



# TRAINING COURSE ON SEISMIC PROTECTION OF LEAD-COOLED REACTORS

*Palazzo Camozzini, Via San Salvatore Vecchio, 6, Verona, Italy, May 21-25, 2012*



## PRESENTATION OF THE COURSE

*Massimo Forni*

*Head, Seismic Engineering Technical Unit of ENEA*

*Coordinator, SILER Project*



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SILER Project, Work Package 7:

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“A training course of 5 days is organised at the end of the first year (month 9) in order to give a base of knowledge to deal with the issues of seismic behaviour and risk mitigation in lead cooled systems. The training course is addressed to PhD students and researchers active in the field.”

15:00

**Presentation of the SILER Project**

Silvia De Grandis, SINTEC (Bologna, Italy), Management Officer of SILER



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16:00 **ELFR, the European Lead-cooled Fast Reactor**

Luigi Mansani, ANSALDO (Genova, Italy)

17:00 **MYRRHA, the Multi-purpose hYbrid Research Reactor for High-tech Applications**

Didier De Bruyn, SCK•CEN (Mol, Belgium)

18:00 **Nuclear installations – Issues and trends in seismic hazard and fault capability evaluation**

Raffaele Figini, ENEL (Rome, Italy), Member of the SILER EAC



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Day 2

09:00

**General overview on the Gen IV Lead-cooled Fast Reactors and the new requirements for safety**

Craig Smith, Naval Postgraduate School, NPS (Monterey, USA), Member of the SILER EAC

10:30

**The damaging effects of earthquakes on conventional facilities**

11:45

**The damaging effects of earthquakes on NPPs**

Antonio Moreno, IDOM (Madrid, Spain)

12:30

**Seismic Isolation: state of the art of applications to Nuclear Power Plants**

Massimo Forni, ENEA (Bologna, Italy), Coordinator of SILER



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Day 2

14:30

**IAEA programme on Fast Reactor Technology**

Stefano Monti, IAEA (Vienna, Austria), Member of the SILER EAC

16:45

**Testing of large scale anti-seismic devices**

Gianmario Benzoni, University of San Diego (USA), Member of the SILER EAC



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## Day 3

09:30 Departure to Selvazzano by bus

10:30 **Visit to FIP industrial laboratories, including the presentation “Anti-seismic devices”**

Maria Gabriella Castellano, FIP Industriale (Selvazzano, Italy)

16:00 Departure to Verona by bus



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Day 4

09:30

## **Special issues on seismic isolation**

Ioannis Politopoulos, CEA (Paris, France)

11:15

## **How to isolate a NPP - general overview**

Sébastien Diaz, NUVIA (Lyon, France)

12:15

## **How to isolate a NPP - interface components: piping joints**

Helmut Novak, BOA (Stutensee, Germany)

12:45

## **How to isolate a NPP - interface components: seismic joints**

Robert Gettert, MAURER (Munich, Germany)

14:30

## **How to isolate a NPP - interface components: fail safe system**

Alberto Dusi, NUMERIA (Cremona, Italy)

15:00

## **Testing of Interface Components**

Pierre Pegon, JRC (Ispra, Italy)



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Day 4

16:15 **Finite Element Modeling and dynamic analyses of isolated NPPs**

Francisco Beltran, IDOM

17:30 **Fragility Analysis of isolated NPPs**

Federico Perotti, POLIMI (Milano, Italy), Member of the SILER EAC





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Day 5

09:30

## **Severe accidents and seismic issues in lead-cooled systems**

Donella Pellini, KIT (Karlsruhe, Germany)

11:30

## **Modeling of liquid metals and analysis of the sloshing effects**

Armando Gabino, IDOM (Madrid, Spain)

14:30

## **Gas Entrapment and fluid-structure interaction**

Pavel Kudinov, KTH (Stockholm, Sweden)

15:30

## **Economics of isolated NPPs**

Helmut Wenzel, VCE (Vienna, Austria)