Profile SFR-16

DOLMEN

FRANCE

GENERAL INFORMATION

NAME OF THE FACILITY: DOLMEN (Double Latitude pour Maintenance En sodium (Na))
ACRONYM: DOLMEN
COOLANT(S) OF THE FACILITY: Sodium
LOCATION (address): CEA Cadarache, 13108 Saint Paul Lez Durance, FRANCE
OPERATOR: CEA
CONTACT PERSON (name, address, institute, function, telephone, email): O. GASTALDI, CEA Cadarache, Building 208, 13108 Saint Paul Lez Durance, FRANCE
Sodium Technology and Components Project Manager, +33 4 42 25 46 40, Olivier.gastaldi@cea.fr

STATUS OF THE FACILITY: In operation
Start of operation (date): 1980 and refurbished in 2013/2014

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 facility is used for testing instrumentation, small components and under sodium repair technique, in sodium telemetry, under sodium visualization... and it can achieve preparation of sample for experiments done on other experimental devices (immersion and wetting in sodium).
It is relatively large facility composed of 2 main tests section made of a large sodium pot (1500 L and 600 L) able to be operated up to 600°C. This facility handles sodium with a high chemical quality obtained through an active purification system. The classical subsystems of such sodium facility are
present: storage vessel, cold trap, plugging indicator... The atmosphere above sodium surface is composed of Argon.

Acceptance of radioactive material
No

Scheme/diagram

3D drawing/photo
<table>
<thead>
<tr>
<th>Parameters table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coolant inventory</td>
</tr>
<tr>
<td>Power</td>
</tr>
<tr>
<td>Test sections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TS #1</th>
<th>Characteristic dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sodium capacity: 1500 L</td>
</tr>
<tr>
<td></td>
<td>Diameter: 1080 mm</td>
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<tr>
<td></td>
<td>And height: 2000 mm</td>
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</tbody>
</table>

| Static/dynamic experiment | Sodium is quasi static in test section during the experiments |

<table>
<thead>
<tr>
<th>Temperature range in the test section (ΔT)</th>
<th>250°C to 600°C</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Operating pressure and design pressure</th>
<th>Operating pressure &lt; 450 mbar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow range (mass, velocity, etc.)</td>
<td>Mass flow rate: 1500 L/h</td>
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</table>

<table>
<thead>
<tr>
<th>TS #2</th>
<th>Characteristic dimensions</th>
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<tbody>
<tr>
<td></td>
<td>Sodium capacity: 600 L</td>
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<tr>
<td></td>
<td>Diameter: 600 mm</td>
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<tr>
<td></td>
<td>And height: 2500 mm</td>
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</tbody>
</table>

| Static/dynamic experiment | Sodium is quasi static in test section during the experiments |

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

Since the beginning of the start-up of this facility, there are a lot of experimental campaigns.

Here can be mentioned some of them. DOLMEN has been used:

- to perform under sodium repair techniques
- to prepare many mock-ups for development of carbonation process
- to establish performance of telemetry with ultrasound techniques
- to test high temperature ultrasonic transducers up to 600°C
- to calibrate inductive level probes...

**PLANNED EXPERIMENTS (including time schedule)**

For the next years the main experimental campaign will be devoted to establish the performance of several sodium instrumentation devices: new high temperature ultrasonic transducers, matrix phased array ultrasonic transducers, electromagnetic transducers, but also some experiments to demonstrate the ability to make under sodium visualization. A specific remotely controlled mechanical harm (xyz movements) is developed and will be coupled to DOLMEN to realise this experimental program.

For longer terms, DOLMEN will be used for under sodium repair techniques testing. Some specific under sodium tools will be tested: cutting, laser ablation, welding...

**TRAINING ACTIVITIES**

Possible, but no specific program is planned.

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

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F. BAQUE
Review of in service inspection and repair technique. Developments for French liquid metal fast reactors, Nuclear Technology, July, 2004


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ANIMMA 2017 (Lièges, Belgique, juin 2017)

Gilles Gobillot (CEA), Emmanuel Sanseigne (CEA), François Baqué (CEA), Ilyas El Khaloufi (CEA)
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Kévin Paumel (CEA), Subassembly identification by ultrasound in sodium cooled fast reactors.
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