First insights from common GRS and IRSN evaluations of operational experiences for the European Clearinghouse
Background

- History of Clearinghouse
- EUROSAFE 2007 discussions and results
- Objective of the European Clearinghouse
- Working procedures of Clearinghouse
- Role of IRSN and GRS
First results (1)

- Development of reports
- Analysis has to be completed by
  - The identification of safety significant event families. Considered separately, each event may not necessarily be safety significant, but together these events can permit to identify significant safety issues.
  - In-depth analysis of each safety significant event family in order to deduce important insights for enhancing nuclear safety.
First results (2)

The content of the report is generally composed of:

- Analyzing in great detail the causes, root causes, contributing factors, consequences, and lessons learnt, and classify them in categories, in order to be able to establish the main conclusions on the topic.

- Writing a detailed technical report containing:
  - A description of the process used to make the analysis;
  - A table listing the safety significant events taken into account for the study;
  - A summary table of the events in function of time, with an analysis of the trends;
  - The causes, root causes, contributing factors, consequences, type of lessons learnt as well as concrete recommendations and guidance for the regulators for the improvement of the safety of NPPs.
First results (3)

Three topics were already analyzed:

- External events
- Ageing of components
- Component supply

A forth task is dealing with a generic statistical analysis of IRSN and GRS databases.
External events

- analysis on the basis of related reported events in France and in Germany
- classification by hazard groups.
  - For each group, statistical time trend analyses are carried out.
  - For all events root causes and the safety significance were investigated.

Results

- no serious accidents caused by external hazards in Germany and France
- total number of events very low in both countries
- no important time trends for most of the investigated external hazards during the last twenty years.
Ageing of components

Objective was to analyse the OEF in France and Germany related to the ageing of structures, systems and components:

- the most common ageing related degradation mechanisms,
- good practices and the efficiency of existing plant programmes to timely detect and control ageing degradation of specific components, and
- the identification of challenging issues related to ageing and the measures permitting to tackle them.

Conclusion: effective ageing management in French and German NPPs - no significant increase of ageing related events with operating time was identified.
Component supply

Two areas analysed: components and consumables

Results:

- in case of generic events information was distributed to other operators in order to avoid similar events in other NPPs
- main cause for events were insufficiencies during manufacturing or testing. Main causes regarding manufacturing events
  - Deficiencies in documentations.
  - Deficiencies in specifications.
  - Changes in manufacturing processes.
  - Deficiencies in testing procedures.
  - Deficiencies in monitoring of manufacturing and testing steps.
Generic statistical analysis

This task consists in:

● screening the operating experience databases of IRSN and GRS.
● identifying main families and sub-families of recurring and safety significant events. These families have been split into 5 categories:
  – initiating events,
  – equipment failures,
  – human factors,
  – modifications and
  – internal and external hazards
● analysis of each family and sub-family

Task will be continued with a second part!
Ongoing work

The following tasks are in development:

● Statistical analysis II,
● Events caused by plant modifications,
● Emergency Diesel Generators
Statistical analysis part II

Following the preparatory work of the previous task on statistical analysis,

- tool was developed to rank the tasks in order to identify the most significant event families
- families should be preferably addressed in the forthcoming tasks
Events caused by plant modifications

Aim of this task was to prepare a systematic survey of the French and German NPPs events caused by modifications. Events will be assigned to six families:

- Modifications to structures, systems, components or process software
- Modifications to operational limits and conditions
- Modifications to procedures
- Modifications to organizations and management systems
- Temporary modifications and
- Non-conformities
Emergency Diesel Generators

The following failures of EDGs should be considered:

- Any mechanical, electrical or I&C failures (including failure to synchronize to the safety bus) 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 (compressed air, cooling, fuel, etc.).

In order to find possible trends, a statistical analysis of events per year and of events per reactor-year (age of NPP) will be carried out.
Lessons learnt for IRSN and GRS

Generally, operating experience feedback is effective in France and Germany for many years!

- some of the differences of the OEF approaches in both countries
  - differences in the reporting criteria may result in other main reporting areas.
  - differences in the number of plants and structure of the fleet of NPPs have also remarkable effects on the distribution of events to the various families e.g. it has been taken into account that Germany operates BWRs.
  - the great importance of generic events esp. in France is based on the quite homogeneous NPP design that is operated by only one licensee.
Summary

- The great knowledge of IRSN and GRS in the evaluation of the national operating experiences, is used by the European Clearinghouse to receive detailed insights on safety related topics.
- IRSN and GRS develop common reports on safety issues that involve a detailed review of their national event databases.
- IRSN and GRS have already finished four different tasks and three further tasks are in progress.
- The results show that meaningful results can be derived from the common in-depth analyses of event databases.
- Thus, widely unknown data sources could be utilized for members of the European Clearinghouse to identify common lessons learned from operating experience and to develop generic recommendations to strengthen the safety of NPPs in Europe.