

1st Announcement

## **International Workshop on Supercritical Water Coolant Radiolysis**

**14-15<sup>th</sup> of June 2007**  
**Conference Centre Rez**  
**Czech Republic**

Organized by Nuclear Research Institute Řež plc under European FP6 programme HPLWR phase 2

### **Background and Objectives**

Change in the density of SCW through the critical point is accompanied by dramatic changes in chemical properties of water. These changes mean that the ionic solubility, pH, corrosion potential etc. will be distinctly different at the core inlet compared to the outlet and system is mainly influenced by in-core radiolysis. The radiolytic yields and recombination rates in SCW are currently unknown, and preliminary studies suggest a markedly different behaviour at SCW conditions compared to what would have been predicted from simplistic extrapolations of the behaviour encountered in conventional water-cooled. This situation complicates chemistry specification for the prototype of SCWR.

A major effort will need to focus on understanding radiolysis under supercritical water conditions, and its effect on the corrosion and SCC behaviour. Two stages of studies are envisioned and were proposed in GIV. The first stage of the program would use accelerators to irradiate supercritical water solutions and to measure the kinetics of recombination processes of various radicals. The experiments should be conducted over the temperature range 280 to 625 oC so that an integrated radiolysis mechanism as a function of temperature and density can be developed.

The second stage is proposed to be studied in in-pile SCW loop that can model operational conditions including controlling the water chemistry and radiolysis.. At the earliest stage possible additives to suppress radiolysis will be very beneficial to define appropriate water chemistries for performance testing of candidate materials.

To obtain a more detailed understanding of the rate-defining processes, the in-pile studies will need to measure the final radiolytic yields as a function of irradiation type (neutron, gamma) and flux. To control corrosion rates and SCC, the chemical potential for each of the reactive species will need to be determined over the complete temperature and density range. The effects of irradiation, water chemistry, water density and heat flux on solubility will also need to be measured and understood to determine the extent of deposition on the surfaces of fuel cladding and turbine blades.

Within the EU sixth framework programme of HPLWR phase 2, NRI Rez plc has reached high stage of building in-pile supercritical loop at LVR-15 research reactor.

## **Workshop Programme**

Programme should include fundamentals (key issues on SCWR radiolysis and electrochemistry), so far results of pulse radiolysis study of supercritical water, radiolysis and ECP modelling, experimental study of SCWR corrosion under gamma irradiation and preparation of experimental programme for radiolysis and water chemistry study on in-pile reactor loop.

Programme is envisaged for one and half day including one day of presentation and half a day of technical visit.

## **Accommodation and transportation**

The workshop will be held in NRI Conference Centre in Rez, Czech Republic. Centre is located 15 km north of Prague. Frequent trains and buses are available between Prague and Rez Centre. Accommodation will be arranged at nearby Hotel Vltava. No registration fee is asked for.

## **Registration and Material Presentation**

Registration form will be distributed as date of the meeting will be fixed.

## **For Technical and Meeting Information Contact**

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