

International operating experience

B. Kaufer, K. McDonald*

Some 30 years ago in October 1978, the Steering Committee for Nuclear Energy began discussing the exchange of information on operating experience gained from light water reactors. It is worth noting that this discussion took place prior to the Three Mile Island accident, showing that the Steering Committee had foreseen the importance of this issue. Two immediate benefits could be drawn from using operating experience feedback: 1) improved safety, and 2) improved plant availability and reliability. A Committee on the Safety of Nuclear Installations (CSNI) was set up and created a tool to collect such feedback. This tool is now known as the Incident Reporting System (IRS).

In 1983, the International Atomic Energy Agency (IAEA) joined with the NEA to jointly operate the IRS. Over the past three decades, the collection and analysis of operating experience has expanded and become more highly developed. Lessons learnt about organising such a system have been extended to other nuclear installations including fuel cycle facilities (the Fuel Incident Notification and Analysis System – FINAS) and research reactors and laboratories (the International IRSRR). In addition, through the World Association of Nuclear Operators (WANO) the nuclear industry has set up an independent database to collect and analyse operating experience.

In response to safety concerns over the last decade, additional NEA project databases have been established to look in greater depth at specific areas

such as piping, fires and computer-based systems. In parallel with the establishment of these databases for operating experience, the NEA and the IAEA have set up a number of international information systems beginning with the International Nuclear Events Scale (INES) in the early 1990s. As an indication of the success of these systems, today over 30 countries provide input to the IRS and over 3 000 events have been recorded.

Developments in operating experience feedback have led to improved safety performance. However, in recent years questions have been raised as to whether the information is being used proportionately to its importance. In a series of international conferences and discussions in the NEA Committee on Nuclear Regulatory Activities (CNRA), the CSNI, the NEA Working Group on Operating Experience (WGOE) and among IRS coordinators at their annual information exchanges, participants have asked if the lessons learnt in the past have subsequently been forgotten, and whether countries actually consider foreign operating experience as relevant to their own situation.

In order to obtain a better understanding of the issues, in 2004 the CNRA formed a senior-level expert group which produced a “Green Booklet” identifying the *Regulatory Challenges in Using Nuclear Operating Experience* (OECD/NEA, 2006). This report, along with other high-level discussions taking place around the world, resulted in the CNRA tasking the WGOE to review existing international operating experience feedback (IOEF) processes and networks, and their connections with national operating experience feedback systems, as well as to provide recommendations for more effective use of IOEF to improve nuclear safety.

The results of the WGOE review have been published in a CNRA report on “The Use of International Operating Experience Feedback

* Mr. Barry Kaufer (barry.kaufer@oecd.org) works in the NEA Nuclear Safety Division. Mrs. Kulvinder McDonald (kulvinder.mcdonald@hse.gsi.gov) works at the UK Health and Safety Executive and is the Chair of the NEA Working Group on Operating Experience (WGOE).

for Improving Nuclear Safety” (NEA/CNRA/R(2008)3). This report considers all existing international systems (e.g., IRS, FINAS and IRSRR) which together cover all nuclear facilities. The report states that development of an IOEF process and a network for implementing this process 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 potentially serious hazards. There is evidence to show that lessons have been learnt from many events, both within and outside the nuclear industry, and from corrective actions implemented to improve nuclear safety. Nevertheless, the report acknowledges a need for continuous improvement.

In discussing the role of the regulator, the report emphasizes that the responsibility for safely operating the nuclear facilities lies with the operator. 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 national OEF is the basis for IOEF. Accordingly, without high-quality national OEF it is not possible to ensure 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.

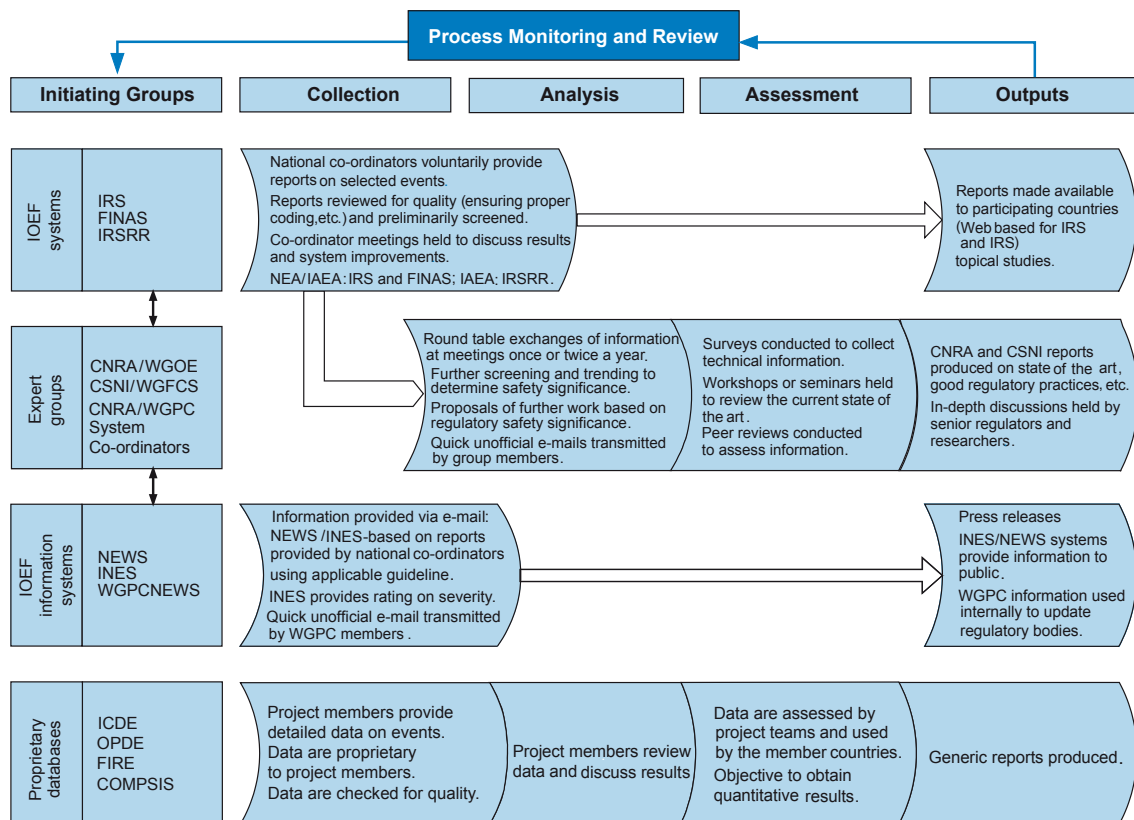
Using the main elements outlined in the IAEA Safety Guide NS-G-2.1, which are adapted for international use, the CNRA report reviews the current state of national and international operating experience systems. It identifies positive and negative aspects of existing international systems, assesses the regulatory objectives and makes 21 recommendations for IOEF enhancements to meet these objectives.

The report identifies some notable strengths of existing IOEF systems: availability of web-based event reporting systems for the IRS and the IRSRR and supporting infrastructures and exchanges in the context of international networks, conferences

and workshops to provide guidance and analysis of specific issues. The report did, however, find several areas to be particularly weak at the international level in regard to identified regulatory objectives; these include lack of overall strategic oversight of IOEF, lack of a web-based system for FINAS, inability of some current systems to capture lessons learnt, and inadequate screening and trending of events for determining priorities and programmes of work.

The recommendations are divided into categories including strategic issues, reporting practices, screening of events for safety significance, regulatory investigations and responses, and dissemination and exchange of information. Some of the key recommendations are as follows:

- In light of the necessary interfaces between national and international systems, NEA members should, as soon as possible, develop national OEF systems to meet international standards of best practice.
- The chairs of the various IOEF groups along with the chairs of the NEA working groups should form a Management Board to provide strategic oversight for clarifying the roles of the various IOEF organisations, improving co-ordination of their work and ensuring the implementation of changes.
- The IOEF operating systems should concentrate on collecting high-quality information on events.
- The working groups should focus on analysing events and determining their safety significance from a regulatory viewpoint.
- 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.
- NEA working groups should annually screen events for safety significance, lessons learnt and applicability of regulatory follow-up.
- IOEF organisations should provide technical experience and assistance (resources) to enable better quality reporting and to assist countries in starting or increasing their reporting of events.
- NEA working groups 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 learnt.
- 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).



The WGOE also notes that a unique opportunity exists today in relation to the new build being considered by many NEA member countries. The establishment of an IOEF system that can meet the regulatory needs as stated within the report would in effect provide a new, reliable, effective and efficient knowledge base to capture lessons learnt in the context of constructing and operating new generation III+ nuclear power plants. Undertaking system development at this time would provide regulators with a baseline departure for monitoring the next generation of plants, incorporating the advantages of experience gained from the past use of OEF.

In view of this opportunity and the high priority assigned to such work by the CNRA, the new NEA Working Group on the Regulation of New Reactors is developing a database to compile feedback from construction experience, which can be used in both the short term and long term for improving nuclear safety.

Over the past few years NEA experts have noted that almost all of the recent, significant events

reported at international meetings have occurred earlier in one form or another. Counteractions are usually well known, but it would appear that the relevant information does not always reach end users or that corrective action programmes are not always rigorously applied. Thus, conditions for maintaining the recent good operational safety performance are to ensure that operating experience is promptly reported to established international reporting systems and that the lessons from operating experience are actually accessed and used to promote safety.

The 2008 CNRA report provides the impetus for advancing towards improved international operating experience feedback. The WGOE has established an implementation plan, including responsibilities and timescales, for the report recommendations. This plan received general support from the CNRA at its summer 2008 meeting. The CNRA has tasked the WGOE with reviewing progress against report recommendations biannually to ensure that momentum on IOEF improvement is maintained, with resulting benefits for nuclear safety on a global scale. ■