Profile LFR-18
KYLIN-II S
CHINA

GENERAL INFORMATION
NAME OF THE FACILITY: KYLIN-II Safety Test Loop
ACRONYM: KYLIN-II S
COOLANT(S) OF THE FACILITY: Lead bismuth, Lead, Lead lithium
LOCATION (address): Institute of Nuclear Energy Safety Technology (INEST), Chinese Academy of Sciences (CAS)
OPERATOR: INEST
CONTACT PERSON: Liu Chao, FDS Team, No.350 ShushanhuRoad, Hefei, Anhui, China, INEST, CAS. +86 55165593681, Contact@fds.org.cn

STATUS OF THE FACILITY
Start of operation (date): 2015

MAIN RESEARCH FIELD(S)
☐ Zero power facility for V&V and licensing purposes
☑ Design Basis Accidents (DBA) and Design Extended Conditions (DEC)
☐ Thermal-hydraulics
☐ Coolant chemistry
☐ Materials
☑ Systems and components
☑ Instrumentation & ISI&R

TECHNICAL DESCRIPTION
Description of the facility
The KYLIN-II Safety Test loop will allow performing experimental campaigns in the field of the Design Basis Accidents (DBA) -steam generator tube rupture accident. It basically consists of three tanks, one LBE storage tank, one high pressure water tank and one LBE/water interaction tank. One tube placed on the bottom of water tank is penetrated into the interaction tank and sealed with a special rupture disk. The experimental campaigns shall pursue the following main objectives:

- Physical behavior of water injected in LBE
- Mechanical impact of the SGTR on the vessel structure
- Unstable transient heat conduction phenomenon near the injector
- Two phase flow detection technics

The total facility is decided to work with 500°C and 25MPa.
Acceptance of radioactive material
No

Scheme/diagram

3D drawing/photo

Parameters table

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant inventory</td>
<td>3 tons</td>
</tr>
<tr>
<td>Power</td>
<td>200 kW</td>
</tr>
</tbody>
</table>

Test sections

<table>
<thead>
<tr>
<th>Characteristic dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ The interaction tank diameter (D=500\text{mm}), height (H=1500\text{mm});</td>
</tr>
<tr>
<td>✓ The water tank volume=20L;</td>
</tr>
<tr>
<td>✓ Max. Pressure of interaction tank and water tank (P=25\text{MPa})</td>
</tr>
<tr>
<td>✓ Temperature of interaction tank and water tank (T=500^\circ\text{C})</td>
</tr>
</tbody>
</table>

Static/dynamic experiment
SGTR experiment

Temperature range in the test section (Delta T)
100-500^\circ\text{C}

Operating pressure and design pressure
0.1-25MPa

*Flow range (mass, velocity, etc.)*

Water injection flow rate: 100t/h

<table>
<thead>
<tr>
<th>Coolant chemistry measurement and control (active or not, measured parameters)</th>
<th>No</th>
</tr>
</thead>
</table>

**Instrumentation**

- High pressure dynamic pressure transducers;
- Transient temperature thermocouple;
- High temperature strain gauge;
- Mass flow meter;
- High pressure level gauge;

**COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS**

**NO**

**PLANNED EXPERIMENTS (including time schedule)**

Experiments:

- **LBE-water interaction:**
  - A pressure wave generation and propagation, due to flashing of the water in LBE;
  - Temperature transient phenomena due to the LBE/water interaction;
- **PbLi-helium interaction**
  - A pressure wave generation and propagation due to “helium” hammer effect.

**TRAINING ACTIVITIES**

Training activities can be agreed with INEST for the operation of the experimental campaign under the supervision of INEST qualified staff.

**REFERENCES (specification of availability and language)**

**NO**