign experience:

- events at NPPs;
- NPP performance;
- NPP OE;
- experience of peer reviews at NPPs; and
- best practices.

VNIIAES staff makes decision on sending the information about operational events at Russian NPPs to IRS event database, prepares event report in accordance with IRS requirements, and also carries out analysis of information about operational events at foreign NPPs coming through IRS database. In case of, in opinion of VNIIAES staff, operational event at any foreign NPP is of interest from the point of view of possibility of repetition of similar event at one of Russian NPPs, or lessons learned from this event could be implemented for enhancement of safety of Russian NPPs, VNIIAES staff carries out translation and distribution of information about event.

Information on the equipment malfunctions and failures received from NPPs is also used in accomplishing the following tasks:

- accumulation of statistical data for probabilistic safety assessments;
- estimation of reliability indicators that characterise the reliability of equipment and safe operation of the NPP units;
- identification of trends in and comparative assessment of operations;
- detection of recurrent/similar events at NPPs and identification of causes for the NPP operational occurrences;
- optimisation of design-basis algorithms as compared to those of real emergencies;
- analysis of safety system operation modes; and

- development of recommendations for the prevention of operational events and other events at NPPs.

Based on the analysis of NPP operational events and other information resources received from nuclear plants, nuclear enterprises, and international and foreign organisations, VNIIAES publishes information and analytical reports on the OE of Russian and foreign NPPs, which contain both generalised data and particular acts of a potential interest to specialists. These, for example, include:

- annual summary reports on the operational safety of NPP units in Russia;
- quarterly and annual reports on the analysis of major technical and economic performance data of Russian NPPs;
- quarterly and annual reports on the analysis of safe operation indicators for Russian NPPs;
- quarterly and annual reports on operational events at Russian NPPs describing the events, identifying their causes and safety implications, and assessing the personnel actions and the planned corrective measures for avoiding similar events in future;
- data sheets on the INES event rating;
- quarterly reviews of equipment failures and defects at Russian NPPs with recommendations for the improvement of the equipment operation;
- summary lists of engineering solutions adopted at Russian NPPs;
- NPP operational event reports;
- reports on incidents at foreign NPPs (from the IAEA/NEA IRS); and
- technical statements on the results of feedback on using Russian and foreign OE information documents by nuclear plants and other nuclear enterprises.

VNIIAES' main information and analytical materials on the OE of Russian and foreign NPPs are distributed to over 30 addressees within different divisions of the Operating Organisation, NPPs and other supporting organisations within the industry, as well as ROSATOM and Rostechнадзор.

The use of Russian and foreign plant OE allows preventing operational events at NPPs and enhancing the NPP safety.

A.10 Slovak Republic

Overview of OE System in the Slovak Republic

The regulatory body arrangements for implementing and using operational and regulatory experience feedback:

1. The Nuclear Regulatory Authority (NRA) of the Slovak Republic (UJD SR) performs analysis to identify lessons learned from operating and regulatory experience, including experience in other States in this extent:
 - actual operating events, plant transients (equipment failures), human and organisational errors and anomalous behaviour;
 - actual failures of systems, structures and components or human failures that can caused operating events;
 - adverse conditions as design weaknesses, degraded safety equipment, aging that can lead to failures of systems, structures and components;

- external events such as vulnerability to weather conditions (flooding, freezing, high winds) and security threats;
 - organisational or human factors (poor safety culture, high human errors rates, poor quality assurance, inadequate procedures and training); and
 - non-nuclear experience such as seismic effects on systems, structures and components.
2. Dissemination of lessons learned and promotion of implementation lessons learned involves:
- IRS arranged by the IAEA and the OECD/NEA;
 - WANO;
 - EC JRC-IE EU Clearinghouse in Petten;
 - information contributed to the IAEA/NEA NPP Operating Experiences Reports (periodically issued through the blue books); and
 - information contributed to the IAEA/NEA topical studies (e. g. National responses to Loss of AC power at Forsmark NPP on July 2006, etc).
3. Reporting of OEF with aim to improve processes, practices and requirements is made by:
- IRS system;
 - EC JRC-IE EU Clearinghouse quarterly published reports;
 - the Blue Books;
 - topical studies; and
 - OECD/NEA questionnaires.
4. Access to the IAEA/OECD IRS database is available to 17 users from the NRA of the UJD SR, the Nuclear Research Institute (VUJE), the Slovak Power Company headquarter, the Bohunice NPP, and the Mochovce NPP.
- Access to the WANO database is available to users from the Slovak Power Company headquarter, the Bohunice NPP, and the Mochovce NPP.
- Access to the NucNet represents another important world information network to which operator has connection to.
- Information from the NPP managers is shared regularly during organised meeting within the WWER Club.
5. Requirements on corrective actions and preventing the re-occurrence of safety significant events enacts:
- Regulation No. 50/2006 Coll. on details concerning the nuclear safety requirements for nuclear installations in respect of their siting, design, construction, commissioning, operation, decommissioning and closure of repository, as well as criteria for categorisation of classified equipment into safety classes, Attachment No. 4, part B, I. Feedback of operating experience:
 - (1) The operator shall take promptly proper corrective action resulting from the results of investigation into events. The operator shall instruct provably staff on the results of investigation and corrective action.

- (2) The operator shall develop a system to evaluate information received from operating experience at other nuclear installations.
 - (3) The operator shall include the results of evaluation of information received under paragraph 2 in the system of own activities as prevention of prospective events.
 - (4) The operator shall develop a system allowing to report staff at a particular level any events having potential nuclear safety impacts.
6. Regulatory body activities to utilisation of international networks for learning from operating and regulatory experience are:
- selection of events at the NPPs of the Slovak republic with safety significant features for reporting to the IAEA/NEA IRS system;
 - analysis of the reports included in the IRS system on the regular meetings of members of the Events Review Group (ERG);
 - participation on Joint IAEA/NEA Meetings of the IRS National Co-ordinators to Exchange Experience on Recent Events in NPPs;
 - contribution to the topical studies related to events on the NPPs (part of IRS exchange system);
 - contribution to the IAEA/NEA NPP Operating Experiences Reports (the Blue Books); and
 - report of events at the NPPs of the Slovak republic with safety significant features and examples of corrective actions to the IAEA/NEA IRS system.

Criteria for selection of events and necessary information potentially interesting to international community are based on the IRS Guidelines principle II.2. (“... events reported to the IRS should be of events safety significance for international community in terms of cases and lessons learned”).

Criteria for reporting from the Licensee to the Regulatory Body are based on Regulation of the UJD SR No. 48/2006 on events on nuclear installations and events during nuclear materials transport, on events reporting and investigation.

7. Regulatory body performs monitoring of measures taken in response to safety relevant information via national or international experience reports based on Regulation No. 50/2006 on the requirements on nuclear safety of nuclear installations, Attachment No. 4, Article I. Feedback from operational events, “license holder shall create system for collection, monitoring and evaluation of events occurred on other nuclear installations”.

Use of OEF from operation on other nuclear installations and research is part of the Periodic Safety Review (Article 3.7 of the Final report of the PSR).

System of use of OEF via national and international knowledge from operation on other nuclear installations is connected with WANO network and IAEA/NEA IRS system.

8. The regulatory body disseminates any good practices of OEF by:
- reporting of events at the NPPs of the Slovak republic with safety significant features and examples of corrective actions to the IAEA/NEA IRS system (standard number of reported events is 1 to 2 events per year);
 - participation and presentation of events with safety significant features and examples of corrective actions on Joint IAEA/NEA Meetings of the IRS National Co-ordinators to Exchange Experience on Recent Events in NPPs;

- contribution to the topical studies related to events on the NPPs (part of IRS exchange system);
- contribution to the IAEA/NEA NPP Operating Experiences Reports (the Blue Books); and
- participation and presentation of events with safety significant features and examples of corrective actions on the meetings of the Working Group of Operating Experiences WGOE of NEA/OECD.

A.11 Slovenia

Operating Safety Experience Feedback (OSEF) in Slovenia

In Slovenia the role and responsibilities of licensees regarding the OEF process are similar as generally accepted within nuclear industry: “It is licensees’ responsibility to assess the operational events and implement appropriate corrective actions.” The Slovenian Nuclear Safety Administration (SNSA) controls the licensees’ OEF arrangements and implementation as part of its inspection activities. However, the SNSA also performs its own assessment of the operational experience. Review and investigation of operational events is a part of the regulatory oversight of operational safety.

Role of the SNSA in OEF process

The role and responsibilities of the SNSA in the area of the OEF are the following:

- preparation of regulatory requirements concerning the OEF,
- review and assessment of the Licensees OEF-processes and related procedures,
- review and assessment of event reports taking into account the implementation of the OEF-process,
- performing periodic inspections targeting the licensee’s OEF-processes, and
- performing inspections of significant events reported to the SNSA or of investigations in order to identify the observations, shortcomings or deviations deemed to have special importance to assure that the licensee has found the real root causes and that the corrective actions are focused on the right issues for improvement.

The SNSA is the national coordinator of IRS reports. The SNSA staff reviews and assesses the IRS-reports disseminated through the IAEA. In addition the staff reviews and assesses other information or reports received directly from regulators from other states (NRC) as well as from operators. The staff suggests to the SNSA management when any actions based on the lessons from foreign events should be implemented by the operator in Slovenia. SNSA also prepares the IRS-reports on national events.

The goal of regulatory activities is not only to foster the licensees to use OEF in the most effective way to maintain and enhance the safety of the plants but also to assure that the SNSA is able to fulfil its obligations in informing other countries and IAEA as well as assure public information on the use of nuclear energy as required in the national and international level.

Regulatory requirements

The basic act in the field of nuclear and radiation safety in the Republic of Slovenia is the Ionising Radiation Protection and Nuclear Safety Act. The Act was adopted in 2002 (Act, Official Gazette RS, No. 67/02).

Based on the Act, 28 implementing regulations were adopted by the end of 2012, namely seven governmental decrees, ten rules issued by the Minister of the Environment, nine rules issued by the Minister of Health, and two rules issued by the Minister of the Interior.

The OEF process is regulated by the Act and implementing regulations. The most important regulation for this area is »Rules on Operational Safety of Radiation or Nuclear Facilities« (http://www.ursjv.gov.si/en/legislation_and_documents/legislation_in_force/)

Regarding the OEF process it prescribes the following:

- basic concepts of the OEF,
- OEF programme,
- dissemination of OE,
- monitoring and analysing events in a radiation or nuclear facility,
- monitoring and analysing OE in other facilities,
- monitoring of safety indicators,
- independent safety monitoring group, and
- reporting on the OEF programme.

The licensee's OEF processes

OE is a valuable source of information in order to learn about and improve the safety and reliability of nuclear installations. It is essential to collect such information in a systematic way. In that way the reporting thresholds for events are set as well as the precursors of events.

The NPP Krško (NEK) uses several sources of industry OE information available for all personnel involved in Corrective Action Process:

- WANO and INPO reports
- IAEA Nuclear Events Web-based System (NEWS)
- Regulatory body publications (e.g. NRC publications)
- Owners groups' information, PWROG
- Supplier and architect/engineer correspondence and EPRI

The primary objective of assessing industry OE is to identify and transfer lesson learned from other plants into actions that enhance safety and stability of each plant.

The primary objective of the Operating Experience Assessment Program (OEAP) is to promote the identification and transfer of lessons learned from internal and industry events, in such way that these lessons are shared between the NPP and the nuclear industry. The OEAP expects to prevent similar events from occurring at Krško NPP by increasing plant personnel awareness of previous onsite and industry events and issues. OEAP identifies and analyses weaknesses of the minor events and near misses in order to prevent occurrence of significant events. The programme specifies instructions for:

- Events assessment (any member of the plant) and screening for on-site OE items.
- Preliminary screening of received industry events for applicability in the Krško NPP.

Special procedure defines the responsibilities and functions of Independent Safety Engineering Group (ISEG) when performing independent assessment of plant activities including maintenance, modifications, operation, etc. The ISEG examines plant operating characteristics, regulatory issuances, industry advisories, licensee event reports and other sources of plant design and OE information, including plants of similar design, which may indicate areas for improving safety. The ISEG is composed of five, dedicated, full-time engineers located on the site.

The ISEG engineers preliminary screen the industry OE items, e.g. event, for applicability. When an item is applicable for the plant engineers electronically report to the information system Corrective Action Program (CAP). In addition, the so called Screening Committee of the NPP further screens the selected industry OE items for applicability, significance, and determination of the potential for a similar event to occur at the site or any lessons learned from industry events applicable to the plant. All members of the Screening Committee have access to industry event databases INPO, WANO (SOER, JIT) and other organisations in nuclear industry. Screened events have to be reported (electronically) to Corrective Action Program. Screening Committee screens and processes Corrective Action Program Requests and determines the following:

- significance level according to severity
- appropriateness of OE item information
- need for the direct repair
- need for further processing, analysis or non-conformance report
- for possible reporting requirements to SNSA

Once analysis is approved, corrective action from the action plan is assigned to a relevant department in charge for its implementation. Based on analysed OE information Krško NPP develops strategy and defines corrective actions. In many cases modification of systems, component or structures is the best way how to prevent undesired event or transient in the future. All WANO SOER recommendations are reviewed, approved by the plant and appropriate corrective actions prioritised, scheduled for timely implementation, and tracked to completion.

The arrangements for the dissemination of operational experience at ISEG by the IAEA, WANO, the Institute of Nuclear Power Operations (INPO) and various plant owners' groups are in place. The information exchange with other NPPs and international institutions is performed by the ISEG. The plant also receives (sometimes directly, sometimes through the SNSA) other information's e.g. NRC circulars, NRC generic letters and others NRC documents. The IAEA/IRS and NEA information the plant follows through WANO/INPO network and Westinghouse Owners Group. The plant also monitors "announcements" by the SNSA and NRC.

The SNSA OEF processes

SNSA has developed its own system for tracking, screening and evaluating the OE of nuclear installations. The SNSA staff regularly tracks the OE throughout the world and screens them on the bases of applicability for the Slovenian nuclear facilities. The OE, which pass the screening, are thoroughly evaluated. The result might be the identification of the need for modification at the licensee, the need for modification of internal procedures in the SNSA or even the proposal for the modification of regulations. Information system helps the SNSA experts to track the process of evaluation and proper logging of activities.

The SNSA OEF process is also based on the IAEA approach. It is supported by the procedure which defines the process of tracking, screening and evaluating, the clearly established responsibilities and the fields covered by the SNSA experts. OE are recorded into the database, which also serves as an editing and reviewing tool, and as a tool for notifications about actions to be taken. OE database is at disposal for all SNSA employees.

The processing of OE comprises five main tasks: tracking, screening and evaluating OE, preparing and executing action plan, and archiving. The administrator of the SNSA's OEF process is responsible for tracking new information which could contribute to higher reliability and safety of nuclear installations. The administrator, who is a person with sufficient knowledge about nuclear safety, searches for the

information (IAEA/IRS/IRSRR, NRC, OECD/NEA, Clearinghouse, etc.). Other SNSA employees are also expected to report any information that could be used in OEF process.

The administrator reviews the information about the OE. To determine if the information is important, reviewer exposes it to a set of questions, like:

- could the OE be applicable to nuclear safety or reliability at any Slovenian nuclear facility,
- could the OE have an effect on failures or degradation mechanisms of main or important equipment, and
- could the OE have any connection with the root cause of design basis accident, etc.

If the reviewer determines that the OE could be important, the OE is a subject of detailed evaluation. An analyst is selected depending on the expertise needed. The reviewer, who can also be an analyst, helps the analyst to gather the necessary information about the OE.

The analyst examines all the information, checks the status at the SNSA and at Slovenian nuclear installations, checks the procedures and regulations. The analyst can inquire about additional information directly at the facilities. If it is necessary, the SNSA inspection can be dispatched for a special inspection at the facility, make an inquiry and gather needed information.

The aim of the evaluation is to find out whether the OE could be used to improve the facility design or procedures, the reliability of equipment or human actions, and thus increase the nuclear safety in any way. If the analyst concludes that improvements could be made, he or she prepares the action plan. If not, the final report is written. The analyst prepares the proposition of an action plan, which can contain:

- proposition of modifications at the licensee,
- further analyses to be made,
- changes in the internal procedures, and
- proposals of modifications of regulations.

The proposal of an action plan has to be reviewed and approved by the head of division of nuclear safety and the SNSA Director. After that the implementation of action plan follows until all predicted actions are taken. Results of the implemented actions are written in the final report.

Bilateral and multilateral cooperation

Cooperation between regulatory authorities has been found to be a very effective and fast way to exchange experiences between countries. Regular meetings are also creating personal contacts with foreign colleagues. In that way the direct exchange of information among experts is encouraged and enabling also an efficient data flow in a case of a need. Slovenia exchanges its experiences in meetings such as e.g. OECD/NEA/WGOE, IAEA/IRS and EC Clearinghouse. Slovenia and neighboring countries have also bilateral meetings where operational experiences are reported.

A.12 Spain

Reporting Requirements

Licensees must comply with Technical Instruction IS-10 “Event Reporting Criteria in Nuclear Power Plants”. This Technical Instruction IS-10 has 37 reporting criteria gathered in eight groups: records, occupational health and safety, radioactive releases, technical specifications, operation, safety systems, other risk situations and external events. Events must be reported within an hour or 24 hours after their occurrence, depending on their safety significance; a follow-up report must be sent within the following 30 days. Event reports (ER) must be sent to both the regulatory body (CSN) and other Spanish NPPs.

Additionally, licensees must send an OE Annual Report to CSN containing information about their own events, events from other Spanish NPPs, events reported by suppliers of safety equipment, ERs from INPO and WANO, and any other event whose analysis has been required by CSN.

National OEF System

As abovementioned, licensees must report events according to Technical Instruction IS-10; the average rate of reporting is 8 ERs per unit per year. The CSN OE staff is in charge of storing, analysing and doing a follow-up of every ER.

Each report is analysed in detail in the CSN Event Review Board, which comprises representatives of different areas in nuclear safety and radiological protection. This board meets every month to review the information sent by the licensee, to analyse the corrective actions and to determine whether additional measures should be carried out by the licensee in order to prevent the recurrence of the event; the OE staff takes charge of explaining every reported event taken place since the last meeting. The event is classified according to its safety significance into one of these three types: significant, irrelevant and of interest. An event can simultaneously be classified as generic if it can potentially affect other NPPs. In this case, the CSN can ask NPPs to determine whether the event is applicable to them. These analyses are reviewed by specialists in the CSN. The follow-up and coordination of these tasks is carried out by the OE staff. Events classified as significant or generic are followed up in-depth.

If an event is considered to have a significant impact of the NPP's safety, a reactive inspection is carried out by a CSN inspection team comprising specialists from different areas.

Apart from ERs, CSN also analyses minor events and adverse and non-conforming conditions which are potentially safety significant. It also carries out trending analysis through its performance indicator system.

Regarding licensees, since they are ultimately responsible for their OE system, they all have developed processes for receiving, storing, distributing and analysing both national and international OE, as well as for implementing corrective actions when needed. CSN carries out inspections every other year to check the effectiveness of the licensees' OE programs.

International OEF System

CSN has an International Event Review Board, whose aim is to analyse events which have taken place in other countries' NPPs. This board systematically reviews different documents on international OE and determine whether Spanish NPPs need to take actions regarding these events; the OE documentation to be reviewed are IRS reports, NRC Licensee Event Reports (LER) and Information Notices (IN), events classified as INES level 1 or higher, INPO Event Reports Levels 1 and 2 (IER-1 and IER-2) and notifications to the NRC 10CFR21 (suppliers). Specifically, the board will review the events in depth to clearly understand direct and root causes, evaluate the corrective actions to determine if they are applicable to Spanish NPPs and identify generic aspects which could affect Spanish NPPs.

Additionally, CSN takes part in international meetings for OE exchange and working groups.

A.13 Sweden

Swedish OEF systems

As stated in most nuclear safety requirements and standards around the world, the licensee has the responsibility for nuclear safety. It is the licensees' responsibility to collect, assess and act upon relevant OE.

The Swedish Radiation Safety Authority, SSM, receives 300 -400 reports every year regarding weaknesses in defence in depth and barriers. Many of these are of low safety significance and many cover the security of the plant. All reports regarding safety are screened by a multidisciplinary group. Reports

that do not fully meet the requirements or have raised questions at SSM are quickly communicated with the licensees. E-mail, letters or injunctions are used depending on the issue.

National OEF at SSM

When a situation occurs at a NPP that must be reported under SSM's regulatory code, it must be reported in the daily report. The licensee must thereafter report the event to SSM within 30 days. The report must encompass:

- a description of the event,
- a safety assessment, including INES,
- outcomes from the event analysis, and
- countermeasures that were taken immediately after the event and also long-term countermeasures after causes behind the situation were identified.

All reports are screened by a multidisciplinary group at the nuclear safety department. All reports are coded and evaluated in relation to the following questions:

- Are the reports descriptive enough?
- Is the safety significance described and does the event analysis reflect the significance?
- Do the event analyses identify root causes and are the countermeasures appropriate?
- Are there generic aspects?
- Is there a need to communicate with the licensee?
- Is there a need to communicate within SSM and/or propose regulatory action?

All reports and minutes from meetings are stored in the event application ASKEN at SSM. In this database application, SSM stores all reports since the 1970s in PDF format. The reports are easily retrievable by all employees at SSM. All evaluations from meetings held for all events are also stored in this database application.

Three times a year, a periodic review is issued and a summary review is issued yearly.

International OEF at SSM

Information to the international OEF follows recommendations from the multidisciplinary OEF meetings at SSM. An event classified as INES-1 or higher is always reported to IRS.

Information from international OEF is screened but does not follow any systematic approach. This kind of system is under way and will be launched during 2015

OEF at Licensees

The licensees have internal systems for collecting and assessing operational experiences internally and externally. The internal systems are used for managing all kinds of experiences for the purpose of enhancing safety, also non-nuclear safety such as safety in the working environment. Events are coded, assessed and communicated in their respective organisations for measures to be taken. The international operational experiences are screened by NORDERF, an industry association.

A.14 United Kingdom

UK OEF system

UK regulatory regime

The legal framework for the nuclear industry is based around the Health and Safety at Work etc. Act 1974 (HSWA), the Energy Act 2013 and the Nuclear Installations Act 1965. HSWA places duties on all employers, including those in the nuclear industry, to look after the health and safety of both their employees and the public. However, because of the particular hazards associated with the nuclear industry, including the potential for accidents to cause widespread harm and social disruption, some legislation is targeted at the nuclear industry, specifically the Nuclear Installations Act 1965. Additionally, there may be nuclear regulations made under the Energy Act 2013 that are also relevant, as well as regulations under HSWA such as the Ionising Radiations Regulations 1999 (IRR99) and Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR).

A key principle of the UK's approach is that nuclear licensees are required to build, operate and decommission nuclear sites in a way that ensures that risks are kept as low as reasonably practicable. This is referred to as the ALARP principle and requires licensees to demonstrate that they have done everything 'reasonably practicable' to reduce risks. This requires them to balance the level of risk posed by their activities against the measures needed to control that risk in terms of money, time or trouble. However, they do not have to take action if those measures would be grossly disproportionate to the level of risk averted.

The Office for Nuclear Regulation (ONR) is responsible for regulating nuclear safety and for regulating non-nuclear, or conventional, health and safety on nuclear licensed sites.

The UK generally operates a goal-setting regime. This means that the ONR sets out its regulatory expectations, and requires licensees to determine and justify how best to achieve them. This approach allows an operator to be innovative and to achieve the required high levels of nuclear safety by adopting practices that meet its particular circumstances. It also encourages continuous improvement and the adoption of relevant good practices. ONR has attached 36 conditions to each nuclear site licence within which the licensees are required to operate. These set goals requiring the licensee to create and implement 'adequate arrangements' for compliance with the licence condition, as well as some more prescriptive requirements. Adequacy, in this context, means ONR's evidence-based judgement that the licensee's arrangements for the management of nuclear safety meet the high standards expected of the nuclear industry in both the UK and internationally.

ONR has legal powers to inspect licensees' arrangements for compliance with legal requirements and to take enforcement action where improvements are necessary. The regulator takes proportionate enforcement action depending on the severity of weaknesses in licensees' arrangements. Wherever possible, persuasion is used to influence the licensee to make improvements. In addition, the regulator has legal enforcement powers, including:

- Approval of licensees' arrangements.
- Specification of changes to licensees' arrangements.
- Regulatory enforcement notices (Improvement and Prohibition Notices).
- Prosecution.

UK Events

Nuclear sites may experience unplanned events that can be described as anomalies, incidents or accidents depending on their severity. In general, the more significant the event the more that could be learned from it. In order to prevent the recurrence of incidents and accidents, ONR encourages licensees

and others with legal duties on the site to disclose events to ensure lessons are being derived. This provides assurance that the duty holder is taking steps to learn from mistakes and helps ONR focus attention in areas where further investigation or advice might be needed. This contributes towards a culture of continuous improvement in the nuclear industry.

The need for licensees to review and learn from OE is an important part of UK regulation and is covered by a number of licence conditions, including: Licence Conditions 7 (incidents on the site), 15 (periodic review), 25 (operational records) and 28 (examination, inspection, maintenance and testing). Licence Condition 7 is the main licence condition defining licensees' responsibilities for OEF. It requires licensees to:

- Categorise events, all the way down to near misses, according to safety significance.
- Report significant events to the regulator within timescales related to safety significance.
- Investigate incidents depending on actual or potential harm.
- Analyse trends and patterns for improvements.

ONR has criteria for deciding which higher safety significance events to investigate and a range of legal powers for use in investigations, including powers to question witnesses, collect evidence and take proportionate enforcement action.

Licensee data on reportable events are collated by ONR, assessed for safety significance, issues for follow up identified and sentenced and trends and patterns analysed within and across licensees. This information is used to inform ONR's senior management of emerging issues, to target regulatory interventions and to provide public reassurance. ONR also works closely with the environmental regulators that have responsibility for the regulation of environmental aspects of nuclear licensed sites as an integral part of this.

ONR actively encourages licensees to share their OE and learn lessons from the nuclear and other industries both nationally and internationally.

International events

ONR operates the relevant international systems IRS, IRSRR and FINAS on behalf of the UK to meet the aims and objectives contained in the system guidelines. In particular, ONR:

- Assesses the relevance of national and international events.
- Inputs relevant UK events to international systems in a timely manner.
- Disseminates information within ONR, to the environmental regulators, and to licensees.

There is no legal requirement for licensees to participate in international reporting. However, UK licensees work closely with ONR to fulfil the UK's international reporting commitments.

A.15 United States

Reporting Requirements

One of the many elements contributing to the safety of nuclear power is the feedback of OE into plant operations. This is achieved in part by the licensee event reporting requirements of Title 10 of the Code of Federal Regulations, Part 50, Sections 50.72 and 50.73 (10 CFR 50.72 and 50.73). Section 50.72 provides for short-term notification requirements via the emergency notification system (ENS) and Section 50.73 provides for 60-day written licensee event reports (LERs).

The information reported under 10 CFR 50.72 and 50.73 is used by the NRC staff in many ways, including; responding to emergencies, monitoring ongoing events, studying potentially generic safety problems, assessing trends and patterns of operational experience, monitoring performance, identifying precursors of more significant events, and providing operational experience to the industry.

National OE System

OE is reported to, or identified by, the NRC staff in event notifications; licensee event reports; inspection reports; component failure reports; industry reports; reports on operational, safeguards, and security events; reports submitted under 10 CFR Part 21, "Reporting of Defects and Non-compliances;" and reports of OE at foreign facilities. NRC staff systematically screens nuclear-reactor related OE for safety significance and generic implications; select non-nuclear events are evaluated for applicability, as well. NRC staff also determines the need for further action and application of lessons learned related to plant OE.

The agency's fundamental OE programme objective is to collect, evaluate, communicate and apply OE information to achieve the NRC's principal safety mission to protect people and the environment. To support this objective, the concept of an Operating Experience Clearinghouse was instituted. The Clearinghouse's responsibilities are to collect, store, screen, and communicate OE; conduct and coordinate the evaluation of OE; track the application of OE lessons learned; and coordinate the NRC OE activities with other organisations performing OE functions.

To accomplish the objectives of a reactor OE programme, the staff determined that the following attributes were necessary for the programme to be effective:

- Clearly defined and communicated roles and responsibilities.
- Efficient collection, storage, and retrieval of OE.
- Effective screening of OE for follow-up, evaluation.
- Timely communication of OE to stakeholders for information or evaluation.
- Timely and thorough evaluations of OE to identify trends, recurring events, or significant safety issues for appropriate follow-up, actions.
- Timely decisions on implementation and appropriate follow-up resulting from the review of OE.
- Periodic assessments of the OE programme to determine its effectiveness and to identify needed improvements.

The OE process is broken down into four phases, which address all of the attributes of an effective OE programme. The definition of each phase and the significant OE programme activities and changes related to each phase are summarised below.

- Phase 1 - The first phase of the OE process involves collecting, storing, and making OE information available to the NRC staff. Through the use of information technology, the NRC has made significant advances in this area, enabling staff to readily locate and evaluate OE information. The collected OE includes those inputs considered new information regarding recent events or conditions at a plant, as well as previously "analysed" information. The majority of the new information is provided to the staff by licensees in response to reporting requirements of the regulations. Other sources include NRC inspection reports, International Nuclear Event Scale (INES) events, Incident Reporting System (IRS) reports, and other internally generated reports on OE. The previously "analysed" information contains insights and lessons-learned related to the subject OE topic. Sources of this type of OE information include generic communications, inspection findings, industry reports, and other OE-related studies and reports.

- Phase 2 - The second phase of the OE process requires the Clearinghouse to review OE information to determine if it has potential significance. The NRC has formalised this review process through the OE programme guidance documents to ensure a more systematic approach to reviewing OE. A set of guidelines that consider risk and qualitative factors such as potential generic implications, adverse trends, or new phenomena (e.g., novel failure mode, material degradation) are applied to identify those OE inputs that are potentially significant and deserving of a more detailed evaluation. OE information that does not meet any of the guidelines is stored for future reference and trending and communicated to cognizant technical experts or inspection staff.
- Phase 3 - After OE information is selected for formal in-depth evaluation and has been communicated to various stakeholders, it is evaluated by Clearinghouse staff or by other technical staff to clearly determine the significance of its impact on plant operation and safety. An evaluation is conducted to glean OE insights and lessons-learned that could be applied toward agency action. The evaluation determines the risk significance and/or identifies other safety or agency concerns associated with the subject OE information. A report is generated documenting any insights gained and making appropriate recommendations for applying lessons-learned to future regulatory activities. These evaluations have supported improved communication and integration between the Clearinghouse, the technical staff, and the regional offices.
- Phase 4 - Once the assigned staff member completes the evaluation and develops recommendation(s) for further action, the appropriate NRC managers are consulted to determine whether, or not, to adopt the recommendations for applying the subject OE information. Identified options for applying the lessons learned have included: (1) communicating OE lessons learned to various internal and/or external stakeholders through reports, briefings, e-mail listservers or generic communications, (2) taking a regulatory action through a generic communication to require responses from the licensees or issuing orders for actions and (3) influencing agency programmes such as inspection, oversight, licensing, incident response, security, rulemaking, and research. The Application phase of the OE process always involves communication of the issue to internal stakeholders. Less common outcomes of OE issue recommendations are rulemaking or transfer to the agency generic safety issues programme although these are possibilities nonetheless.

An internal website dedicated to providing a centralised source for accessing reactor OE information was created when the programme was launched. This website serves as a gateway to NRC's OE document collections, contacts, search tools, sources, and reference material. This website has been continuously improved to ensure staff can quickly access the proper information. All of NRC's event-related reports can be found on the agency's public Web site at <http://www.nrc.gov/reading-rm/doc-collections/event-status/>, and generic communications can be found at <http://www.nrc.gov/what-we-do/regulatory/gencomms.html>.

International OE

The NRC receives information regarding international OE from the International Nuclear Event Scale (INES) and the Web-based Incident Reporting System (WBIRS). This information is collected, screened, evaluated, and applied using the same processes which are used for domestic OE. International OE is reviewed to determine if the information has applicability to the U.S. reactor fleet. International events are shared internally with cognizant technical staff and evaluated further, if necessary.

The NRC shares domestic OE with the international community. Each reported domestic event is rated using the INES User's Manual. Events that are rated Level 2 or above (on a scale of 0-7 with 7 being the most severe), are reported internationally through the Nuclear Events Web-based System (NEWS). In addition, the NRC submits about 20 reports each year to the WBIRS, which is available to regulators and other nuclear organisations in foreign countries. The NRC also participates in various international meetings to share nuclear power plant OpE data and to learn about the OE programmes of other countries.

APPENDIX B: EXISTING INTERNATIONAL OEF SYSTEMS

B.1 International “Learning from Experience” Systems

- **International Reporting System (IRS)**

Overview: The IRS is an international system jointly operated by the IAEA and the OECD/NEA, through which thirty-three participating countries exchange experience to improve the safety of nuclear power plants by submitting event reports on unusual events considered important for safety. The main objective of the IRS is to assure proper feedback on events of safety significance on a worldwide basis to help prevent occurrence or recurrence of serious incidents or accidents.

Operation: In the last few years, the IRS has been converted into a web based system, in which national co-ordinators can now easily enter new events, retrieve information on past events, search for similar events, etc. The historical reporting characteristic of the IRS database is such that it is **not** intended to be used for trending of events. Although focus is placed on lessons and the system allows for it, reports on recurring events are not normally submitted and information and follow-up information on corrective actions (both licensee and regulatory) taken is rarely received.

The recent introduction of the Web based IRS system has significantly improved the functionality and usability of the IRS system. However, not all of the improvements have yet been fully realised.

- **Fuel Incident Notification and Analysis System (FINAS)**

Overview: FINAS is an international system jointly operated by the IAEA and the OECD/NEA to exchange lessons learned from OE in fuel cycle facilities gained in participating Member States. The main objective of FINAS is to assure proper feedback on events of safety significance on a worldwide basis to help to prevent the occurrence or recurrence of incidents or accidents.

Operation: FINAS is a web based system that is similar in operation to IRS.

- **Incident Reporting System for Research Reactors (IRSRR)**

Overview: The IRSRR is a system operated by the IAEA to collect, analyse, maintain and disseminate information received from participating Member States of the IAEA on unusual events that have occurred at research reactors. Until now 50 Member States are registered under IRSRR. This system is open to regulators, operating organisations staff and designers.

Operation: IRSRR is a web based system operational since 2001. It includes reports that occurred before the web based came into effect. This web based system will be replaced in the near future by a system similar in operation to IRS.

- **World Association of Nuclear Operators (WANO)**

Overview: The WANO system was established by the operators with access restricted to operating organisations. WANO has its own comprehensive network of NPP operating organisations, and its own OEF programme. Extensive reporting on events takes place among

WANO members, and each year WANO provides to its members event reports that convey detailed recommendations on measures for improving safety.

Operation: WANO reports are restricted to its member organisations and are thus not available to the regulatory bodies or other third parties. However, useful summaries on general observations and trends are occasionally reported by WANO experts in international meetings.

B.2 International Information Systems

Although these are not reporting systems as described in the previous section, they could alert the regulators and operators to incidents that possibly provide important lessons. Detailed information needs to be found later through other channels such as bilateral contacts or international reporting system reports.

- **International Nuclear Events Scale (INES)**

Overview: INES is jointly operated by the IAEA and the OECD/NEA and is used for facilitating rapid communication to the media and the public regarding the safety significance of events at all nuclear installations associated with the civil nuclear industry, including events involving the use of radiation sources and the transport of radioactive materials. Events are classified on the scale at seven levels: levels 4–7 are termed “accidents” and levels 1–3 “incidents”. Events without safety significance are termed “deviations” and are classified below scale at level 0. Events without relevance to radiological or nuclear safety are termed “out of scale”.

Operation: INES uses the Nuclear Events Web-based System (see next item) as its portal for communicating information to both the INES Co-ordinators and for public access. The INES target is to communicate information as quickly as possible (within 24 hours). While initial reports are received quickly, in actual practice the timing is much longer than 24 hours, especially in regards to receiving a final rating of the event.

- **Nuclear Events Web based System (NEWS)**

Overview: NEWS is a secure, proprietary, Internet-based communications system that allows for rapid transmission of information between regulators, operators, technical support organisations, etc. The system is jointly operated by International Atomic Energy Agency (IAEA) and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD/NEA)¹. Its main objective is to alert national experts to the occurrence of an incident and trigger dialogue among experts on its evolution and consequences and to provide consistent information to national experts in both governmental agencies and responsible industry personnel to enable them to respond to media requests for information.

Operation: While NEWS was setup as an independent system (following the success of the Y2K Early Warning system - YEWS) its current operation is mainly limited to communicating INES reports. The system does have the capability (as described above) to provide instantaneous information to a wide variety of participants, this function has never been fully used. It should also be noted that NEWS has the capacity to provide (limited) information directly to the public.

- **Nuclear Regulators' Information exchange network (WGPC FL@SHNEWS)**

Overview: WGPC FL@SHNEWS is an email discussion list restricted to members of the CNRA Working Group on Public Communication for Nuclear Regulatory Organisations (WGPC). The objective of the network is to quickly disseminate preliminary information regarding events having or likely to have an impact on public communication. The main goals are to obtain easy and direct contact with the staff of regulatory organisations in charge of public communication,

¹ The World Association of Nuclear Operators (WANO) was consulted with and participated in the initiation of NEWS.

in any (urgent) case; to be informed about important activities, undertaken by regulatory organisations, in the development of public communication, and which might be of interest to other regulatory organisations; to exchange information on public communication concerning major events that are of wider interest; and to increase communication to help build public confidence and trust in the nuclear regulatory organisations.

Operation: WGPC FL@SHNEWS is limited to OECD/NEA regulatory authorities and is an informal email based system used by members of the group to exchange rapid information. As such the information provided is more varied than that of the other systems (e.g., internal regulatory information) and for events dissemination it may or may not differ from that provided to INES or NEWS.

B.3 Specific Data Bases

A number of specific data bases have been set-up as projects, mainly under the Nuclear Energy Agency umbrella to collect data on events in specific topics of interest. These projects are run independently from the NEA Safety Committees and the data collected is proprietary to the members of each project. The current data base projects are as follows:

- OECD/NEA Cable Ageing Data and Knowledge (CADAK) Project
- OECD/NEA Component Operational Experience, Degradation and Ageing Programme (CODAP)
- OECD/NEA Fire Incidents Records Exchange (FIRE) Project
- OECD/NEA International Common-cause Data Exchange (ICDE) Project

Detailed information on the setup and operation of these databases is contained on the NEA Web Site under Nuclear Safety and Regulation [8] and therefore is not repeated in this report.

APPENDIX C: INTERNATIONAL OEF EXPERT GROUPS

C.1 Overview

Summary documents discussing the most important events or events related to specific safety issues are produced by the main international nuclear safety organisations; International Atomic Energy Agency (IAEA); World Association of Nuclear Operators (WANO) and the Nuclear Energy Agency (NEA). Other organisations such as the EC, WENRA, INSAG, etc carry out work from time to time as appropriate.

In addition to the development of safety standards and guidelines the IAEA organises yearly consultancies and technical committees which produce various topical studies based on the OE systems. IAEA also conducts workshops and provides training in their member states.

The NEA/CNRA runs a permanent WGOE. The WGOE provides among other things generic reports on safety concerns related to OEs and organises workshops and conferences on specific OEF topics.

In the area of event Analysis, Association Vinçotte Nuclear (AVN) of Belgium has taken the initiative to organise an annual technical meeting on probabilistic precursor analysis in the nuclear industry.

C.2 Specific International OEF Groups

- **NEA/CNRA WGOE**

WGOE meets annually to share OE and knowledge, provide expert insights to reach timely conclusions on trends, lessons learned in the short and medium term, and implement effective responses. In the longer term, the WGOE promotes proposals for the reassessment of safety, identifies areas where additional research is needed, assesses new or revised regulatory inspection practices and shares improvements in operational management of nuclear installations.

- **Working Group on Public Communicators for Nuclear Regulatory Organisations (WGPC)**

WGPC meets annually to facilitate the exchange of information, news, documents, experiences and practices among nuclear regulatory organisation communicators.

- **IAEA/NEA Coordinator meetings for IRS, FINAS and INES, IAEA Coordinator meetings for IRSRR and NEA Projects**

Coordinators from the respective systems meet, usually on an annual basis to review events from the past year, screen and discuss safety issues based on the presentations for development of topical studies and to discuss ways to improve the data bases.

- **The European Clearinghouse on Operating Experience of Nuclear Power Plants**

The European Clearinghouse is a network gathering the Regulators of European countries with a nuclear power programme. This network is operated by JRC and aims at improving the use and the dissemination of OE of Nuclear Power Plants throughout Europe.

The European Clearinghouse makes use of dedicated staff at JRC to release topical studies and newsletters about events occurring worldwide, to operate a web-based information repository and to organise training related to event investigation.

C.3 Regulatory Groups

- **CNRA Working Group on Inspection Practices (WGIP)**

WGIP meets twice a year to exchange information and on regulatory inspection practices. Inspection is defined as any examination, observation, measurement, or test to assess structures, systems, components, materials, operational activities, processes, procedures, and personnel and organisational competence. Regulatory inspection is inspection by or on behalf of a regulatory body.

C.4 Technical Support Groups

- **NEA/CSNI Working Groups**

The CSNI has expert groups in specialised areas including Human and Organisational Factors, Risk Assessment, Structural Integrity, Accident Management and Analysis, Fuel Safety and Fuel Cycle Safety. Each of these groups reviews and analyse technical aspects of the design, construction and operation of nuclear installations insofar as they affect the safety of such installations.

C.5 Coordination and Interaction between Groups

As shown in Chart 2, these groups have different methods and strategies involving the various inputs, collection, analysis and assessment and outputs concerning international OEF. In addition there are many paths of coordination and interaction between these groups. The current flow of information to and between these various groups is complex, however the following simple elements have been developed to help guide the user of this report (does not reflect industry systems):

- a) Initially unofficial transmittals of information are transmitted by WGPC FL@SHNEWS and by the various individual expert group members and official communications on events (emails, press releases, etc.) are transmitted to NEWS and INES. Further information and regulatory responses are discussed at meetings of the CNRA and its working groups, while CSNI and its working groups review and discuss technical safety issues arising. Over a longer period detailed reports are prepared and inputted into and then distributed out by the various international OEF systems.
- b) Once collected, initial screening performed and distributed. Coordinators and expert groups further review and discuss the significance and determine appropriate next steps, e.g., tasks, topical studies, generic reports, workshops, etc. The Secretariats of the NEA and IAEA work together to ensure information is exchanged efficiently and effectively and to help ensure no duplication exists. Within the NEA, CNRA and CSNI work closely together to identify their respective programmes of work through a joint strategic plan and their expert groups work together on similar issues.
- c) The international OEF systems disseminate their reports either through the web or by hard paper and produce topical studies. Working Groups produce reports on the state-of-the-art and good regulatory practices, while the communication systems provide press releases, to the public and

internal transmittals within their own expertise. The proprietary data bases disseminate data between the member countries and produce generic reports based on the data.

The flow and exchange of information between the various factions, as described above is an optimal situation, however, it should also be noted that:

- IRS, FINAS, NEWS and INES are joint systems operated by both the NEA and the IAEA. In many cases the coordinators of the joint systems are also the same members on the NEA expert groups. Additionally WANO participates in many of the expert and coordinator groups. Additionally, annual coordination meetings are held between NEA and the IAEA and the IAEA and WANO albeit at a high level.
- The intent of the communication systems are to disseminate information as quickly as possible. As such very many different sources transmitting information in parallel, the messages are not always consistent or uniform.
- Full reports, topical studies, state-of-the-art reports, etc., take time and normally are not available, at the earliest, one year or more after the event.

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