**Progress report on the ISTC project #3592 “Investigation of Corium Melt Interaction with NPP Reactor Vessel Steel” (METCOR-P)**

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Objectives of METCOR-P project: qualification and quantification of physicochemical phenomena of corium melt interaction with reactor vessel steel with a particular interest to:

- Interaction at a vertically positioned interaction interface

- European vessel steel behavior at interaction

-Oxidation effects

The МСР-5 test was performed in order to compare the rate and depth of corrosion of the European and Russian vessel steels at the interaction with molten suboxidized corium.

The melt composition, steel specimen surface temperature and molten pool condition were found to be most similar to those in the MC9 test with Russian steel, that is, Сn≈30%; Ts≈1450ºC, and absence of surface crust.

The main results are as follows:

* Qualitatively, the processes that characterize corrosion kinetics are similar to those related to Russian steel, namely, prolonged incubation period and the corrosion rate correlation (accurate within a coefficient).
* The maximum depth of corrosion is determined by temperature at the final boundary between the interaction zone and steel specimen. This temperature value corresponds to that determined in tests with Russian steel.

The МСР-6 test was carried out in order to determine the rate of metallic melt oxidation in steam.

The melt composition was (mass %): U-21; Zr-14;SS-65.The melt temperature amounted to 1400ºС.

Preliminary results:

* The rate of oxidation is controlled by the surface oxidic crust.
* The time profile of oxidation rate is nonmonotonous and is determined by cracking of the crust.

The МСР-7 test was performed for determining the rate of molten suboxidized corium oxidation in steam.

The melt composition was С-30; (U/Zr)at =1.2. The melt temperature was 2350ºC and the surface crust external temperature amounted to 2080ºC.

Preliminary results:

* The surface crust substantially reduces the rate of melt oxidation.
* The appearance of cracks determines the nonmonotonous time profile of the oxidation rate.

The МСР-8 test

The purpose of the test is to investigate vessel steel corrosion during the interaction with the U-Zr-Fe metallic melt at the vertical position of the interaction interface.

Current status:

* A pretest aimed at fine tuning of the vertical specimen cooling system and of the corrosion rate ultrasonic measuring system has been performed.
* The test facility has been completely prepared for conducting the test.