

The European Clearinghouse for NPP Operating Experience Feedback operated by EC-JRC: Networking European Nuclear Regulators and TSOs

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Abstract. Operating Experience Feedback is one of the ways of improving nuclear safety of operating nuclear power plants. In 2008 a regional initiative, the European Clearinghouse, was set up to support nuclear safety regulatory authorities of EU Member States and their Technical Support Organizations, international organizations and the broader nuclear community in their effort to enhance nuclear safety through lessons learned from operating experience of nuclear power plants. The European Clearinghouse is organized as a Network and is operated by a Central Office located at the Institute for Energy and Transport in the Joint Research Centre of the European Commission. The Clearinghouse maintains its own database of unusual events in NPPs considered being relevant for safety. This database brings together publicly available information from regulatory bodies and searches major data collections such as the USNRC Licensee Event Reports. In Topical Studies the Clearinghouse generalizes findings of generic event families by identifying root causes, providing recommendations and by highlighting lessons to be learned. Examples of these and other recent activities of the Clearinghouse are discussed.

1. Introduction

Several participants at the conference on Improving Nuclear Safety through Operating Experience Feedback that was held in Germany in 2006 [1] discussed the possibility and benefits of joined efforts at European level to enhance the effectiveness of Operating Experience Feedback (OEF). As a result a regional initiative was set up in 2008 in support of EU Member States' nuclear safety regulatory authorities, but also EU Technical Support Organizations (TSO), international organizations and the broader nuclear community, to enhance nuclear safety through improvement of the use of lessons learned from operational experience of nuclear power plants (NPPs). The experience of US NRC Operating Experience (OE) Clearinghouse showed that the establishment of a centralized OE Clearinghouse for a particular region in the world can yield significant benefits due to optimized use of resources and improved feedback of lessons learnt. Due to differing regulatory regimes in the EU member countries, significant diversity of the NPP designs and different languages used, the establishment of the European Clearinghouse was more complicated and challenging and needed strong support and commitment from the EU nuclear safety regulatory authorities.

The Joint Research Centre (JRC) of the EC has been chosen to play a central role in establishing and running of the European Clearinghouse for OEF. The choice allowed use of well-established JRC working mechanisms, means and technical expertise in the field to promote better cooperation and more effective use of the limited national resources and to strengthen the capabilities for OE analyses and dissemination of the lessons learned.

The European Clearinghouse is organized as a Network operated by a Central Office located at the Institute for Energy and Transport that is part of JRC of the European Commission. It

involves currently 17 European nuclear safety regulatory authorities and 3 major European TSOs.

The European Clearinghouse was challenged during and in the aftermath of the Fukushima Daiichi accident and provided daily technical updates on the local situation for dissemination in the EU member States [2].

2. Objectives of the European Clearinghouse

The objectives of the European Clearinghouse are set out in the Terms of Reference of the Clearinghouse. Among them are:

- Strengthening co-operation between European safety authorities, Technical Support Organizations (TSO) and the international OEF community to collect, evaluate and share NPP operational events data and apply lessons learnt in a consistent manner throughout member countries.
- Establishment of European best-practices for assessment of operating events in NPPs.
- Coordination of OEF activities and maintenance of effective communication between experts from European regulatory authorities involved in OEF analyses and their TSO.
- Strengthening European resources in operating experience.
- Support for the long-term EU research and policy needs on NPP Operating Experience Feedback.

3. Scope and working method

The Institute for Energy and Transport (IET), one of seven institutes making up the Joint Research Centre which is a Directorate General of the European Commission (DG JRC), is the Centralized Office (CO) of the EU Clearinghouse on OE for NPPs. The European Clearinghouse is governed through two main bodies; the Technical Board (TB) and the Steering Committee (SC).

The SC is the decision body of the EU Clearinghouse. The SC mandate is to approve the annual work programme proposed by the OA, as well as the final version of the deliverables prepared in the framework of the EU Clearinghouse, before their formal distribution.

The Steering Committee has a right of initiative to propose areas of special interests on NPP OEF for further development. The SC approves or rejects new candidate members and observers to the TB, as well as to the SC.

The Technical Board is a discussion forum for the working programme and the work performed. It consists of safety authorities, TSOs and international organizations such as IAEA, OECD-NEA and DG-ENER of the European Commission.

The scope of activities of the European Clearinghouse was, inter alia, agreed to

- fostering the collection of operating experience from European nuclear regulators or operators, assessing its potential value for learning lessons, and ensuring that events relevant to global OEF are reported systematically and in consistent manner to the IRS system jointly operated by NEA and IAEA;
- distributing selected events to appropriate professional groups in Europe for detailed event analyses;

- evaluating the IRS reports and alerting the national regulatory bodies on the most relevant events and significant corrective actions implemented;
- providing topical studies of events with similar features or causes, conducting precursor studies of events at selected European nuclear power plants, facilitating trend analyses to enable better understanding of the main patterns from operating experience events.

The Clearinghouse activities can only be carried out in close collaboration with the international community. As Fig. 1 illustrates that Technical Support organizations or TSOs play a central role in obtaining and analysing information about operating experience: three major European TSOs (IRSN from France, GRS from Germany and Bel V from Belgium) are members of the Technical Board and advise the Clearinghouse about technical issues and in many occasions, JRC and TSO experts work together to elaborate comprehensive topical studies.

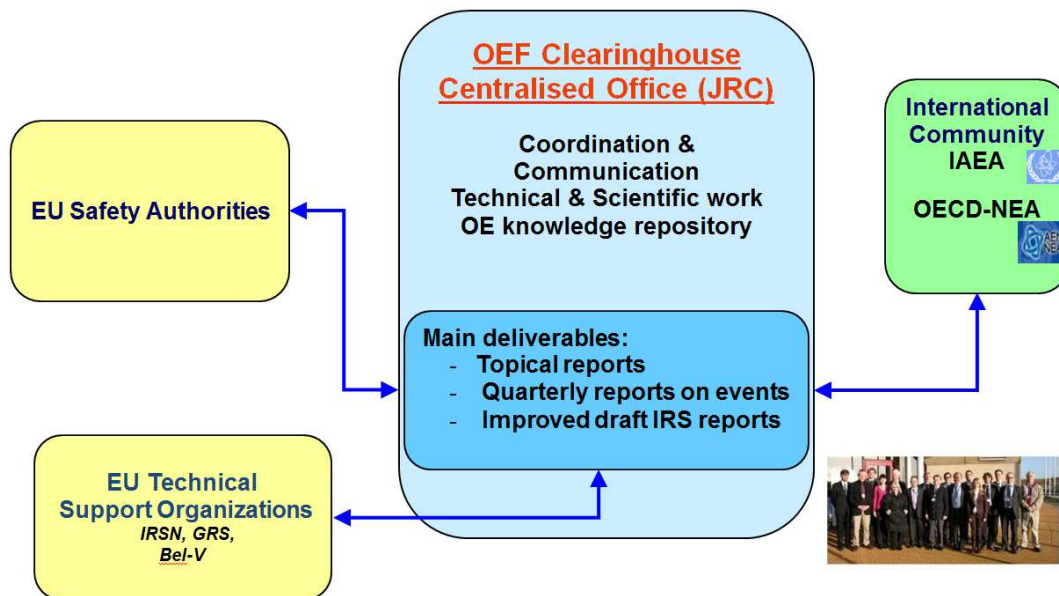


Fig. 1 Relations of the Clearinghouse Centralised Office to the international community

4. Major activities

The activities in the frame of the European Clearinghouse include different approaches and are presented according to their relevance in more detail.

4.1. Topical studies on preselected subjects related to NPP operating experience

Topical Studies provide in-depth assessment of selected safety relevant subjects for which operating experience has been reported. These studies cover often 200 events or more. They typically provide statistical analyses, corrective actions, lessons to be learned and recommendations to void recurrence of events. The Clearinghouse project has finished 14 Topical Studies with one report being under final review. A summary of the completed studies is given in Fig. 2.

Studies on events related to external hazards in 2012 [3] or on emergency Diesel generators in 2013 [4] are prominent examples.

The study on external hazards analysed 230 events from several databases classified into different categories according to the initiating event such as extreme weather conditions, extreme heat sink conditions, external flooding, external fires, lightning strikes, fouling, chemical events and man-induced events. In addition to the recommendations and lessons learned specific to each type of external hazard, the study allowed raising several generic issues.

The study on emergency Diesel generators applied a similar approach and screened events over a time from 1990 to 2010. Special attention was given to common cause failures (CCF) as observed with the Fukushima Daiichi NPP accident. Several events were assessed which could be considered as important precursor for potential CCF type failures (e.g. icing events compromising cooling, harsh weather conditions, design deficiencies or insufficient qualification for earthquakes). The study concludes with recommendations in six main areas including preventive maintenance and testing, protective devices, reliability and external events.

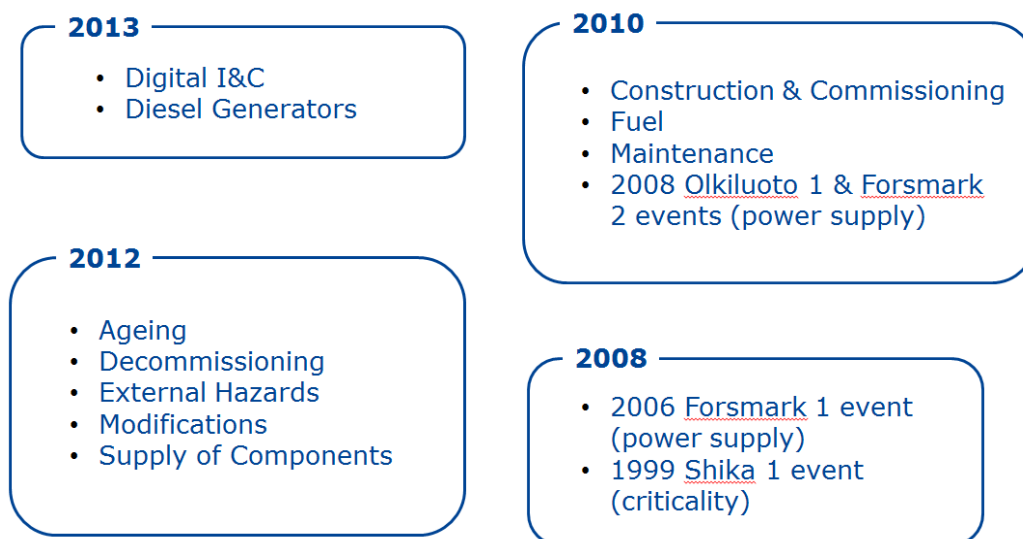


Fig. 2 Examples of Topical Studies carried out by the Clearinghouse

Fig. 3 provides an overview of the studies under development or review and the plans for 2015.

As already mentioned the topics of all studies are based on available reported operating experience, and this find its reflection in the studies planned for 2015.

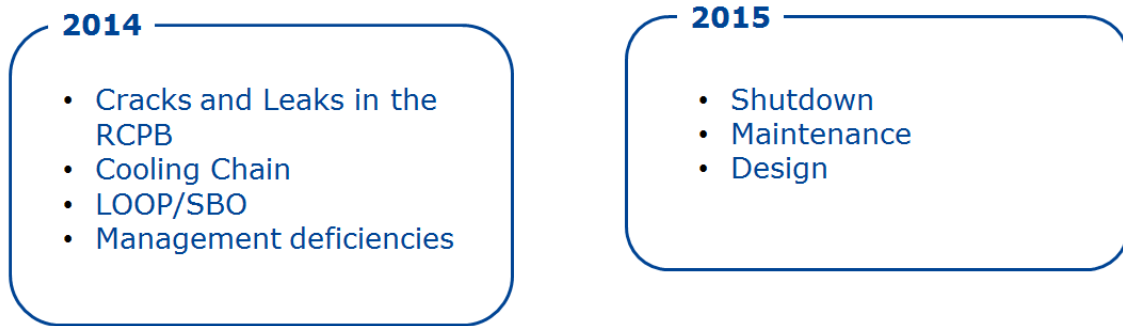


Fig. 3 Topical Studies in progress or under consideration

All Topical Study reports can be found on the Clearinghouse website. For each of these reports a short document summarizing the findings of the study is provided and is freely accessible after registration. The Topical Study reports can also be obtained from the IAEA IRS website.

4.2. Contribution to improve the quality of event reports sent to the International Reporting System

The International Atomic Energy Agency (IAEA) together with the Nuclear Energy Agency (NEA) of the OECD operates the International Reporting System for Operating Experience (IRS). Thirty-one participating countries share operating experience to improve the safety of nuclear power plants and submit event reports on unusual events relevant for safety.

The Clearinghouse helps ensuring quality and consistency of these event reports to the IRS system by reviewing draft reports upon request of Clearinghouse member countries.

4.3. Quarterly reports on Operating Experience

Quarterly reports provide timely information to the Clearinghouse members and the general interested Community about recent significant events, with a real or potential impact on nuclear or radiation safety. These reports are intended to be complementary to other international reporting systems such as the International Atomic Energy Agency (IAEA) IRS, rather than duplicate the information provided by there.

Quarterly reports compile NPP events that were reported publicly. Each quarter, around 100 events are screened by a selection committee which decides about five or six more relevant events to be published in the quarterly report. All screened events are uploaded in the Clearinghouse database.

4.4. Development, maintenance and population of a database for storage of Operating Experience related information

The Clearinghouse maintains a website and a database which can be found under the following address: <https://clearinghouse-oef.jrc.ec.europa.eu/> .

This platform provides access to all relevant resources of the Clearinghouse project. It is organized in three layers. The entry level is open to all visitors of the platform and provides comprehensive information about Clearinghouse and its objectives but also Latest news, Next Activities and Interesting Links including quarterly reports and other documents.

The restricted and confidential levels require special credentials and were established according to the character of documents provided there.

The platform provides also access to a database which contains the events screened for the various activities of the Clearinghouse such as quarterly reports.

4.5. Training in the field of Root Cause Analysis and event investigation

Each year, the European Clearinghouse provides a 5-day training course about Root Cause Analysis and event investigation, aimed mainly for Regulatory Bodies and TSOs staff. This training combines lectures and practical exercises of event investigation, including interviews.

5. Conclusion

Six years of operation of the European Clearinghouse have shown the added value of the initiative and further areas are being developed such as statistical tools to identify topics on which the efforts should focus in the future.

Numerous Topical Studies on selected safety relevant subjects for which operating experience has been reported and Quarterly Reports or newsletters have been published by the European Clearinghouse and contribute to further strengthening nuclear safety in the operation of NPPs.

Beyond the tasks carried out by the Centralized Office of the European Clearinghouse, the key aspect of the achievements obtained so far is the successful cooperation of European Regulatory bodies, European TSOs and the JRC.

References

- [1] OECD Nuclear Energy Agency (NEA), Improving Nuclear Safety through Operating Experience Feedback, International Conference, Cologne (Germany), 2006.
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- [3] Ramos, M., Zerger, B., External Hazards related events at NPPs, Topical Operational Experience Report, European Commission, Joint Research Centre, Institute for Energy and Transport, 2012.
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