Unclassified **NEA/CNRA/R(2008)3**

Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development **31-Jan-2008**

English text only

NUCLEAR ENERGY AGENCY
COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

NEA/CNRA/R(2008)3
Unclassified

THE USE OF INTERNATIONAL OPERATING EXPERIENCE FEEDBACK FOR IMPROVING NUCLEAR SAFETY

January 2008

JT03239524

English text only

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996), Korea (12th December 1996) and the Slovak Republic (14 December 2000). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of the OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full Member. NEA membership today consists of 28 OECD Member countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, Norway, Portugal, Republic of Korea, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The Commission of the European Communities also takes part in the work of the Agency.

The mission of the NEA is:

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

Specific areas of competence of the NEA include safety and regulation of nuclear activities, radioactive waste management, radiological protection, nuclear science, economic and technical analyses of the nuclear fuel cycle, nuclear law and liability, and public information. The NEA Data Bank provides nuclear data and computer program services for participating countries.

In these and related tasks, the NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has a Co-operation Agreement, as well as with other international organisations in the nuclear field.

COMMITTEE ON NUCLEAR REGULATORY ACTIVITIES

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

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

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

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

FOREWORD

The main objective of the CNRA Working Group on Operating Experience (WGOE) is to share experience and knowledge, analyse and provide expert insights from operating experience to reach timely conclusions on trends, lessons learnt and effective responses in the short to medium term, and to promote proposals for re-assessment 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.

This report addresses the proposal made at the December 2006 CNRA Meeting for the WGOE to review existing International Operating Experience Feedback (OEF) processes and networks, and their connections with National OEF systems and provide recommendations for more effective use of international OEF to improve nuclear safety.

The Task Group included WGOE members and observers from both the IAEA and EC and consulted other interested parties, including: CSNI, CRPPH, WENRA, INPO, INSAG and WANO.

The Task Group was chaired by Mrs. Kulvinder McDonald (NII, United Kingdom) and the members included André Vandewalle (AVN, Belgium), Mary Jane Ross-Lee (NRC, United States), Pavel Bobaly (UJD, Slovak Republic), Remy Bertrand, Laurent Foucher (IRSN, France) and Jacky Mochel (ASN, France), Michael Maqua and Matthius Bergener (GRS, Germany), Seija Suksi (STUK, Finland), Shigeo Tamao (JNES, Japan), Xavier Bernard-Bruls (IAEA) and Vesselina Ranguelova (EC).

TABLE OF CONTENTS

EXECUTIVE SUMMARY

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

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 and analyzing operating experience (OE) information has grown in depth and sophistication over the years, and by now there is an extensive literature on the methodology for collecting and analyzing operating experience. In general it can be stated that nuclear operators and regulators are familiar with these methods.

In developing an International Operating Experience Feedback (IOEF) 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 IOEF 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. Nevertheless, it is acknowledged that there is a need for continuous improvement. There have been recent improvements to IOEF reporting systems. However, reporting on events needs to be coupled with suitable programmes to ensure that the lessons learned from previous events are widely applied and appropriately documented.

In discussing the role of the regulator, it is important to note that the operator has the responsibility for safely operating the nuclear facilities. Nothing the regulator does should ever diminish or interfere with that basic responsibility for safety. Likewise, the collection of information on Operating Experience is the responsibility of the operator and as stated in many previous conferences and in many documents, national OEF is the basis for IOEF. Accordingly, without high quality national OEF it is not possible to have IOEF.

Operating experience 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 IOEF process must capture any experiences that have led to significant corrective actions in human performance, hardware or safety management practices. Likewise, it must provide information on safety research

programmes that were started 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 report includes all existing international systems covering all nuclear facilities (e.g., IRS, FINAS, IRSRR) not just those looking at nuclear power plant events.

Resources allocated to date to develop and maintain IOEF 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 learnt, 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 operating experience systems, the positive and negative aspects of existing international systems, assesses the regulatory objectives and makes proposals for enhancements to meet these objectives.

The Task Group evaluation confirmed that existing IOEF systems had positive aspects against the majority of the NS-G-2.11 IOEF 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 Group did, however, find the following areas to be particularly weak at international level against identified regulatory objectives: strategic IOEF oversight, current systems do not capture lessons learnt, lack of a web based system for FINAS, IOEF screening, IOEF trending for determining priorities and programmes of work.

Section 3 provides the full set of recommendations made by the Task Group. These recommendations cover national systems, given that robust national systems are a pre-requisite for effective IOEF, and at international level.

The CNRA should take the appropriate actions to advance and improve IOEF in accordance with Task Group recommendations.

Another equally important finding by the task group is that the current situation for nuclear power represents a unique opportunity in relation to the new build now being considered by many NEA member countries. The establishment of an IOEF system that can meet the regulatory needs as stated herein would in effect establish a new, reliable, effective and efficient knowledge base for lessons learned for the new generation 3^+ nuclear power plants to be built, including the construction stage. The timing of this work provides regulators with a ‘new start’, at least for the next generation of plants, with the advantage of learning its own lessons from the past use of OEF.

1. THE IMPORTANCE OF OPERATING EXPERIENCE 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, analyzing 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 GS-R-1 on Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety [9] states; *"the regulatory body's responsibility to establish national regulations in the field of operating experience feedback and to ensure that operating experience is appropriately analysed, that lessons to be learned are disseminated, and that appropriate records relating to the safety of facilities and activities are retained and are retrievable. In addition, feedback on operational experience provides important information for the safe operation of nuclear facilities. The regulatory body should therefore be organized to take full advantage of lessons learned from the feedback of operational experience both from facilities in its own country and from those in other States. In a large organization, each of its functions may be assigned to a discrete organizational unit within the regulatory body. Each organizational unit may have its own specialists. However, it is often practical and efficient to group the specialists in a matrix such that each organizational unit that is assigned responsibility for a particular function can draw on the necessary specialist skills."*

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

- need for better feedback of corrective actions and changes made in regulatory requirements.

- need for the international OEF process to ensure that events involving serious potential hazards did not re-occur. To achieve this result, reporting on events needed 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 much only event oriented.

  - Further current programmes on precursor analyses/event analysis to encompass larger regional experience (e.g., EC, Asia).

1.2 Evolution of Operating Experience Feedback Processes to Enhance Nuclear Safety

After over 4 decades of commercial nuclear operation both licensees and regulators face 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

wasn't until the late 1970's that researchers and regulators began looking more closely at operating experience to derive lessons learned. In 1978 the CSNI approved setting up a system to collect international operating experience data. The accident at Three Mile Island shortly after added impetus to this and led to the start of the IRS.

In the years since, national operating experience systems have evolved, numerous international systems have been added and the practices of collecting and analyzing operating experience (OE) information has grown in depth and sophistication. The recent 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 operating experience are being used commensurate with their importance to safety.

- There is a need for improved processes to assure that operating experience is used systematically to promote safety.

The CNRA Operating Plan [3] 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 operating experience feedback process to better disseminate information on corrective actions and their implementation. Both national and international operating experience 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]

1.3 Task Group Mandate

Based on the work of its Senior Level Task Group, observations from its Working Group on Operating Experience, INSAG 21 [4] and results from the recent International Conferences [5], 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 IOEF processes and networks and their connections with National OEF processes, including their status and approaches to meet current regulatory challenges.

The main objective of this task is to review existing IOEF processes, and provide recommendations on how to better organise the international network and outputs for more effective use of operating experience feedback to:

- ensure consistent and comprehensive capture of any operational experience which leads to significant corrective actions at any plant worldwide,

- ensure that the lessons learnt from previous events are widely applied emphasizing exchange of good practices, and

- allow for corrective actions preventing occurrence.

The task group adopted the definition of operating experience as stated in the recent CNRA green booklet: "all events, conditions, observations or new information that could affect nuclear safety". This broad definition of operating experience 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) *organizational 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.*

As a result of the Cologne Conference findings, a number of initiatives have been undertaken, mainly in the European arena. This includes discussions at the CNRA, INSAG and WENRA meetings; proposals to set up a regional network for nuclear facility operating experience feedback. The Task Group received presentations on each of these and discussed them in general, but agreed that these proposals were outside the scope of this work as they are regional in nature and not fully international. It was noted that, while differences exist in the exact means, the overall objective of all of these is basically the same and that the current activities and future developments need to be included in the overall review of IOEF and should factor into future decisions. Although outside the scope of this work, the Task Group was clear that these proposals should aim to enhance, not duplicate, existing IOEF systems.

The fundamental objective of all 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 operating experience 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.

Further to this, the CNRA, recognising the importance of operating experience, has noted that their working groups (WGOE) need to enhance their efforts in reviewing the regulatory response to events.

2. EXISTING NATIONAL AND INTERNATIONAL OEF SYSTEMS AND ORGANISATIONS

2.1 National OEF Systems

The importance of operating experience feedback (OEF) for enhancing nuclear safety is well recognized. At national level, the 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 IOEF systems.

In order to capture the current situation, the task group members, which cover a representative sampling of countries[1], provided in Appendix A short narratives outlining their national OEF practices. In order to get a comprehensive picture, these descriptions would have to be supplemented by those from other member countries.

2.2 Current IOEF Organisations, Systems and Expert Groups

There are 3 international organisations operating[2] IOEF systems on events at nuclear installations. These organisations operate IOEF 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 IOEF Organisations

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

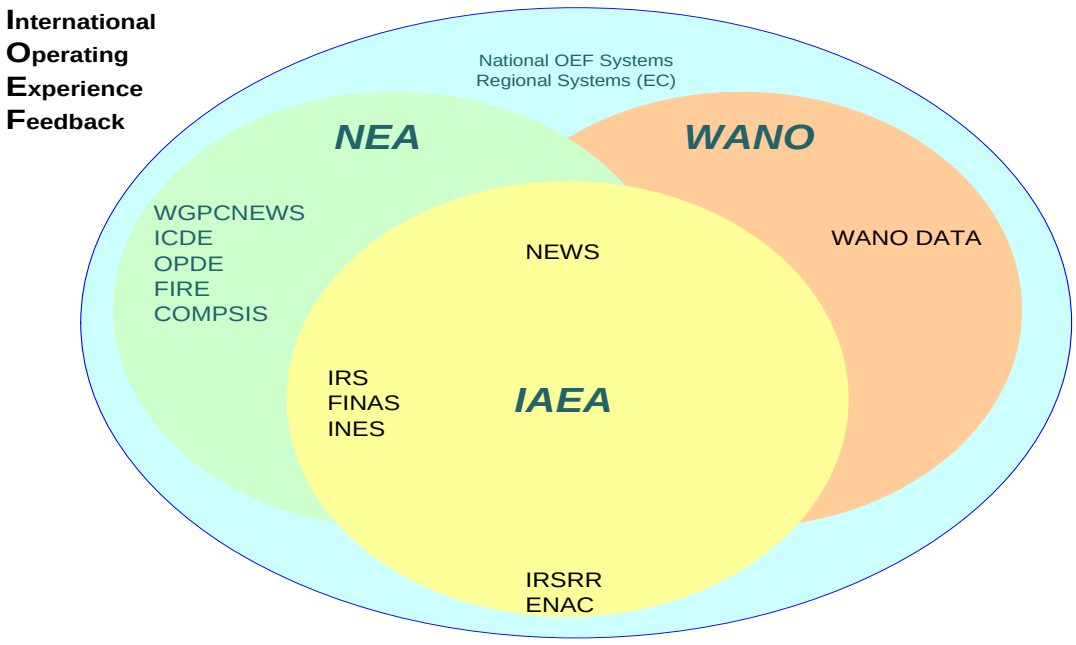
[1] In addition Spain also provided an input

[2] NEA and IAEA jointly operate a number of these systems.

2.2.2 IOEF 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. The major IOEF systems that exist today (ref: Chart 1 below):

- IAEA/NEA Incident Reporting System (IRS)
- IAEA/NEA Fuel Incident Notification and Analysis System (FINAS)
- IAEA Incident Reporting System for Research Reactors (IRSRR)
- World Association of Nuclear Operators (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)



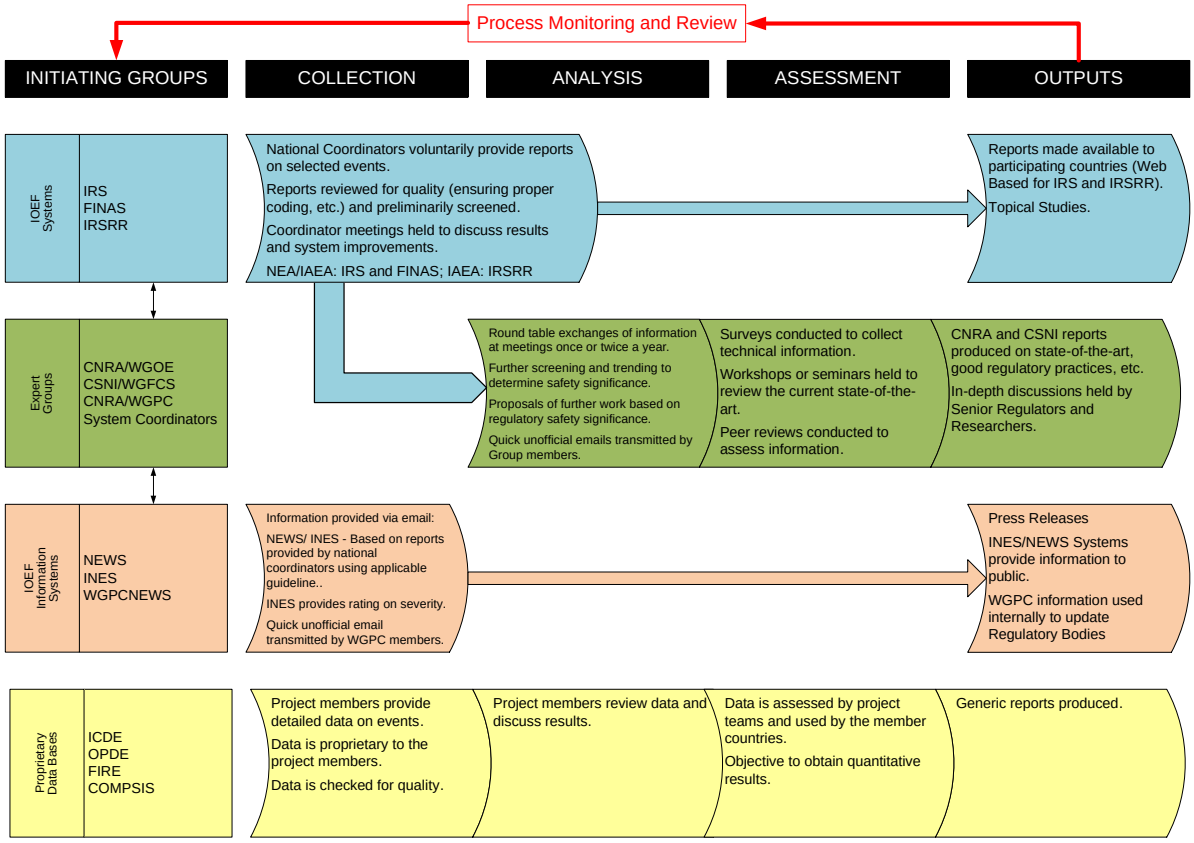
2.2.3 IOEF Expert Groups

Meetings of experts are held by the 3 organisations on a continuing basis on operating experience. In addition, these groups interact with other experts in assessing the safety significance. The major international expert groups that exist today include (ref. Chart 2 below):

- 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 IOEF include; NEA/CNRA Working Group on Inspection Practices.

- Technical Support Groups interacting with IOEF 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 IOEF SYSTEMS

3.1 IOEF Task Group Methodology

IAEA Safety Guide NS-G-2.11[2] provides best OEF practice at 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 operational experience;
- A storage, retrieval and documentation system for information on events.

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

3.2 Task Group Evaluation

The Task Group initially assessed the efficiency and effectiveness of existing IOEF 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 IOEF Systems

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

INTERNATIONAL OEF SYSTEM ELEMENTS	CURRENT ARRANGEMENTS	POSITIVE ASPECTS	NEGATIVE ASPECTS
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	Issues Topical Studies, Blue Books, Highlights, etc Trends 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.)	Issues - IOEF 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 not the same contacts. Dissemination is limited based on the national coordinator or national member of group who receives the information Feedback on the usefulness of information (e.g. event reports; SOARs, etc.) is not readily available (completing the loop). Lack of web based FINAS.

INTERNATIONAL OEF SYSTEM ELEMENTS	CURRENT ARRANGEMENTS	POSITIVE ASPECTS	NEGATIVE ASPECTS
8. Continuous Monitoring and Improvement of IOEF Processes	Reporting Systems Co-ordinators Meetings. WGOE, WGFCS IAEA and NEA perform limited QA.	Input provided by Co-ordinators using the systems at yearly meetings. Network of OE experts. QA performed have enhanced the effectiveness of the WBIRS system.	Resources limit effectiveness Lack of QA has been detrimental in making improvements to FINAS and IRSRR systems. No overview of all IOEF systems.
9. Storage, Retrieval and Documentation Systems	Web Based - IRS, IRSRR NEWS, INES FINAS paper documents. NEA Data Bases – Stored in NEA Data Bank (data bases are proprietary).	Web based system events reports are readily available. NEA Data Bank contains a lot of useful data on events.	FINAS event reports are not readily accessible. The proprietary nature of the NEA Data Bank limits the exchange of information.

3.3 Regulatory IOEF Objectives and Proposed Enhancements

The group reviewed its IOEF evaluation, considered shortfalls and proposed enhancements to address these shortfalls. The following Table and supporting text summarise the outcome.

Table 2: Regulatory IOEF Objectives and Proposed Enhancements

ELEMENTS OF IOEF SYSTEM	REGULATORY OBJECTIVES	PROPOSED ENHANCEMENTS
1. General - International Strategic Role	1) Adequate IOEF systems and consistent participation by the member countries. 2) Overview of all IOEF systems. 3) Coordination between different working groups. 4) Quality Reviews of the effectiveness of National Systems.	1) Effective national OEF system including sufficient resources is a pre-requisite for having effective interfaces with international OEF systems. 2) Effective strategic oversight and co-ordination of IOEF 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.
2. Reporting of events / good practices	1) Adequate IOEF systems accessible to all countries. 2) Supporting criteria and guidelines for inputting information into IOEF systems for all parts of the plant life cycle. 3) Consistent application of IOEF criteria and guidelines by member countries especially relating to the submittal, timeliness and input of follow-up actions. 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.	1) All systems to be updated to the web-based system is a high priority 2) Guidelines should cover the entire plant life cycle and be periodically reviewed and updated as needed. 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. 4) IOEF systems to be updated to facilitate reports on other than reportable events. 5) In order to facilitate coordination of overall IOEF it would be beneficial to make IRSRR a joint IAEA/NEA system.

ELEMENTS OF IOEF SYSTEM	REGULATORY OBJECTIVES	PROPOSED ENHANCEMENTS
3. Screening of events - primarily on basis of safety significance	1) Events screened to determine the safety significance of events, lessons learned, or generic applicability for the purpose of regulatory follow-up.	1) Screening of international OEF to allow for informed resource expenditure for input to plans of work.
4. Regulatory Investigation and Analysis	1) Prioritisation and timely investigation and analysis based on the results of IOEF screening. 2) Receive technical or regulatory assistance on key issues identified for follow-up.	1) Inform the decision-making process for resource expenditure based on output of IOEF screening process 2) Clarify the roles of the various international organisations 3) Request technical (CSNI WGs) or regulatory support (CNRA WGs) from the appropriate expert group.
5. Regulatory Actions in response to events	1) Recommend changes to regulatory practices based on the results of the investigation and analysis 2) Sharing best practices and lessons learnt to other interested parties including industry. 3) Follow-up on recommended actions.	1) Analysis and investigation reports (including lessons learned and best practices) should identify recommended actions. 2) WGOE should periodically follow-up on usefulness of reports, and implementation of recommended actions.
6. Wider consideration of issues / trends	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). 2) Comprehensive input of national data to support trending	1) Establish ways to perform meaningful international trending to meet the regulatory objectives. 2) Make recommendations based on outputs from trending.
7. Dissemination and exchange of event information	1) Need comprehensive information from all countries in IOEF 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.	1) Ask IAEA and NEA to ensure member countries participate fully in I 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 IOEF Processes	1) Periodic reviews of individual IOEF programmes and quality assurance of the processes. 2) Periodic holistic overview of IOEF	1) IAEA and NEA Groups to perform periodic review of IOEF programmes. 2) Establish a means to implement change in IOEF 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 systems. Therefore, effective national OEF systems, including insights on lessons learned and corrective actions taken are a pre-requisite to effective IOEF.

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 operating experience, and broad industry trend information.

However, participation by member countries is inconsistent and differences exist between the various IOEF data bases, the level of reporting is mixed and resources allotted to operating experience are limited. Additionally, other than the specific issue related data bases, no systematic collection is performed to derive 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 IOEF systems.

Hence, our recommendations are that CNRA members should, as soon as possible:

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

Additionally, there is a need to have better strategic IOEF oversight, with transparent mechanisms for changing existing processes and for improved co-ordination between the various IOEF organisations and systems. We, therefore, recommend that:

- Chairs of the IOEF 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 for; clarifying the roles of the various IOEF Organisations, improving co-ordination of their work and for ensuring the implementation of changes.
- The roles of IOEF 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 IOEF 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. Accordingly, the task group agrees with the proposal by the CNRA Bureau that WGOE should focus on regulatory responses to events.

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 operating experience 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 to them of an event.

Additionally, submittal of OEF reports on other matters 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.

Our recommendations are that:

- The first priority concerning IOEF system operation is that all should be web based. This priority should precede other system improvements such as providing a common platform for IOEF systems.

- IOEF 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 IAEA and NEA agree to operate IRSRR jointly similar to the arrangements made for the already operating data base systems.

We also recommend that CNRA members should ensure that their national reports are submitted in accordance with guidelines of IOEF systems in a timely manner with input of follow up operator and regulator 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 systematic 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 now the Blue Book (which covers a 3 year period and is used to inform the public about the IOEF process) 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. The Blue Book is "promotional" to inform people about the international OEF process.

These Yearly "Highlights" reports have not been available since the late 1990's (mainly due to a lack of resource). In re-introducing such a report, its value could be increased by also looking at corrective actions in addition to trending and analysis.

We recommend that:

- Events from IOEF 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 years. 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.

We believe that the WGOE / WGFCS IOEF screening process should highlight areas for further regulatory investigation and analysis, which should be allocated to the appropriate international organisation.

We, therefore, recommend that:

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

We believe that recommendations from the IOEF investigation and analysis process should inform changes to regulatory practices at 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 IOEF activity to monitor the usefulness of the information provided and the extent to which recommendations are implemented.

We, therefore, recommend that:

- CNRA members review and, where appropriate, implement at national level in a timely manner recommended changes to regulatory practices from IOEF investigation and analysis reports (including lessons learned and good practices).

- WGOE and WGFCS undertake annual reviews of the usefulness of IOEF 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 usefully inform IAEA and NEA priorities and programmes of work. However, currently IOEF plays only a minor role in this context. Comprehensive data entry at national level is needed to support trending.

Topical studies and reports prepared by 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. Communication, meeting and participation between the NEA and IAEA help eliminate duplication and improve co-ordination.

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.

We recommend 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 annual (?) reviews to close out issues which are no longer safety relevant.

- Roles of various IOEF organisations are clarified.

3.10 Dissemination and Exchange of Information

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

Information is currently disseminated through access to the IOEF 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.

We recommend that:

- CNRA members ensure their full participation (regulators and industry) in IOEF 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, IOEF systems, and IOEF Expert groups should be disseminated as broadly as possible (without releasing proprietary data).

3.11 Continuous Monitoring & Improvement of IOEF Processes

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

The work of the international organizations, 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 IOEF systems. However, there is no clear mechanism for oversight of the overall IOEF picture or a means of implementing change in IOEF 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.

We recommend that WGOE carries out a holistic overview of IOEF systems, initially on a 3-yearly 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 and all provide for 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.

Collection, storage and retrieval of IRS and IRSRR event information is 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 not easily accessible and the proprietary nature of NEA data bases limits the exchange of information.

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

4. CONCLUSIONS AND RECOMMENDATIONS

The Task Group evaluated the effectiveness and efficiency of IOEF systems against the IAEA Safety Guide NS-G-2.11 [1].

The Task Group considered effective National OEF systems to be a pre-requisite to effective IOEF.

The Task Group evaluation confirmed that existing IOEF systems had positive aspects against the majority of the above IOEF 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
- Analysis of specific issues

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

- Strategic IOEF oversight
- Lack of a web based system for FINAS
- Do not capture lessons learnt
- Screening
- IOEF trending for determining priorities and programmes of work

In order to meet regulatory objectives, the Task Group makes the following recommendations for enhancement of existing IOEF 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 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 IOEF 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 for; clarifying the roles of the various IOEF Organisations, improving co-ordination of their work and for ensuring the implementation of changes.

5. The roles of IOEF 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 IOEF 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 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 IOEF system operation is that all should be web based. This priority should precede other system improvements such as providing a common platform for IOEF systems.

7. IOEF 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 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 IOEF systems in a timely manner with input of follow up operator and regulator actions.

Screening of events – primarily on basis of safety significance

10. WGOE and WGFCS should annually screen events for safety significance, lessons learnt 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 IOEF screening, with requests made for technical (CSNI WGs) or regulatory support (CNRA WGs) as appropriate.

12. IOEF 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 IOEF investigation and analysis reports (including lessons learned and good practices).

14. WGOE and WGFCS should undertake annual reviews of the usefulness of IOEF 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 IAEA and NEA priorities and programmes of work 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 IOEF 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, IOEF systems, and IOEF Expert groups should be disseminated as broadly as possible (without releasing proprietary data).

Continuous monitoring and improvement of IOEF processes

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

5. REFERENCES

1. OECD Nuclear Energy Agency, Regulatory Challenges in Using Nuclear Operating Experience, 2006.

2. International Atomic Energy Agency, NS-G-2.11, A System for the Feedback of Experience from Events in Nuclear Installations, 2006.

3. OECD Nuclear Energy Agency, NEA/CNRA/R(2006)2, CNRA Operating Plan, 2006.

4. International Atomic Energy Agency, INSAG-21.

5. IAEA International Conference on Operational Safety Performance in Nuclear Installations in Vienna, Winter 2005 and the NEA International Conference on Improving Nuclear Safety through Operating Experience Feedback: Present Challenges and Future Solutions, Spring 2006.

6. Excerpt from the Summary Record of the Steering Committee for Nuclear Energy Meeting (OECD, Paris 19th October 1978.

7. The Committee on Nuclear Regulatory Activities (CNRA) WGPC is made of public communicators from Regulatory Bodies within the OECD/NEA.

8. NEA Web Site Address: http://www.nea.fr/html/nsd/welcome.html

9. International Atomic Energy Agency Safety Requirements publication GS-R-1 on Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety.

10. CNRA Operating Plan, Section 2.3; Reference NEA/CNRA/R(2006)2.

6. ACRONYMS

CNRA	Committee on Nuclear Regulatory Activities
CRPPH	Committee on Radiation Protection and Public Health
CSNI	Committee on the Safety of Nuclear Installations
EC	European Commission
FINAS	Fuel Incident Notification and Analysis System
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
IOEF	International Operating Experience Feedback
IRS	Incident Reporting System
IRSRR	Incident Reporting System for Research Reactors
IRRS	International Regulatory Review Service
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
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
WGFCS	Working Group on Fuel Cycle Safety
WGIP	Working Group on Inspection Practices
WGHOF	Working Group on Human and Organisational Factors
WGOE	Working Group on Operating Experience
WGPC	Working Group on Public Communications

APPENDIX A: NATIONAL OPERATING EXPERIENCE FEEDBACK SYSTEMS

A.1 Belgium - Operational Experience Process in NPPs at AVN

Objectives of the Operational Experience Process at AVN

The objectives of the operational experience process of AVN have to be consistent with the fundamental mission of AVN as a Licensed Inspection Organisation, i.e. the surveillance of the effectiveness of the nuclear safety management and radioprotection programs of the licensees. The analysis of significant events and near misses, the identification of corrective actions that should avoid their recurrence, the implementation of lessons learned from such events in similar installations and the detection of negative trends and weak management programs, based on the analysis of low level events, are important components of the safety management program of the licensees. The operational experience process at AVN intends to support, in an independent way, the evaluation of the effectiveness of these licensee programs and to initiate inspection activities whenever this is judged necessary.

The main objective of the process is to support the following inspection activities:

- To verify that the licensees are able to avoid recurrence of events with actual or potential safety impact (i.e. existence of adequate detection mechanisms and appropriate grading) of safety importance of events; use of adequate analysis methods; appropriateness of depth and extent of the performed analysis; adequateness of proposed corrective measures with appropriate coverage of technical, human and organisational deficiencies; adequate reporting and diffusion of analysis results; respect of reasonable delays to perform these activities).

- To verify that licensees adequately review and apply lessons learned from significant events and near misses in similar Belgian plants.

- To detect and analyse deficiencies in safety related processes or management programs of the licensees, based on a periodic review of events, which are reported by the utility or internally reported in AVN inspection reports (the latter include low level events which are not always reportable as defined by the administrative requirements of the Technical Specifications). The focus is on the recurrence of causal factors, which affect the effectiveness of these programs.

- To obtain a global picture of the safety status of the plants based on the population of events reported within a certain time frame.

- To initiate independent in-depth investigations of a small selection of events whenever this is felt necessary.

- To select events for reporting to national bodies and international organisations (including the IRS).

Overall approach and organisation

The overall approach of the operational experience process of AVN has to deal with its ambitious objectives, while taking into account the limited available resources.

Therefore the following twofold approach has been chosen:

- in-depth analyses of a limited number of potentially safety significant events (usually 5 to 10 per year for a total of 7 units) for which the appropriateness of the event analysis, which was performed by the licensee, is reviewed in detail and the completeness of proposed corrective actions is thoroughly checked;

- more superficial analyses and registration of all other events collected in the process, through licensee event reporting or independent inspection reports.

The process is supported by the nuclear power plant inspectors, which perform an early data collection on the events and participate to the event reviews or analyses. They have direct access to the information on the field and the best knowledge on the specific plant systems and plant organisation. The events, including less safety significant events, which should be treated in AVN's operational experience process, are selected on the basis of internally agreed reporting criteria and internally reported through a standardised form. Later follow-up inspection findings are reported in the regular inspection reports and referred to in the internal reporting form. The data collection and event reviews are completed by the analysis of the licensee event reports, if available.

The overall co-ordination of the process is assured by the Operating Experience Coordinator (OEC), who animates regular review meetings, during which the events are further discussed and follow-up action is decided. The OEC is responsible for the coding of all selected events in a database, which supports the technical and administrative follow-up of the events, on the basis of the information included and referred to in the internal reporting forms and in the licensee event reports, if available. He is responsible for the development of additional methods and tools, which should support the analysis of the events, and provides advice and support to and if necessary participates in the event analysis (review) itself. He is responsible for the drafting of periodic reports on the status, results and main lessons learned of the operational experience process.

Furthermore the process is supported by experts who are able to perform a supplementary analysis, with the use of PSA-tools, of a small and carefully chosen subset of events, in order to have an independent and quantified assessment of the safety significance of these events.

Safety significant events and identification of precursors

The main objectives of the AVN probabilistic precursor program (PSA-based Event Analysis - PSAEA) are to determine the quantitative importance of a few well-selected operational events per year and to subsequently identify potential safety issues, which are assumed to be originally not or insufficiently addressed by the licensee event analysis. By doing so, the analysis results should support the inspection activities in convincing the licensees that more effort should be paid to the safety implications of certain events, to the analysis of their contributing and root causes and to the construction of effective barriers in order to avoid their recurrence in similar circumstances.

This AVN precursor program is integrated in the overall operational experience process. Although it has been demonstrated that the precursor program provides useful insights and supports the operational experience program, AVN is fully aware of its inherent limitations. These limitations are mainly related to

available PSA-models and PSA-scope, and to the main focus of the analysis on core damage scenarios. Furthermore, limitations in the modelling of organisational factors, which contribute to a large extent in the genesis of significant and low level events, do not allow addressing and appreciating the influence of these factors.

Performance of PSA-based analysis of events, if done in a timely manner, could also help AVN in identifying safety significant events, which warrant an independent in-depth investigation by an inspection team.

A.2 Finland - Operating Experience Feedback Process in Finland

Responsibilities and roles of licensees and regulator in operating experience feedback 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' operating experience feedback arrangements and implementation as part of its inspection activities. In addition to this STUK 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 STUK in OEF process

The role and responsibilities of STUK in the area of operating experience 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's international OEF group and experts review and assess the IRS-reports disseminated through IAEA and other information or reports received directly from foreign regulators or operators suggesting 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 operating experience feedback in the most effective way to maintain and enhance the safety of the plants, and to assure that the 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 Decision of the Council of State (1991/395) and in the YVL Guides. Decision of the Council of State defines the main requirements for the OEF as follows:

- Operating experience from nuclear power plants 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 operating experience and the results of safety research as well as the advancement of science and technology.

STUK sets the criteria for collecting information, analyzing it and reporting to regulatory authority in the YVL-guides, especially guide YVL 1,5 and 1.11. The Guides are also giving detailed requirements for the content of event and periodic reports. In addition the regulatory requirements are covering the resources, competence and organizing of the OEF-processes in the Licensees organizations.

STUK is using IAEA-guides to prepare national requirements. The early IAEA-Guide on OEF TECDOC-596) defines the international criteria for well established internal and international OEF processes. This Guide and other relevant IAEA guidance (75-INSAG-4, NS-G-2.4, NS-R-2) was used in preparing STUK's Guide YVL 1.11 on OEF. The Finnish requirements on operators' OEF process fulfil the IAEA's latest guidelines on OEF (NS-G-2.11).

Review and assessment of the licensees OEF-processes

The Licensees OEF-processes are described in the Quality Assurance manuals and administrative procedures. In Finland the higher level documents e.g. QA-manual, are submitted for 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 regulatory handling. Safety significance event reports (license event reports, LER) are submitted for approval and operational reports are submitted for information. STUK has human and organisational factors (HOF) specialists 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 organization, procedures, resources, open corrective measures and recurrent events. Inspection criteria are set forth in the regulations, IAEAs guides and Licensees QA-manual. Inspections of national OEF activities are normally conducted once in two or three years. The inspections on international OEF activities are performed biannually.

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 foreign regulators or operators (process chart below). STUK has an International Operating Experience Feedback (IOEF) group reviewing the reports and making suggestions to the line organization of the Regulatory authority. The group meets monthly. The deputy director of Nuclear Reactor Regulation department is the chair of the group and STUK's IRS co-

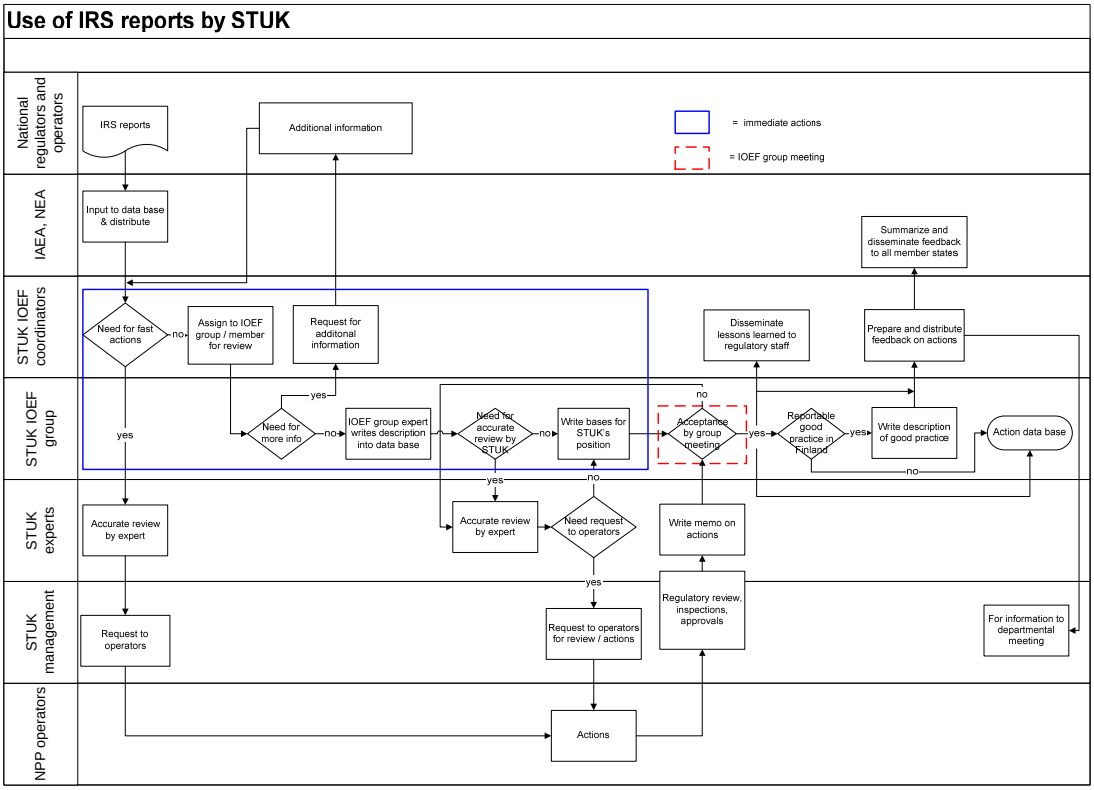
ordinator and international OEF manager as well as the publication secretary who manages the IOEF database of STUK are permanent members of the group. In addition, the group has 9 rotating experts in different technical disciplines who are responsible for assessment of the reports assigned to them.. 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.

STUK has recently 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.

WWER-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's IOEF process for IRS reports and other international reports or information.

A.3 France – Operating Experience Feedback System in France

1. 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 operating experience is used effectively to support the objective of safe operation, the French regulator requires from the operators:

- To have an appropriate organization permitting to collect and analyse operating experience 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.

1.1 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:
    - long-term unavailability or multiple inoperability,
    - overshooting certain thresholds or authorized values,
    - 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…),

4. external hazard: earthquake or plane crash, for example,

5. real or assumed malevolent act,

6. fallback of the unit according to the OTS or accidental procedures following an unforeseen behaviour of the plant,

7. event resulting or possibly resulting in multiple failures or affecting redundant trains,

8. event or anomaly affecting main primary or secondary circuit,

9. 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,

10. 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.

1.2 Role of the ASN

The incidents are subject to an immediate declaration by the owner and an analysed by ASN.

The main function of the operating experience group of ASN is to:

- collect all reactors incident in a database an 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 operating experience at national level,
- to inform inspectors on recurring events,
- to identify topics to be considered more in depth an to participate to advisory committee,
- to maintain consistency in processing and analysis of incidents,
- 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.

1.3 IRSN operating experience 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,
- 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,
- 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,
- 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,
- 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,

- 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,

  – 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 analyzes. A quarterly technical meeting between ASN, IRSN and EDF allow exchanges on this subject

1.4 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 meting. This report carries out an in-depth analysis of significant events. It analyzes 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.

2. 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,
- 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 operating experience. 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 operating experience is taken into account.

A.4 Germany

Evaluation of operating experience in Germany

National Regulatory Requirements

In Germany reporting of operational events in NPPs is regulated by a legally binding ordinance. This ordinance specifies 80 reporting criteria. The licensees are obliged to notify any event by using a prescribed “notification sheet” in accordance with its actual safety significance in due time to enable the regional regulatory authority (respective Federal State Authority) to take appropriate actions:

- Category S (immediate report, without delay)
- Category E (quick report, within 24 hours)
- Category N (normal report, within 5 days)
- Category V (before initial core loading, within 10 days)

In the formal report (or a later update) the licensee has to address the event and its radiological impact as well as a detailed description of the course of the event, its safety significance, its causes and the derived measures and corrective actions as well as measures taken to prevent recurrence of the event.

The regional regulator and its technical expert organisation (in general the regional TÜV) perform their own analyses on the safety relevance of the event and lessons that have been learned. If necessary they perform inspections, review plant documentation or perform additional analyses and assessments as appropriate.

In addition the licensee has agreed to classify any event according INES. Events rated INES 2or higher as well as events with major public interest are reported by the German INES officer to the IAEA/NEA/WANO NEWS. For events of major significance the German IRS coordinator initiates the elaboration of an IRS report after the course and the causes of the event have sufficiently been clarified.

The "notification sheet" and related information is not only disseminated on the regulatory side but also on the licensee side.

- On the regulatory side other regional authorities and their independent experts are informed as well as the Federal Regulator (BMU) (supervising the regional regulators), the Federal Radiation Protection Authority (BfS), which operates the German reported event database, and the independent expert organisation of the Federal Regulator, the GRS.

- On the licensee side reported events have to be distributed to the four operating organisations, VGB PowerTech, to the vendor organisation AREVA as well as to WANO if the WANO reporting criteria are met. These industry organisations run an event data base of their own.

The expectation of the regulatory body is that licensees and industry take appropriate actions to assess the experience and take adequate actions to maintain and improve safety of all plants if applicable. This refers not only to immediate actions but also to follow-up actions after detailed investigations to verify or restore confidence that the plant is in the license status. It also refers to investigations regarding lessons that can be learned to improve safety in general beyond the current licensing base. Thus the continuous improvement process as prerequisite of a strong safety culture is met.

National Operational Experience Feedback System

- reported events

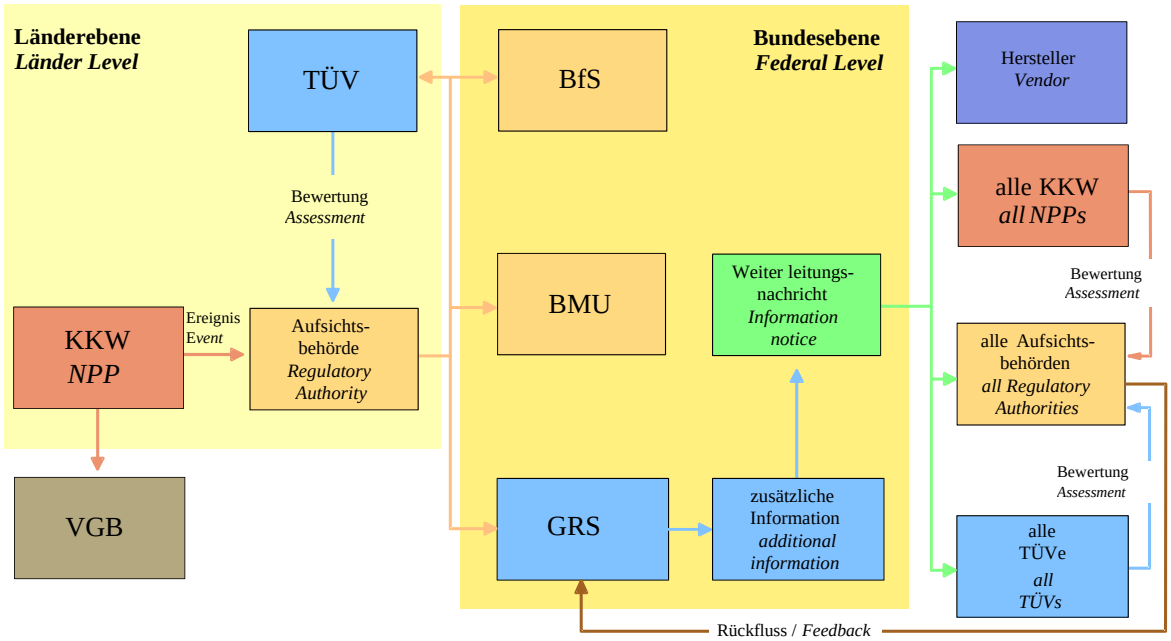
At the federal level, the Radiation Protection Authority compiles all reported events. It checks the correct application of the reporting criteria and runs the national event data base. It further distributes event reports to other supervisory authorities and publishes regular summary reports for the Parliament and the public. More detailed scientific - technical investigations of reported are performed by the independent expert organisation of the Federal Regulator, the GRS. All events are screened with respect to safety significance and performance data as frequency of initiating events, system failures or human failures to identify generic topics or trends.

For safety significant events that might contribute to additional verification and improvement of safety of power plants in general the GRS prepares assessments and in-depth analyses using appropriate methods and generic knowledge. Results and recommended actions (action level are summarized in "information notices" („Weiterleitungsnachricht"). The GRS distributes these information notices on behalf of BMU to all authorities, TÜVs, the NPPs in Germany, Switzerland and the Netherlands, the licensees and other institutions. It is regulatory practice in Germany that the recommendations have to be

assessed specifically for all NPPs by the respective licensee. Results and conclusions have to be reported to the regional regulator for review and assessment which might include additional expertise from a regional independent expert organisation as the TÜVs. To close the feedback loop the actions taken to cope with the recommendation should be fed back to the GRS to be compiled in annual reports.

Furthermore, GRS performs generic assessments of operating experience. Generic safety issues in general are related to recurring events due to similar causes. The results and conclusions of generic evaluations are reported similar to "GRS information notices".

GRS performs precursor analyses for national reportable events. The operating experience is screened to identify precursor events. These are evaluated by probabilistic methods to assess their safety significance and to find and analyse potential weak points.



National Operating Experience Feedback System

- operating experience in general below the criteria for reportable events

Generally the licensees record and evaluate also abnormal occurrences below the reporting thresholds in their installations as well as maintenance and repair activities. These occurrences as well as in-service inspection and maintenance findings are addressed in daily meetings to define measures and corrective actions. The licensees prepare monthly, maintenance outage and annual reports to inform the regional regulator (*Länder* authorities) about the results and conclusions of their assessment of operating experience and modification and backfitting measures.

The regional regulator supervises the proper use of operating experience by the licensees based on regular reports and inspection findings and perform additional in depth inspections or assessments if necessary supported by independent experts, mainly the regional TÜV. The authorities and their support

organisations further monitor the adequate implementation of corrective actions and derived measures and evaluate the applicability of an event to other plants in their area of supervision.

International Operating Experience Feedback:

The Federal Regulator BMU is responsible for Germany's participation in international operational feedback systems as operated by the IAEA and OECD-NEA and in related groups. Respective work is performed by GRS, the positions of the German INES officer and of the IRS coordinator are held by GRS.

INES: GRS screens the nuclear event web-based system (NEWS) regarding safety significant international events. Each event is screened and evaluated regarding its safety significance and applicability on German installations. Events with an INES category of 2 and higher are commented to the BMU with preliminary results of the assessment.

Regarding German event reports, the INES officer checks the INES classification derived by the licensees and decides which national events are reported to the INES system.

IRS: GRS screens all IRS event reports and assesses their safety significance and the applicability of lessons learned and correctives actions for nuclear installations in Germany. The results of the initial assessments are summarized and commented in quarterly reports. These quarterly reports together with the corresponding event reports by IRS are distributed nation-wide to the regional regulators, expert organisations and licensees. In-depth analyses are performed for events of major importance for the safety of German NPPs. The results of the in-depth analyses together with recommendations regarding corrective actions and further measures are communicated by information notices.

On the basis of their in-depth analyses GRS selects national events to be reported to IRS. In close co-operation with the Federal Regulator and other parties involved, GRS prepares IRS event reports in cooperation with the licensee and forwards them to the system.

International operational experience is regularly presented to the competent working group within Federal States Committee consisting of federal and the regional regulators to consider or decide follow up actions..

General regulations require that also foreign operating experience shall be taken into account. Respective information on reportable events or significant operational experience from foreign plants is compiled and delivered by VGB PowerTech and using in the international reporting system operated by WANO.

A.5 Japan

Outline of regulators OEF System in Japan

1. Incidents and failures at the domestic nuclear plants

Reactor Regulation Law and the Electricity Utilities Industry Law require license holders to report the situation and measures taken to the incidents or failures occurred in commercial power reactors to the regulatory authority, NISA.

NISA 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 NISA. NISA evaluate the licensee's report if it is acceptable, being advised by subcommittee members of the Advisory Committee on Nuclear and Industrial Safety, who are experts

on operational management, inspection and radiation management. Sometimes, if NISA conclude that their own investigation is necessary other than the licensee, NISA will do so by itself in parallel with the licensee.

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

2. Incidents and failures at the overseas nuclear plants

JNES has the data base 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. JNES and NISA share these collected safety information. JNES makes screening of the incident and failure reports and analyze the screened issues. NISA and JNES discuss and review them at the "Safety Information Review Meeting". The members are the management level of NISA and JNES. The Safety Information Review Meeting is held periodically. At the meeting, it is discussed if those overseas incidents would affect to the domestic plants and if any regulatory actions should be taken to the domestic plants. When it is concluded to take regulatory actions, NISA and JNES discuss the issue with the licensees and sometimes require them to investigate and take the corrective actions when necessary. Furthermore, if the issue requires to amend or to establish codes or standards, it will be discussed with the industries and the societies.

A.6 Slovak Republic

Overview of Operating Experience System in the Slovak Republic

Legislative base of OEF in the SR, rules and general requirements:

Events at the nuclear installations (NIs) are categorized, reported, detected, investigated and published using of Regulation No. 48/2006 of the Nuclear Regulatory Authority of the Slovak Republic on Events at nuclear installations.

The Regulation No. 48/2006 enacts:

- detailed arrangement of categorisation of events at nuclear installations – deviations, incidents and accidents (INES classification)
- the manner of reporting the events to Authority
- the method of detection of the causes of such events
- the method of public information on incidents, accidents and transport incidents

The written report on deviations, incidents and accidents:

- time sequence of its development
- evaluation of systems and equipments related to the incident or accident, their function, faults and their effect upon the incident or accident

- consequences and its effect upon its surroundings, upon nuclear installation, upon operator's employees or persons staying at NI
- statements of expert units, operators and service staff
- safety evaluation (in-depth analysis, defence in depth violation)
- establishing direct causes and root causes
- corrective measures (short-term and long-term corrective measures, measures to prevent from repetition)
- evaluation by the INES degree and its justification

Event analysis at the Bohunice NPP (similar at the Mochovce NPP installations) – practice

Systematic methodology to determine root causes of the event –HPES:

- safety significant events
- events reported to NRA
- similar family of the events

Experience oriented approach and routine investigation:

- low level events
- near misses

Event investigation group:

- 2 engineers and 1 technician in NS department
- people in responsible OP and Maintenance department
- training HPES techniques
- independence
- event database
- Plant Event Committee

Corrective actions programme:

- the result of the event analysis process
- total number of CA proposed by plant event committee in actual year
- the average percentage of the CA fulfilment in actual year (average about 85%)
- plant implements large modernisation program

Key elements of OE process:

- management support of OE process
- blame - free atmosphere
- communication of the management expectations to the plant staff
- personnel have to be informed back about the results of their reports
- good documentation of the events

Positive feature regarding OEF:

- Annual meetings with OEF staff from Dukovany NPP and Temelin NPP (Czech Republic) with similar type of reactors

Problems, weaknesses regarding OEF:

- not enough near misses and low level events is reported
- people are not willing to report their mistakes (fear of punishment ...)
- large amount of information from external sources (WANO, IRS...) at 2 engineers and 1 technician in NS department
- screening of the external experience is not centralised for WWER reactor operators (idea for specific clearinghouse...?)
- people use to accommodate/deform the event investigation techniques – repetition of the training is needed

A.7 Spain

Operating Safety Experience Feedback (OSEF) in Spain

Objectives of CSN Operating Experience Program

- To ensure that operating experience is used effectively to promote the safety of NPPs
- Input for regulatory actions and decisions making criteria

Spain Regulatory Requirements

The Spanish licensees are abided by the Technical Instruction IS-10 "Event Notification Requirements at Nuclear Power Plants" that states reportability criteria, format, timing, etc. of reports.

What is reported under such an instruction is called Event Report (ER). ERs have to be sent to both regulatory body and all other Spanish NPPs.

The instruction IS-10 contains 36 notification criteria grouped in eight types: registries, health and safety at work, releases, technical specifications, operation, safety systems, risk situations not included in licensing documents and external events. According to such instruction, events have to be notified as soon as possible, some of them within one hour after its occurrence and others within 24 hours of occurrence.

All events reportable in less than 24 hours require a 24 hour confirmation report containing expanded information.

The licensee shall send a 30 day report of any reportable event. The report can be delayed until 45 days to include root cause analysis conclusions. That report shall contain the information according to a prescribed format which includes: plant identification, time of occurrence, time of reporting, reporting criteria applicable, initial conditions, safety assessment, root cause conclusions, identification of human failures, identification of equipment failures and corrective measures.

In addition, the licensee shall send to CSN, and other licensees, an Annual Report of OSEF, as required by licensing conditions, containing information on the status of implementation of every corrective measure stemming from:

1. ERs
2. ERs of other Spanish NPPs
3. Experiences communicated by the suppliers of safety equipment (mainly the NSSS vendor)
4. Significant Operating Experience Reports (SOER), and Significant Event Reports (SER), from the Institute of Nuclear Power Operations (INPO) or WANO.
5. Any other event required to analyze by CSN

OSEF is based at NPP level, i.e., licensee is responsible for analyzing its events, issuing its ERs and other required reports, as well as analyzing all external Operational Experience (OE) applicable to its plant.

The main role of CSN on OSEF is to check out that the system works as intended, to promote improvements of the system and to supply some specific inputs. At times, the CSN steps into the analysis of a specific event if it estimates that the issue may be very safety significant, or has generic implications, or actions undertaken by the plant are insufficient.

National OEF

1. Reporting, storage and screening of events

As it was mentioned before, licensees have to notify ERs to CSN. The number of ERs varies very much from plant to plant, even from year to year. The average rate of reporting is 8 ERs per reactor-year.

CSN is owner and is in charge of filling up a Database containing more than 1400 ERs collected from 1990. Licensees don’t have access to this database.

Regarding the equipment reliability, Licensees have to report also safety related component failures, according to defined criteria, to a national data bank called DACNE. This databank is owned and managed by UNESA (Union of Electrical Utilities of Spain) and CSN has access to its data. The data bank was started to provide the specific plant data required in the Probabilistic Safety Assessment (PSA). Recently it has been extended to cover other activities, like safety performance indicator program.

Another branch of DACNE is the Bank of Operational Events, that collects electronically all ERs of Spanish plants plus non scheduled power reductions bigger than 10%.

Each licensee sends its ERs and Annual Reports on OSEF to UNESA, who distributes them among all Spanish licensees and a national training centre, owned by the electrical utilities, called TECNATOM.

All licensees have procedures stating the formal process to retrieve, store, distribute and analyze both in-house and external experiences. Internal ERs are reviewed by the Plant Nuclear Safety Committee of the licensee and the senior management is involved in monitoring OSEF.

CSN receives all ERs of Spanish plants through the Emergency Room (SALEM). SALEM is designed to activate the CSN's emergency response if needed and provide quick information to the staff on ERs.

CSN screens, files and analyzes independently all ERs. Recently, CSN has developed a new process for events prompt assessment which objective is to provide immediate CSN's response whenever the event is deemed potentially safety significant. If the event is considered safety significant enough (according to expertise judgment and aiming specific criteria), an Event Inspection Team (EIT) is dispatched. CSN event inspection teams are set off as soon as possible, desirably within a few days after the event.

CSN counts on its Events Revision Panel (ERP) that meets monthly, to ensure medium term assessment and systematic treatment of all events at Spanish NPPs). At the ERP every event is reviewed from their safety significance and potential generic impact point of view. The ERP is chaired by the Head of the Area of Operational Experience and Training and is made up of representatives from the Areas of Operations, PSA & Human Factors, Core Physics, Safety Systems, Mechanical and Chemical Engineering, Electrical and Instrumentation & Control Engineering, Auxiliary Systems and Maintenance. Most safety significant events have already been dealt with by CSN when they reach the ERP by the project manager, the resident inspector or different technical areas. The ERP appoints those events considered “significant”, according to deterministic and probabilistic criteria (conditional core damage probability higher than E-5), usually 0.5 to 0.8 per reactor-year and those considered generic. For those rated “significant”, the ERP ensures that appropriate corrective actions have been provided either on licensee devices or on CSN requirement. For those classified as “generic”, ERP usually proposes a generic letter to the affected licensees, telling the cause of the event and requiring its analysis and implementation of adequate corrective measures.

2. Analysis of events

Human Performance Enhancement System (HPES), developed by INPO, is the methodology currently used by most Spanish licensees for simple events, although the approach varies from plant to plant. Most licensees apply HPES in a systematic approach to all ERs. For specific significant events which involve human and organizational factors Management Oversight and Risk Tree (MORT) is applied.

An Event Inspection Team (EIT) is a formal action carried out by a team of CSN staff members who go to the plant, and licensee headquarters if needed, interview plan personnel, visit places of the facility and gather copies of records, documents and other matters of fact. The EIT writes down an inspection report that is an official and public document having legal value, where the facts found out are recorded. After the inspection report, an in depth analysis report is elaborated and shall contain conclusions on safety significance, generic implications (if any), root cause analysis and required corrective measures. Such conclusions are communicated to the licensee that is formally required to implement the required corrective measures.

CSN event investigations make use of MORT methodology. A full events and causal factor chart is developed when the event is very complex and organizational matters are involved. Barrier analysis, fault trees, change analysis are usual techniques used by CSN when conducting its evaluations. CSN picks events to investigate regarding their actual or potential safety significance; the Area of Operational Experience and Training typically performs 1 to 4 event investigations in depth per year, making formal use of MORT methodology once a year.

3. Trending and Review

CSN uses Traditional Performance Indicators, inspired in the old NRC indicator program (pre-2000), for identification of trends. This system also allowed comparing Spanish plants performance vs. American one, Spanish plants among them, etc. The indicators take into account in this program are: *Automatic scrams while critical, Safety system actuations, Significant events, Safety systems failures, Forced outage rate (%), Equipment forced outages/ 1000 commercial critical hours, Collective radiation exposure and Cause codes.*

Among those indicators, cause codes indicator has been revealed as the most useful tool for identification of trends among Spanish plants and for detection of latent failures. This indicator contains the following subcategories: Administrative Control Problems, Errors of Licensed Operator, Errors of Other Personnel, Maintenance Problems, Problems in design/construction, installation, fabrication and Miscellaneous.

Besides these traditional performance indicators, CSN runs a set of performance indicators similar to those of the NRC ROP.

4. Recommendations and decisions process on actions

It is up to the licensees to analyze events and conclude corrective measures to implement. The annual report includes such corrective measures, its status and foreseen date for implementation

The senior management of the utility orders audits to the OSEF system, usually every other year. The audit is conducted by personnel belonging to Quality Assurance and an engineer not related with the plant. One of the main focuses of such an audit is to implement on time the corrective measures.

Most licensees have in place a sort of “Operating Experience Committee” that meets regularly, in several cases quarterly, aimed at the activation of corrective measures implementation stemming from both internal and external OE analysis.

Unless very safety significant corrective measures are planned, CSN approval is not required prior to implementation. The rule is that CSN approval is required only if licensed documents, such as Safety Analysis Report or Technical Specifications, have to be modified or the probability of any accident can increase due to the planned corrective action.

CSN audits the efficiency of corrective actions resulting from the OES and including in the Corrective Actions Program. Obviously, if the corrective measures are implemented on CSN's request, the regulatory body carries out a closer follow up.

International OEF

As members of INPO, WANO and NSSS owners groups, Spanish licensees report these international organizations according to applicable requirements. So do they with suppliers of safety equipment.

CSN elaborates event reports to the IRS according to the reporting criteria of the system. CSN elaborates generic letters to all Spanish plants describing specific Spanish or international events, their roots causes and lessons learnt requiring their analysis when it reaches conclusions different to licensee's ones.

Licensees receive INPO, WANO, safety equipment suppliers' reports on OEs containing recommendations when applicable, as well as all IRS reports. UNESA collects and distributes to licensees all information coming from INPO, WANO, IAEA and NEA.

Research institutions and engineering companies do not have OSEF information for granted. They only receive specific information when needed to develop a determined work contracted by the regulator, a licensee or any authorised recipient of that information.

Analysis of IRS reports is not mandatory in Spain to the licensees. CSN endorses those IRS reports considered of interest.

In the CSN, Nuclear Safety Director, Radiological Protection Director, Deputy Directors, Resident inspectors and Heads of Division have access to the IRS web page.

WGOE information gathered in the meetings is published in the internal CSN WEB.

A.8 United Kingdom

UK operating experience feedback system

UK regulatory regime

1. The Nuclear Installations Act 1965 (as amended) and underpinning Health and Safety at Work etc Act 1974 provide the legal basis for the nuclear safety regulation in the UK. Within this permissioning "goal setting" regulatory framework, licence applicants wanting to operate a nuclear site must first obtain a licence from the regulator. The licence requires licence applicants to make arrangements for meeting defined safety goals to show that the nuclear hazard on the site will be managed safely. Licences for all UK licensees have a standard set of 36 licence conditions covering various aspects of nuclear safety.

2. The regulator 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:

    a. approval of licensees' arrangements.

    b. specification of changes to licensees' arrangements.

    c. regulatory enforcement notices.

    d. prosecution.

UK Events

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

   a. categorise events, all the way down to near misses, according to safety significance.

   b. report significant events to the regulator within timescales related to safety significance.

   c. investigate incidents depending on actual or potential harm.

   d. analyse trends and patterns for improvements.

4. The regulator 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.

5. Licensee data on reportable events is collated by the regulator, 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 the regulator's senior management of emerging issues, to target regulatory interventions and, ultimately, to provide public reassurance.

6. The regulator actively encourages licensees to share their operating experience and learn lessons from the nuclear and other industries both nationally and internationally.

International events

7. The regulator 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, the regulator:

   a. assesses the relevance of national and international events,

   b. inputs relevant UK events to international systems in a timely manner.

   c. disseminates information within the regulatory body and to licensees.

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

A.9 United States

Reporting Requirements

One of the many elements contributing to the safety of nuclear power is the feedback of operating experience (OpE) 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 immediate 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, confirming licensing bases, 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.

NRC modified these rules in 1992 and 2000 to delete reporting requirements for some events that were determined to be of little or no safety significance. The modified rules continue to provide the Commission with reporting of significant events for which NRC may need to act to maintain or improve reactor safety or to respond to heightened public concern. The modified rules also better align requirements on event reporting with the type of information that NRC needs to carry out its safety mission. NRC issued Revision 2 to NUREG-1022, "Event Reporting Guidelines, 10 CFR 50.72 and 50.73," concurrently with the rule changes.

NUREG-1022 is structured to assist licensees in achieving prompt and complete reporting of specified events and conditions. It includes a comprehensive discussion of each specific reporting criterion with illustrative examples and definitions of key terms and phrases.

National Operating Experience System

Operating experience is reported to or identified by NRC 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 operating experience at foreign facilities. NRC staff systematically screens nuclear reactor related operating experience for safety significance and generic implications. Staff also determines the need for further action and application of lessons learned related to plant operating experience.

The revised Operating Experience Program was launched in January 2005. The agency's fundamental OpE program objective is to collect, evaluate, communicate and apply operating experience information to achieve its principal safety mission: protect people and the environment. To support this objective, the concept of a Clearinghouse was instituted. The Clearinghouse's responsibilities are to collect, store, screen, and communicate operating experience; conduct and coordinate the evaluation of operating experience; track the application of operating experience lessons learned; and coordinate the NRC operating experience activities with other organizations performing operating experience functions.

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

- Clearly defined and communicated roles and responsibilities.
- Efficient collection, storage, and retrieval of operating experience.

- Effective screening of operating experience for follow-up, evaluation.
- Timely communication of operating experience to stakeholders for information or evaluation.
- Timely and thorough evaluations of operating experience 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 operating experience.
- Periodic assessments of the operating experience program to determine its effectiveness and to identify needed improvements.

When the revised operating experience program was launched in 2005, the staff implemented a number of recommendations, including better defined roles and responsibilities, a central Clearinghouse, and improved collection, storage and retrieval of operating experience.

The operating experience process is broken down into four phases, which address all of the attributes of an effective operating experience program. These phases are explained in detail in Management Directive (MD) 8.7, "Reactor Operating Experience Program." The definition of each phase and the significant operating experience program activities and changes related to each phase are summarized below.

- Phase 1 - The first phase of the operating experience process involves collecting, storing, and making operating experience information available to the NRC staff. Through the use of information technology, the NRC has made significant advances in this area, enabling staff to locate and evaluate operating experience information with ease. The collected operating experience includes those inputs considered new information regarding recent events or conditions at a plant, as well as previously "analyzed" 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 operating experience. The previously "analyzed" information contains insights and lessons-learned related to the subject operating experience topic. Sources of this type of operating experience information include generic communications, inspection findings, Institute of Nuclear Power Operations (INPO) reports, and other OpE-related studies and reports.
- Phase 2 - The second phase of the operating experience process requires the Clearinghouse to screen a new piece of operating experience information to determine if it has potential significance. The NRC has formalized the screening process through the program guidance documents to ensure a more systematic approach to reviewing operating experience. A set of screening guidelines that considers risk and qualitative factors such as potential generic implications, adverse trends, or new phenomena (e.g., novel failure mode, material degradation) are applied to screen-in those operating experience inputs that are potentially significant and deserving of a more detailed evaluation. If operating experience information is screened-in for further evaluation, it becomes a formal assignment, and a Clearinghouse staff member gathers additional information in preparation for evaluation of the issue. Operating experience information that does not meet any of the screening guidelines is screened out but may be communicated to cognizant technical experts or inspection staff. It is also tracked to identify any adverse trends.
- Phase 3 - After operating experience information is screened-in 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 operating experience 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 operating experience 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 of the screened-in item and recommendation(s) for further action, the Clearinghouse management decides, in consultation with other appropriate NRC managers when necessary, whether or not to adopt the recommendations for applying the subject operating experience information. Identified options for applying the lessons learned consist of: (1) communicating operating experience lessons learned to various internal and/or external stakeholders through reports, briefings, e-mail listservs 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 programs such as inspection, oversight, licensing, incident response, security, rulemaking, and research. Application always involves communication of the issue to internal stakeholders. Less common outcomes of operating experience issue recommendations are rulemaking or transfer to the agency generic safety issues program.

An internal website dedicated to providing a centralized source for accessing reactor operating experience information was created when the program was launched. This website serves as a gateway to NRC's operating experience document collections, contacts, search tools, sources, and reference material. This website has been continuously improved to ensure staff can quickly access the proper information. In addition, an Operating Experience Community forum was created to quickly disseminate relevant operating experience to technical staff. NRC also issues about 60 generic communications each year to alert the industry to safety concerns. 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 Operating Experience

The NRC receives information regarding international operating experience 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 described above which are used for domestic OpE. The screening of international events is performed to determine if the information has applicability to the current fleet of operating reactors. Several international events have been shared internally with cognizant technical staff through the web-based OpE Community forum. In addition, a few international events have been screened in for further evaluation due to their risk significance and potential generic applicability to the current operating reactors.

The NRC shares domestic OpE with the international community. Each reported domestic event is rated daily using the INES. 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 (reactor-related generic communications) each year to the WBIRS, which is available to regulators and other nuclear organizations in foreign countries. The NRC also participates in various international meetings to share nuclear power plant OpE data and to learn about the OpE programs of other countries.

APPENDIX B: EXISTING IOEF SYSTEMS

B.1 International "Learning from Experience" Systems

- **Incident Reporting System (IRS)**

  Overview: The IRS is an international system jointly operated by the IAEA and the OECD/NEA, through which thirty-one 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 learnt 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 operating experience 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: At present FINAS is a ***paper based*** system and has been in the process of converting into a web based system over the past few years. It should be 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 organizations. 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 organizations 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 it 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)[3]. 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.

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

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 (WGPCNEWS)**

  Overview: WGPCNEWS is an email discussion list restricted to members of the CNRA Working Group on Public Communication for Nuclear Regulatory Organisations (WGPC) [7]. 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, 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: WGPCNEWS 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 International Common Cause Failure Data Exchange (ICDE)
- OECD/NEA Fire Project (FIRE)
- OECD/NEA Piping Failure Data Exchange (OPDE)
- OECD/NEA Computer systems Important to Safety (COMPSIS)

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: IOEF EXPERT GROUPS

C.1 Overview

Summary documents discussing the most important events or events relater 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 Operating experience systems. IAEA also conducts workshops and provides training in their member states.

The NEA/CNRA runs a permanent working group on operating experience (WGOE). The WGOE provides among other things generic reports on safety concerns related to operating experiences and organizes 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 IOEF Groups

- N**EA/CNRA Working Group on Operating Experience (WGOE)**

  WGOE meets annually to share operating experience and knowledge, provide expert insights to reach timely conclusions on trends, lessons learnt and in the short and medium term, implement effective responses. In the longer term, the WGOE promotes proposals for the re-assessment 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.

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 review 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 IOEF. 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 WGPCNEWS 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 IOEF 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 exchanges 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 IOEF 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.