



THEME [Fission-2011-2.3.1]
[R&D activities in support of the implementation
of the Strategic Research Agenda of SNE-TP]

SILER

Seismic-Initiated events risk mitigation in LEad-cooled Reactors

Grant Agreement N°: 295485

Deliverable title: Minutes of the second RP management meetings: Minutes of the second general Governing Board and External Advisory Committee meetings

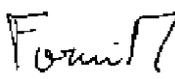
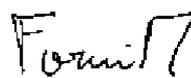
Work Package	Deliverable number	Lead contractor	Date	
WP1	D1.3	SINTEC	03/05/2013	
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Starting date	Due date	Actual date	Delay*	Nature
01/10/2011	30/09/14	25/11/14		R- PU
Description of the activities: The document summarizes the outcomes of the second RP general management meeting.				
SIGNATURES				
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Minutes of the second RP management meetings: Minutes of the second general Governing Board and External Advisory Committee meetings

1. Introduction

The first RP general meeting has been held in Rome on September 22-23rd 2014. The meeting has started with the technical issues, where all the results obtained during the second 18 months of the project have been outlined.

The technical meeting has been followed by the Governing Board meeting and by a summary from the External Advisory Committee.

2. Governing Board Meeting

The Governing Board Meeting agenda was as follows.

Welcome, introduction of participants, aim of the meeting (Silvia De Grandis, SINTEC, on behalf of Didier De Bruyn, SCK, governing board chairman)

Verification of quorum

Discussion on the results of project

Any point asked by GB members

Any other business

Each partner was present or represented, so the legal number of participants was reached, so the meeting was declared valid.

The outcomes of the Project technical meeting have been summarized and the results were considered satisfying. The Project emerged to have fully achieved the expected results.

Partners were satisfied of the activities carried out and of the results came out from the Project. Some possible activities to be carried out in the future to increase and deepen the knowledge generated in SILER Project have been proposed and the Management office of the Project assumed the responsibility to try to find possible ways to continue the cooperation among the partners in the near future for continuing the study of seismic isolation and, in general, on seismic risk for nuclear power plants.

No other issue or any problem to discuss emerged from the GB meeting.

3. External Advisory Committee Meeting

The EAC super intended the Project during all its three years duration. At the end of the activities of SILER, after the presentations held during the final meeting, Rome, 22-23rd September 2014, the conclusions of the EAC are the following.

It must be recognized that the work presented was relevant from qualitative and quantitative point of view.

The different WPs are the following:

WP1 - Consortium Management

No special comment

WP2 - Systems Modelling

In this WP, the selected reactor systems (LFR and ADS) were modelled in order to evaluate their seismic and mechanical behaviour and to define the isolation system.

Different solutions for isolators are proposed: High Damping Bearings and Lead Rubber Bearings; this gives more flexibility for final design.

A very big amount of information was generated with the different solutions, different soil conditions and different seismic levels, including beyond design conditions.

This gives a strong confidence in the capacity of designing acceptable configurations.

A lot of input signals were generated using p-Cares code.

It was only recalled that the low frequency content should be controlled in the generated signals.

In addition, it was mentioned during discussions, that beyond design conditions are very severe (3 times SSE level).

WP3 - Risk Analysis for Critical Components.

The prevention of damage of main components is examined.

Sloshing is of special interest, because it is considered as a key issue for HLM cooled reactors.

Different sloshing and gas entrapment models were presented, with different levels of modelling.

The analyses are performed with sophisticated Computational Fluid Dynamics codes; they are generally extremely time-consuming. This does not allow large set of parametrical studies. Local stresses may be very high in case of sloshing.

A risk management approach integrating all the sub-tasks were presented; this is still under development, apparently.

For sloshing effect, more simple and robust design approaches should be proposed.

The fragility analysis of the isolation system was presented as well, though the anticipated data from full-scale testing of the isolators were not made available to the research team.

The analysis was based on a simple dynamic model of the reactor building and on a refined model of the non-linear behaviour of the isolators.

The fragility computation was based on consolidated approaches for reliability analysis; the results deliver some interesting information on the beyond-design behaviour of the isolation system.

Within the context of the simple limit state considered (horizontal relative displacement across isolators), the obtained results seem encouraging.

The problem of tension forces, though limited, developed by the isolators, need attention by the design team.

WP4 – Development and Characterization of Isolation Devices.

Two models of devices was specified and manufactured. Scale 1 tests has been performed on a dedicated facility.

Some results are available.

They confirm characteristics of the devices specified by the project.

WP5- Additional Components Design.

This WP is dedicated to all those interface components connecting the isolated and non-isolated parts of the plant (i.e. the parts connecting the beam line to the reactor vessel), or

components requiring a specific design in case of isolation of the system (i.e. cover joint of the seismic gap, pipe expansion joints, foundation and isolated concrete slabs, horizontal fail safe system, tsunami protection etc.).

Different solutions, more or less robust were presented.

They show, in general, the feasibility of the different projects.

Some full scale tests have been performed.

For tsunami protection the main question is the height of the platform, which ensure a dry site.

This requires a detailed site evaluation task.

WP6 – Recommendation for standardization

WP6 summarizes the work, concentrating on cost benefit evaluation, safety evaluation and drafting of Guidelines.

All the groups involved in the project are contributing to this task.

A draft of the cost evaluation was presented; the other subtasks are finalizing their work.

EAC members want again to focus on some questions which seems important and/or which should be addressed in the deliverables. They have mentioned during the midterm review meeting and their title are briefly listed below.

- ✓ Soft Soil
- ✓ Beyond design conditions
- ✓ Defence in Depth, specially for the Beam transport line.
- ✓ Careful selection of time-histories for non-linear analyses
- ✓ Tension forces on the isolators in beyond-design conditions

Some of the considerations raised on these subjects during the mid-term meeting have been already included (e.g. the ductility demand).

It is expected that many considerations will be included in final drafting of deliverables.

As a conclusion, we don't see any technical point which could be blocking for the project.