

INTERNATIONAL TRIP REPORT: Paris, France

Travelers, Titles and Affiliations

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Subject

RES staff participated in the Organisation for Economic Co-operation and Development (OECD) Task Group for Meeting of the High Energy Arcing Faults (HEAF) on September 7, 2011 as well as the 16th meeting of the OECD FIRE Project Review Group on September 8-9, 2011.

Dates of Travel, Countries and Organizations Visited

September 5th 2011 through September 10th, 2011
Paris, France
OECD Conference Center: September 7-9

Desired Outcome

This travel served two purposes.

- 1) Participation in the OECD High Energy Arcing Faults (HEAF) panel and planning meeting where the status of the current efforts were presented and planning of future meetings and efforts were discussed on September 7, 2011. The current test plan for upcoming High Energy Arc Fault testing was presented to the member countries in order to gauge interest and obtain status of any possible donations towards the project in the form of equipment or monetary donations.
- 2) Participation in the OECD database planning meeting where the status of the current efforts were presented and planning of future meetings and efforts were discussed on September 8-9, 2011.

Summary of Trip

OECD HEAF Meeting – Day 1

Following introductions and adoption of the agenda, Tsuyoshi Uchida the Senior Officer for Probabilistic Safety Assessment Group in JNES presented a power point presentation of the fire that occurred in the Onagawa Nuclear plant in Japan that was a direct result of the seismic event, not the tsunami. The event was a direct effect of the earthquake and was an arching fault in non-emergency M/C switch gear cabinet. They attributed the cause of the fire to a “Magnet-Blast Breakers” (MBBs), which are hung up by buses in their MC6-1A Cabinet.

The earthquake caused the breakers to shift and damaged the connection points internal to the cabinet which resulted in an arc and fire. Even though this fire started in a non-emergency switch gear cabinet the fault propagated throughout the system and knocked out their emergency diesel A through a synchronous detection circuit.

There were several other interesting things that happened during the fire scenario such as; 9 cabinets in total being affected by the fire, Only the cables directly above the cabinet of origin showed fire damage, 7 hour fire time due to the fact there was no off site fire brigade support because of the limited access after the tsunami.

They also took action to fix the MBB to a VCB which will be fixed to the floor of the cabinet and not hung through the use of a pedestal as well as installing a switch between the emergency and non emergency cabinets to limit the likelihood the fault will propagate.

Japan had several questions for the international panel regarding how and if we specifically separate non-emergency equipment from emergency equipment. Each panel member committed to compiling some examples of how these scenarios are handled in each member country and this was added as an action item for the next meeting.

This discussion led to the NRC presentation of the Conceptual Test Plan for High Energy Arcing Faults Fire Experiments PRELIMINARY DRAFT prepared by Sandia National Labs. U.S. NRC Project Code: JCN N6981. The NRC explained the objectives, overview of testing needs, experimental approach, proposed test facilities/limitations, and desired test matrix. There were then discussions as to the contributions that each country would facilitate for the test program. Germany indicated that they have acquired at least two pieces of equipment; a 10kV-30kV transformer as well as a 6.9 kV Switchgear. Canada indicated that they have multiple pieces of equipment but would like more clarity on which pieces of equipment they should be focusing on so they can have a specific list to reach out to their licensee's. Canada also expressed concern with the cost and time issue associated with ensuring that the equipment is asbestos free. Korea has already committed to send various switchgear cabinets and is working with Sandia currently to facilitate the shipping.

The next presentation was given by Grant Cherkas on the current status of the Canadian Stress Tests. This issue became a high importance issue due to the Fukushima event and the Canadian report should be publically available in early October 2011. The issue of seismically induced fires was not evaluated because the decision was made that there was no design basis argument for this issue, although recent events may change this philosophy for the industry.

The first day was concluded with a discussion as to future meeting dates as well as locations. It was decided that the next meeting will be held in France at the OECD headquarters to keep in compliance with the OECD framework for meeting times. This was done in hopes of holding the subsequent meeting in Albuquerque New Mexico in order to observe the HEAF testing program/ test facilities.

OECD FIRE Meeting – Day 2-3

Day two introduced a larger panel team for the OECD FIRE Project Review Group and focused on refining the proposed outline for the official project report. This effort was lead by Marina Rowekamp from Germany. The first item on the agenda was to go over the various action items from the last meeting in order to close out any longstanding issues and

reschedule the topical report publication date. One item left on the table from last meeting was the need for a definition for the coding field "Proposed direct effects (failure of safety related systems) vs. indirect (affect to response systems, like flooding) vs. Consequential effects (affect process as a result of direct effects)". This discussion led to a roundtable talk as to the distinction between safety related and non-safety related systems. This classification category was decided to be handled on a trial basis due to the differing definitions for safety related systems from country to country. Grant Cherkas was assigned with creating a more strict definition and distributing among the panel members.

The following item discussed was the need for individual country component populations in order to accurately assign component based frequencies for those countries which are reporting ALL fire events to the database. The US was exempt from this effort due to the fact that we are only reporting LER level fire events. The NRC will aid in the data analysis of this process with the contractors Eskonsult/SAC.

A presentation was given by Helen Bigun on a recent fire event which occurred in Sweden during a containment air test. The cause of the event was attributed to an arc in a vacuum cleaner which was left inside containment during the containment air test. This was a particularly interesting fire because it occurred inside of containment during an over pressurization which limited access and limited information as to the fire effect and condition. The over pressurization was determined to have increased the flame spread rate and the only means for fire suppression was containment spray.

There was also a repeat presentation by Tsuyoshi Uchida on the Onagawa event in Japan. This was followed again by the NRC giving a presentation on the Conceptual Test Plan for High Energy Arcing Faults Fire Experiments PRELIMINARY DRAFT prepared by Sandia National Labs. This duplication was due to the fact that not all of the Fire Group members elected to be part of the High Energy Arcing Fault working group and we are attempting to reach out to a larger audience in order to gain support for this upcoming experimental effort.

Next the panel members reviewed the Topical Report Draft format to be presented at the 21st International Conference on Structural Mechanics in Reactor Technology (SMiRT 21) -12th International Pre-Conference Seminar on "FIRE SAFETY IN NUCLEAR POWER PLANTS AND INSTALLATIONS". Some editorial changes were brought up as well as an inaccurate comparison to NURGEG-6850 frequency numbers. The OECD fire event database is attempting to compile component based frequency numbers and compare them to those frequencies currently published in NUREG-6850. It was decided that this comparison cannot be made at the moment due to the disparity of component based frequencies to reactor year frequencies found in NUREG-6850.

The FIRE meeting was concluded with a discussion as to future meeting dates as well as locations. It was decided that the next update to the database will occur 6 months from this meeting and member countries will need to input the data early in 2012, specifically one month before the next meeting. Distribution of next version of the database will occur once the National Coordinators provide the number of reactor years as well as historical events (4 weeks before the next meeting). It was decided that the next meeting will be held in France but the necessity for future meetings will have to be discussed independently of the High Energy Arcing Fault working group needs.

Pending Actions/Planned Next Steps for NRC

1. Refine HEAF test plan and put Sandia National Laboratories in contact with Grant Cherkas and Marina Rowekamp in order to finalize component donation shipping methods and High Energy Arc test plan.
2. Revise the paper to be presented on the Enhancements in the OECD fire database relating to fire frequencies and severity of events.
3. Update the OECD fire events database with evens which occurred in the past year as well as backdating events to 1995 before the next meeting.

Points for Commission Consideration/Interest

This trip did not result in any points of interest for the Commission.

Attachments

Agenda 16th Meeting of the OECD FIRE Project

Conceptual Test Plan for High Energy Arcing Faults Fire Experiments PRELIMINARY DRAFT prepared by Sandia National Labs. U.S. NRC Project Code: JCN N6981.

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