Profile SFR-12

NAIMMO
FRANCE

GENERAL INFORMATION
NAME OF THE FACILITY
NAIMMO
ACRONYM
NAIMMO
COOLANT(S) OF THE FACILITY
Sodium
LOCATION (address):
CEA Cadarache,
13108 Saint Paul Lez Durance
FRANCE
OPERATOR
CEA
CONTACT PERSON
O. GASTALDI
CEA Cadarache
Building 710,
13108 Saint Paul Lez Durance, FRANCE
Sodium Technology and Components Project Manager
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STATUS OF THE FACILITY
Under Design
Start of operation (date):
2019

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
This test section is one of the three test sections of the CHEOPS facility (NAIMMO, NADYNE, NSET). The CHEOPS facility is under design and will be able to realise experiments from the first half of 2019. CHEOPS is devoted to the development of the
ASTRID innovative components and completes efficiently the PAPIRUS facility, due to the large scale components which could be tested. CHEOPS includes its own cleaning facility which is called STALACMITES.

The NAIMMO test section is a large tank which will permit to develop components with large scale (full scale for some parts of components) in similar conditions than those of the ASTRID reactor (except neutron flux).

This test section is mutualised with the NADYNE test section, so both test sections have the same storage tank, purification system, pump, heater and cooler (all the sodium technology “standard”). So CHEOPS facility includes two sodium loops: the NAIMMO / NADYNE loop and the NSET loop.

Acceptance of radioactive material
No

Scheme/diagram

3D drawing/photo

FIG. 1. Overall view of CHEOPS Facility
FIG. 2. Overall scheme of CHEOPS processes

Parameters table

<table>
<thead>
<tr>
<th>Coolant inventory</th>
<th>Sodium inventory : 70 tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>300 kW</td>
</tr>
</tbody>
</table>

Test sections

<table>
<thead>
<tr>
<th>TS #1</th>
<th>Characteristic dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diameter : 4400 mm</td>
</tr>
<tr>
<td></td>
<td>Height : 4000 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Static/dynamic experiment</th>
<th>Static and dynamic experiments</th>
</tr>
</thead>
</table>

<p>| Temperature range in the test section (Delta T) | Until 580°C |
| Operating pressure and design pressure | Operating pressure : 5 bars |</p>
<table>
<thead>
<tr>
<th><strong>Flow range (mass, velocity, etc.)</strong></th>
<th>200 m$^3$/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant chemistry measurement and control (active or not, measured parameters)</td>
<td>Active coolant quality measurement and control (purification with a cold trap on a bypassed flow: 10 m$^3$/h and impurities level &lt; few ppm, and impurities content evaluation by a plugging indicator)</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>Thermocouples, Argon pressure measurement, Inductive level probes, Sodium flowmeters, Sodium pressure sensor</td>
</tr>
</tbody>
</table>

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

N.A.

**PLANNED EXPERIMENTS (including time schedule)**

The time schedule is not yet established in detail. So, only the planned experiments will be listed hereafter:

- Development of sealing using metallic joints with large diameter (for IHX)
- Thermal-hydraulic of sodium vapour in argon in order to improve the heat transfer law between sodium free surface and reactor slab
- Development of instrumentation for In Service Inspection & Repair (ISI&R)
- Development of articulated arm for ISI&R
- Development of some parts of the fuel handling system
- Development of some parts of the control rod mechanisms

A period of 5 years is planned to realize these experiments.

**TRAINING ACTIVITIES**

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

1. GASTLADI O. and al. Experimental platforms in support of the ASTRID program: existing and planned facilities at CEA, ICAPP 2015 NICE, FRANCE, MAY, 3-6, 2015 – Paper 15126