



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

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# Outline

- Background information on European Commission and JRC;
- What is the Clearinghouse?
- The objectives and working scope;
- The activities of Clearinghouse project;



European Court of Auditors

The Council of the European Union or Council

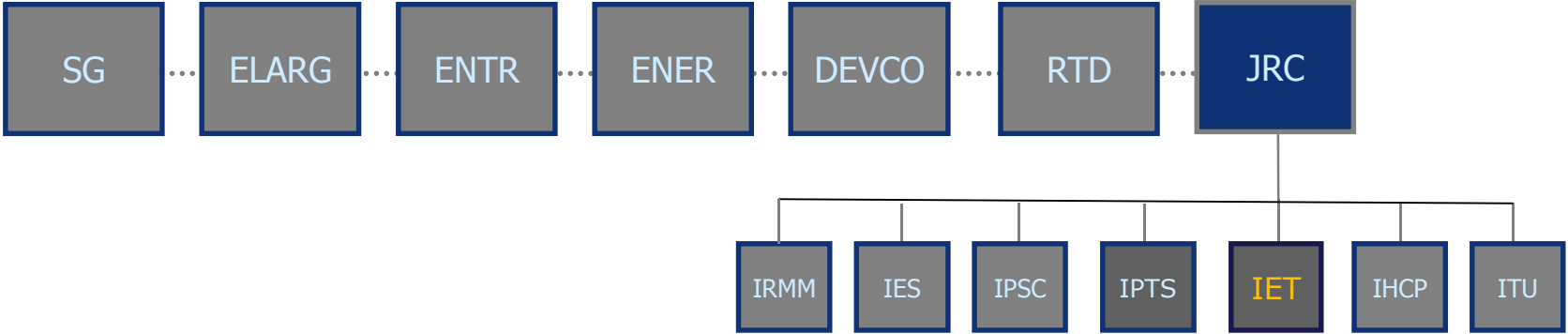
European Court of Justice

European Parliament

European Council

European Central Bank

European Commission  
(28 Commission members)



## JRC current Structure



**IET** - Petten The Netherlands and Ispra  
*Institute for Energy and Transport*



**IRMM** - Geel Belgium  
*Institute for Reference Materials and Measurements*



**ITU** - Karlsruhe Germany and Ispra  
*Institute for Transuranium Elements*



**IPSC** - Ispra Italy  
*Institute for the Protection and Security of the Citizen*



**IHCP** - Ispra Italy  
*Institute for Health and Consumer Protection*

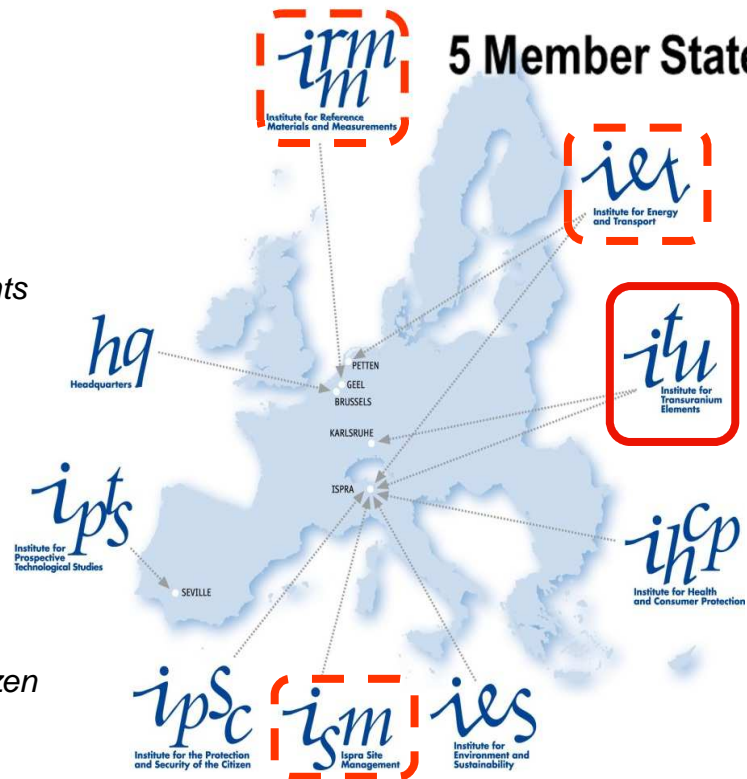
**IES** - Ispra Italy  
*Institute for Environment and Sustainability*



**IPTS** - Seville Spain  
*Institute for Prospective Technological Studies*

7 Institutes in

5 Member States



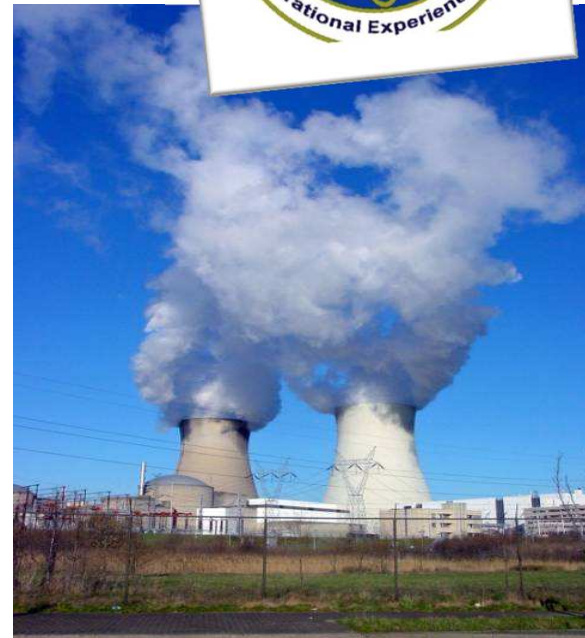
Approximately 3000 Staff

 JRC Nuclear site

 JRC Partially Nuclear sites

# Nuclear reactor safety assessment

- ❖ *Clearinghouse for NPP Operating Experience Feedback*
- ❖ Nuclear Reactor **Severe Accident Analysis and Modelling**
- ❖ Scientific support to the **EU nuclear safety policies** (DEVCO, ELARG, ENER)
- ❖ **Reactor Safety assessment** in the frame of **Generation IV** International Forum





## What is the EU Clearinghouse?

- The EU Clearinghouse on Operating Experience for Nuclear Power Plants is a centralised European initiative at service for the nuclear safety authorities in EU Member States;
- It is meant to improve the use of operating experience from nuclear power plants;
- Created in 2008 with 7 participating Member States.



## Objectives and working scope

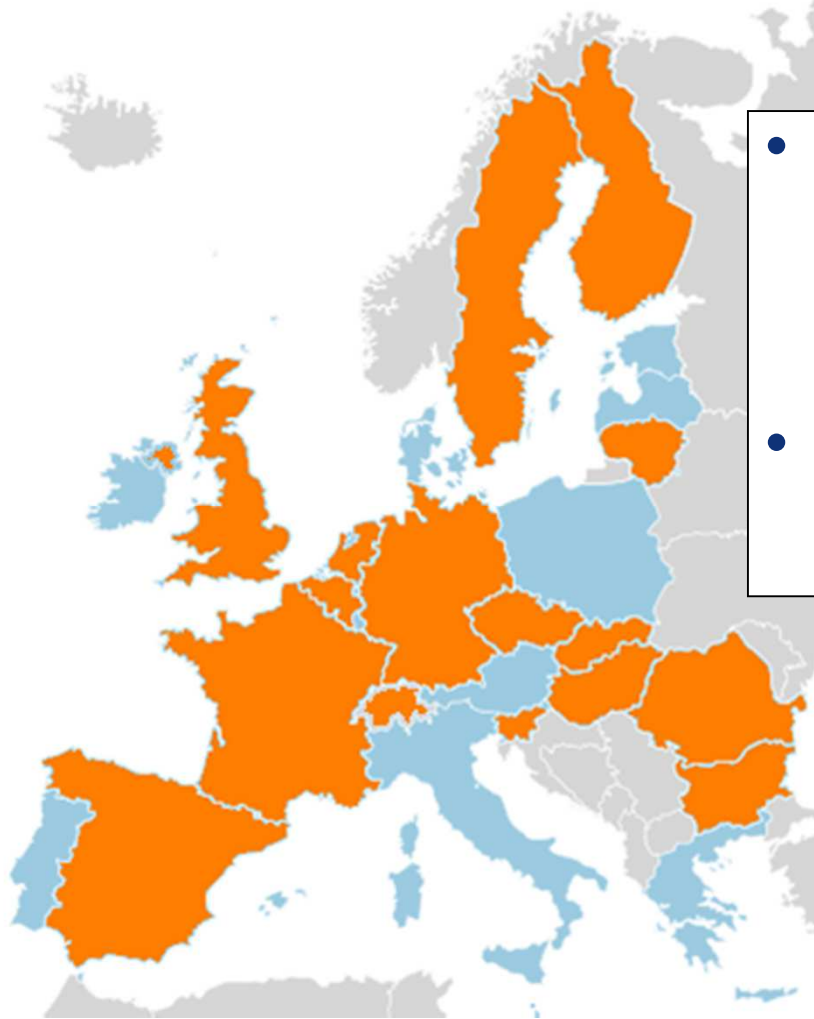
- Strengthening co-operation between European safety authorities, Technical Support Organizations (TSO) and the international OEF community;
- Establishment of European best-practices for assessment of operating events in NPPs;
- Coordination of OEF activities and maintenance of effective communication between experts from European regulatory authorities and others;
- Strengthening European resources in operating experience;
- Support for the long-term EU research and policy needs on NPP Operating Experience Feedback;



## Objectives and working scope (cont'd)

- Fostering the collection of operating experience from European nuclear regulators or operators;
- 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.





- All nuclear regulators of EU Member States having NPPs and Switzerland are now participating in the European Clearinghouse;
- The Polish nuclear safety authority (PAA) has recently joined the Clearinghouse.





## Governance of the European Clearinghouse

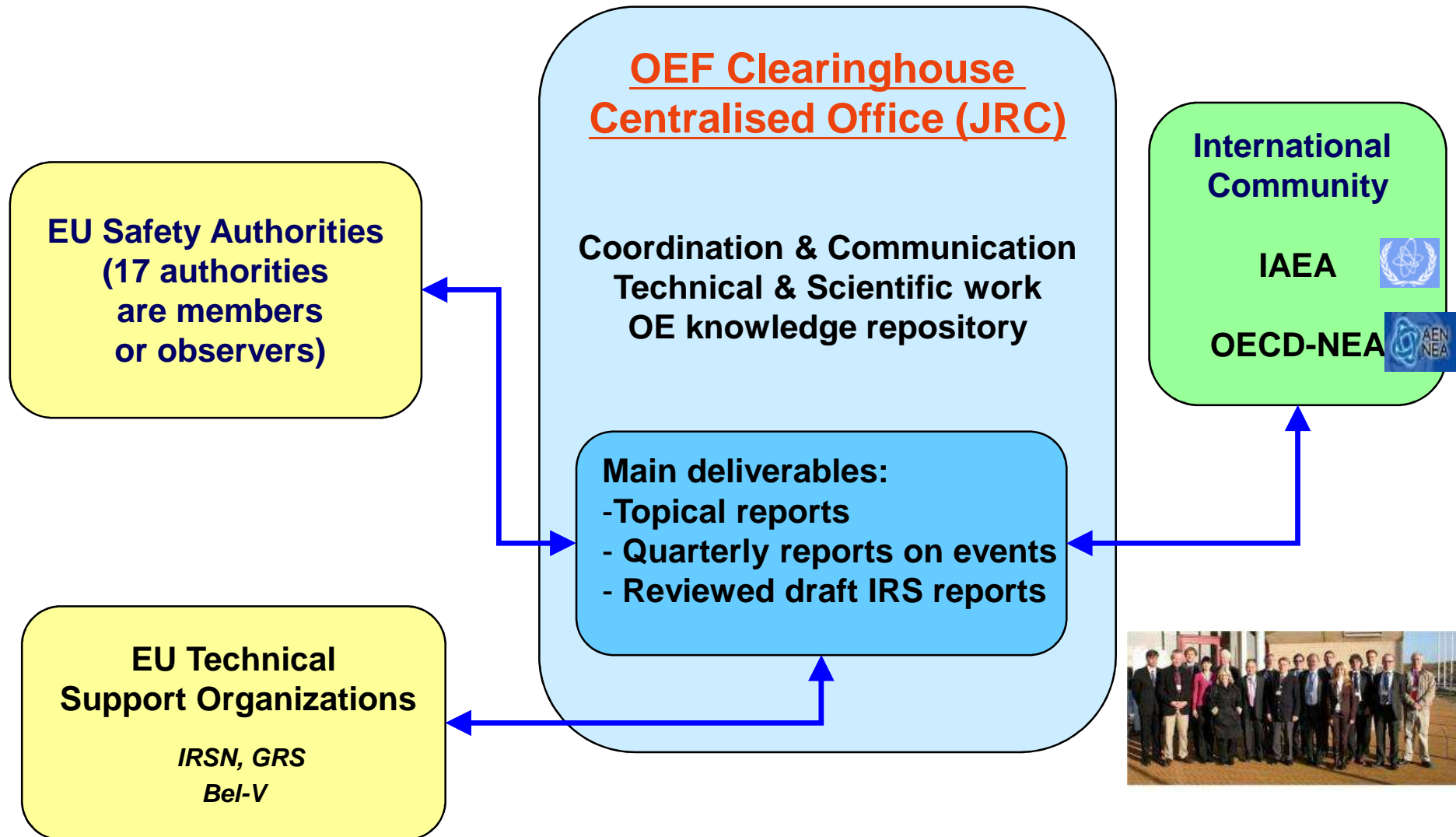
- Technical Board made of nuclear Safety Authorities, Technical Support Organizations, IAEA, NEA, nuclear industry, EC-JRC and EC-ENER
  - Discussion forum for technical work performed and work programme
- Steering Committee made of nuclear Safety Authorities; EC-JRC to report to the Steering Committee
  - Approbation of the work programme
  - Assessment and approbation of the work performed

**Nuclear Safety Authorities are the customers of the European Clearinghouse: they decide the work to be done / they approve the deliverables**



# Clearinghouse Centralised Office

- About 10 colleagues
- Permanent or temporary staff
- Background from regulatory bodies, technical support organisations, licensees, nuclear engineering companies, academics





# What do we do ?

## European Clearinghouse deliverables

- Topical studies (ex: construction experience, events related to ageing, to external hazards..)
  - Available on IAEA IRS website (13 to date, 8 on-going)
  - For 5 of them, drafted together with IRSN (French events) and GRS (German events) – JRC taking care of IRS and US NRC events
- Review / draft IRS reports (34 to date)
- Quarterly newsletters on events worldwide (20 issues, about 900 events shortlisted)
- Website + database of events (about 52000 events)
- Root Cause Analysis Training
- Background research (analysis of Human and Organizational Factors, identification of patterns in databases...)

## Topical studies (1/4)

Amount of OE information is often too big to find easily relevant and useful data (sometimes over-information of unstructured data).

- Aim: To perform in-depth analyses of dedicated generic event families, in order to:
  - Identify the main causes, root causes and contributing factors.
  - Highlight **generic concrete** lessons learned
  - Raise **generic concrete** recommendations
- **“Questions that can be asked by the RBs inspectors”**
- Origin of data:
  - Mainly the IRS database and the USNRC Licensee Event Reports;
  - Support by TSOs on ad hoc basis;
  - Scientific literature, working files;

## Topical studies (2/4)

Currently completed

### 2008

- 2006 Forsmark 1 event (power supply)
- 1999 Shika 1 event (criticality)

### 2012

- Ageing
- Decommissioning
- External Hazards
- Modifications
- Supply of Components

### 2010

- Construction & Commissioning
- Fuel
- Maintenance
- 2008 Olkiluoto 1 & Forsmark 2 events (power supply)

### 2013

- Digital I&C
- Diesel Generators



# Topical studies (3/4)

In progress

## 2014

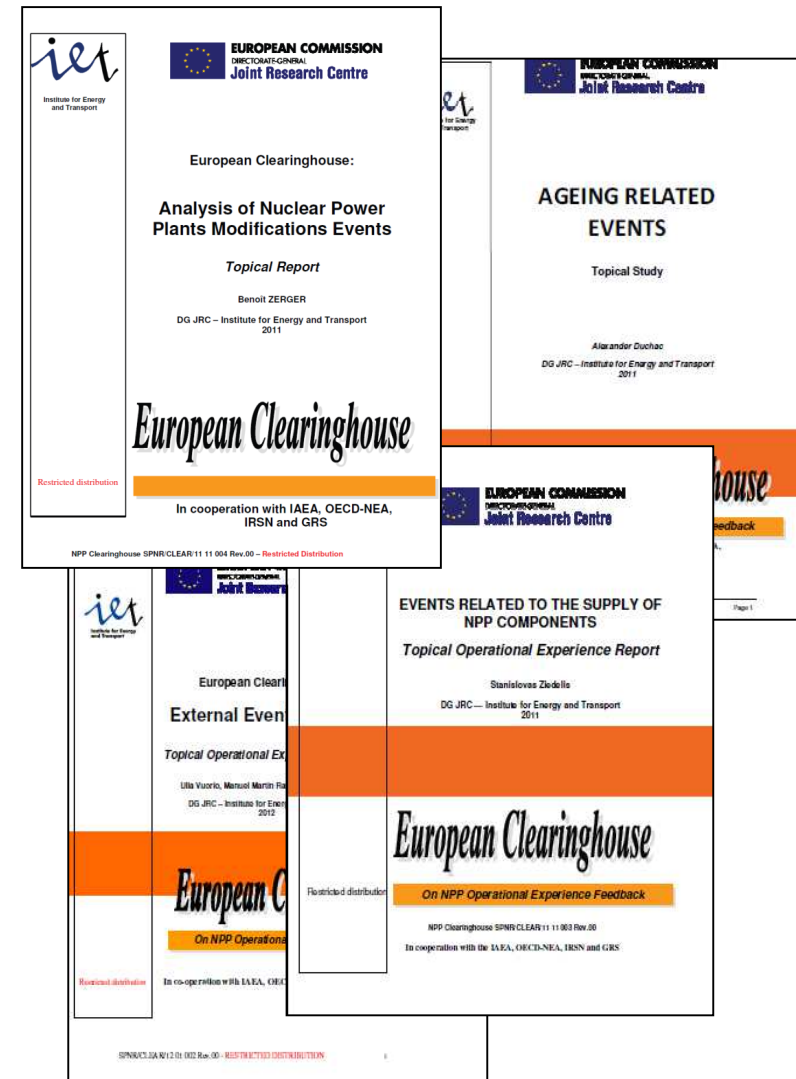
- Cracks and Leaks in the RCPB
- Cooling Chain
- LOOP/SBO
- Management deficiencies

## 2015

- Shutdown
- Maintenance
- Design

## Topical studies (4/4)

- Reports available on the Clearinghouse website (restricted area) and on the [IAEA IRS website](#) (section “Publications”)
- Concise summaries of topical study reports extracted to facilitate the dissemination of the main messages / lessons learned (accessible through public area of the Clearinghouse website)



- **EDGs failures considered:**

- Any mechanical, electrical or I&C failures occurring during a start-up on-demand, operation or surveillance testing;
- Failures related to EDG voltage and frequency control system;
- Failures related to EDG support systems (instrument air, cooling, fuel, exhaust, lubrication, etc.);
- EDG unavailability due to regular maintenance during the outages not considered.

- **Data sources and screened events:**

- **GRS** databases (VERA) – 241 events (time span: 20 years);
- **IRSN** database (SAPIDE) – 255 events (time span: 21 years);
- **IRS** – 65 events (time span: 25 years);
- **U.S.NRC** (LERs) – 115 events (time span: 23 years).

- **Preventive maintenance and testing**
  - Consistency, quality, intervals, spare parts, run test, load test, etc.
- **Manufacturers**
  - Sharing information, availability of spare parts, etc.
- **Operating experience feedback**
  - Sharing information, inspections of the same or similar components, activation of non-priority EDG protections, electrical disturbance and effect on EPS, etc.
- **Protective devices**
  - Inspection, calibration, power supply (UPS) to EDG starting devices, stop button, etc.
- **Reliability**
  - Scope and consistency of T&M, measuring and actuation channel redundancy
- **External events**
  - Regular review of design basis for potential risk (flooding, earthquake, severe weather conditions)

# Clearinghouse website

<http://clearinghouse.jrc.nl/>



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Institute for Energy and Transport (IET)

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European Commission > JRC > IET > OEF Clearinghouse

### Learning from Others

In the European Union, a regional network has been established to enhance nuclear safety through improvement of the use of lessons learned from Operational Experience. This network's hub is located at the European Commission Joint Research Centre (JRC) in Petten, the Netherlands.

This organisation is known as the European Clearinghouse on Operational Experience Feedback for Nuclear Power Plants. The 'Clearinghouse' is comprised of dedicated staff from JRC and member states that have joined the organisation. Membership is mainly composed of nuclear safety regulatory authorities and their Technical Support Organizations within the EU region.

SEARCH

### The 'Clearinghouse' objectives

The overall objectives of the European Network on Operational Experience Feedback for Nuclear Power Plants are to facilitate efficient sharing and implementation of operational experience feedback to improve the safety of Nuclear Power Plants, in particular:

1. Improvement of NPP safety through strengthening co-operation between licensees, regulatory authorities and their Technical Support Organisations staff to collect, communicate, and evaluate reactor operational events information and apply systematically and in a consistent manner lessons learnt throughout European countries participating in the project.

### Do you know the 'Clearinghouse' tasks?

1. Fostering the collection of operating experience from European nuclear regulators or operators, assessing the potential value of lessons learned, and ensuring that events relevant for the global OEF are reported systematically and in consistent manner to the IRS system operated by NEA/IAEA.
2. Screening of important operational events and keeping timely contacts with the authors of the reports as needed to improve the clarity and usefulness of the reported information.
3. Providing support to the original authors in categorizations of the European IRS reports (following the advice given in the IRS guidelines) to ensure consistent categorization and reduce the burden to the authors.

[Read more](#)

# Clearinghouse database

- Centralized knowledge repository
- Web-based
- Mainly collection of publicly available information

▼ Search results

Sort by Relevancy | Title | Event date 46787 results recovered | Results per page 20

Confidential 
  Restricted 
  Open

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**Breach of technical specifications: inappropriate extraction of control rods**

Jorge TANARRO COLODRON - 15/10/13 0 votes

**Version:** 1 Version Revision Number 0 1 2 3 4 5

**Country:** France

**Date Event:** 22/09/13

**Type:** Clearinghouse-OEF - Quarterly Newsletter

**Ines level:** 0 1 2 3 4 5 6 7

**Power plants:** CATTENOM 2

**Visibility:** Open

**Description:**  
 On the 22/09/2013 at 16h41, during start-up operations, the turbine tripped due to mechanical dysfunctions. A reactor scram occurred and all control rods fell down into the core. While the operators were operating following the "incidental procedures", one of them started the extraction of the control rods, not following the correct procedures. Even with that event, the reactor was carried to a safety state within 1h The analysis of this human factors event is still on-going. No consequence, but because of the lack of safety culture of the operator team, the event was rated at INES 1.

PDF

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**Problems with control rods in Loviisa 2**

Jorge TANARRO COLODRON - 11/10/13 0 votes

**Version:** 2 Version Revision Number 0 1 2 3 4 5

**Country:** Finland

**Date Event:** 22/09/13

**Type:** Clearinghouse-OEF - Quarterly Newsletter

**Power plants:** LOVIISA 2

**Visibility:** Open

**Description:**  
 During the start-up of Loviisa 2 after the yearly revision it was found out that one control rod did not drop during a test of the emergency shut-down system. The rod could be moved normally with the electrical motor and it the fault did not reappear during subsequent tests. A day earlier another rod could not be moved completely up after a drop test. However the rod moved normally after it had been dropped again and the fault did not reappear. STUK assumes that FORTUM makes a thorough investigation of possible reasons for the faults and makes an enhanced investigation during the next revision. The incident did not affect the security of the unit or the environment. The incident is classified as INES0.

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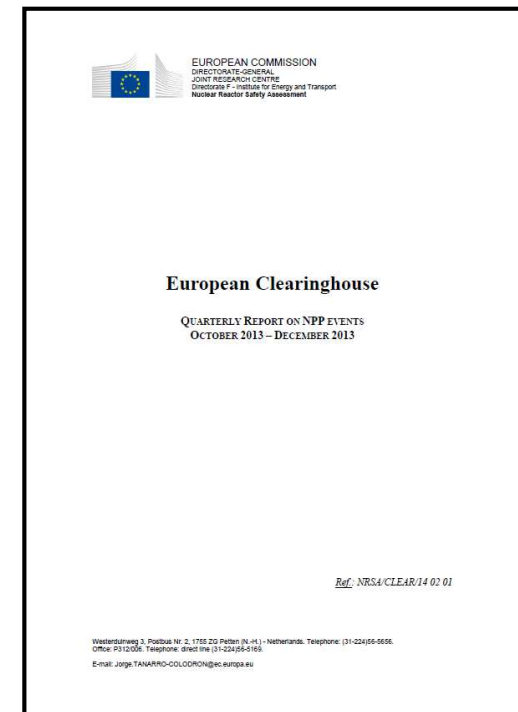
**Late detection of fuel building ventilation system (FBVS) inoperability**

Jorge TANARRO COLODRON - 11/10/13 0 votes

**Version:** 1 Version Revision Number 0 1 2 3 4 5

# OEF quarterly report ("Newsletter")

- 18 issues in <https://clearinghouse-oef.jrc.ec.europa.eu/documents/list/43600#cmis-browser-wrapper> (publicly available)
- So far:
  - A total of 893 events shortlisted (Excel table and database)
  - About 5 events selected per Newsletter issue.



# Annual Training on Root Cause Analysis and Event investigation

- Sessions organized in 2013 and 2014
- Many participants from EU countries
- Very positive feedback







# Review of draft IRS reports

- 34 draft reports were reviewed for 9 countries up to now:
  - Well established procedure for reviews of draft IRS reports;
  - Aim of these reviews is to harmonize and improve the quality level;
- Parts of reports have also been drafted on request by countries.

## Background research

- Event assessment methodologies
- Research on statistical methodologies for the analysis of events databases (computer tool OPERATE to identify patterns in a database)
- HOF (preparatory work to identify on which sub-family we should focus for a topical study)
- Lessons learned from other hazardous industries
- Technical note on Turbine-driven pumps events
- Technical Note on Motor-Operated Valves

# International cooperation



- OECD-NEA
  - WGOE
  - WGRNR
  - WGHOE
  - Working Group on Treatment of Counterfeit, Fraudulent and Suspect Items (CFSI)



- IAEA
  - Joint IAEA/OECD IRS-system
  - Publication of JRC topical studies on IRS website
  - Contribution to Consultancy Meetings and IAEA scientific work.
- PUNE agreement with China



**Thank you for your kind attention**