Profile SFR-37

LCTMF

INDIA

NAME OF THE FACILITY	Leak Collection Tray Mockup Facility
ACRONYM	LCTMF
COOLANT(S) OF THE FACILITY	Water
LOCATION (address)	Safety Engineering Division, Fast Reactor Technology Group (FRTG), Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India
OPERATOR	FRTG, IGCAR
CONTACT PERSON	Dr. P. Selvaraj, Director, Fast Reactor Technology Group, Indira Gandhi Centre for Atomic Research, Kalpakkam – 603102, India, +91 44 27480083, pselva@igcar.gov.in
STATUS OF THE FACILITY	Dismantled
Start of operation (Date)	2013

MAIN RESEARCH FIELDS

- ☐ 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

Leak collection Tray Mockup Facility (LCTMF) was a facility to test the performance of leak collection tray which is being used as a passive sodium fire mitigation device in sodium cooled fast breeder reactor. This mockup facility consisted of a water reservoir, air buffer tanks associated with air compressor and the leak collection tray to be qualified. All the above components were mounted on a steel structure. The mockup facility was used for design validation of the leak collection trays and the experimental results were useful to design engineers for improving the design of leak collection tray.

ACCEPTANCE OF RADIOACTIVE MATERIALS - No

Scheme/Diagram

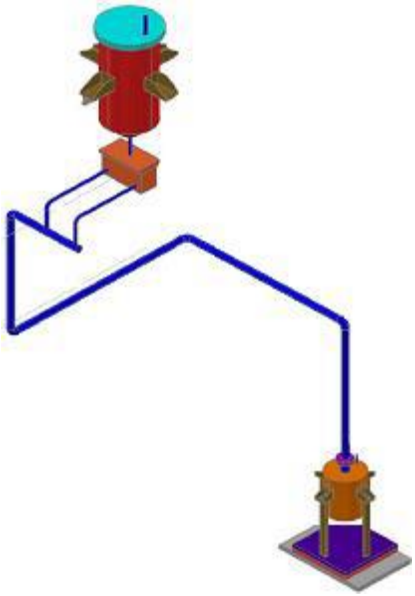

FIG.1. Scheme of the LCTMF facility

3D Drawing/Photo

FIG. 2. View of the LCTMF mock-up facility

Parameters table

Coolant	Water
Coolant inventory	150 kg
Power	Heater power of 50 kW
No of test sections	Three
Test sections	
	Characteristic dimensions Water reservoir Mild steel cylindrical tank with 150 litres capacity Valve: Manual/automatic Opening area : 1 cm^2 Pipelines 4" pipeline with six bends with a sloping angle of 2˚ Air buffer tanks Tank 1: SS tank with 400 litres capacity designed for 10 bar pressure Tank 2: MS tank with 1000 litres capacity designed for 6 bar pressure Drain tank Plastic cylindrical tank with 150 litres capacity
Coolant chemistry measurement and control (active or not, measured parameters	Coolant is not active
Instrumentation	Platform Scale: PC based platform scale - 3000 kg capacity with resolution of 0.1 kg.

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

Experiments were conducted simulating sodium leak scenario in pipelines of secondary circuit of PFBR in case of sodium leak accidents. Water, as a simulant, was released through 1 cm^2 opening into the leak collection tray at various leak rates. The leak rates were controlled by maintaining constant overhead air pressure. Experimental results at 4 bar pressure show that about 49% of water spilled over the LCT due to splashing. Suppression of spillage is a challenging task for the designers of the LCT.

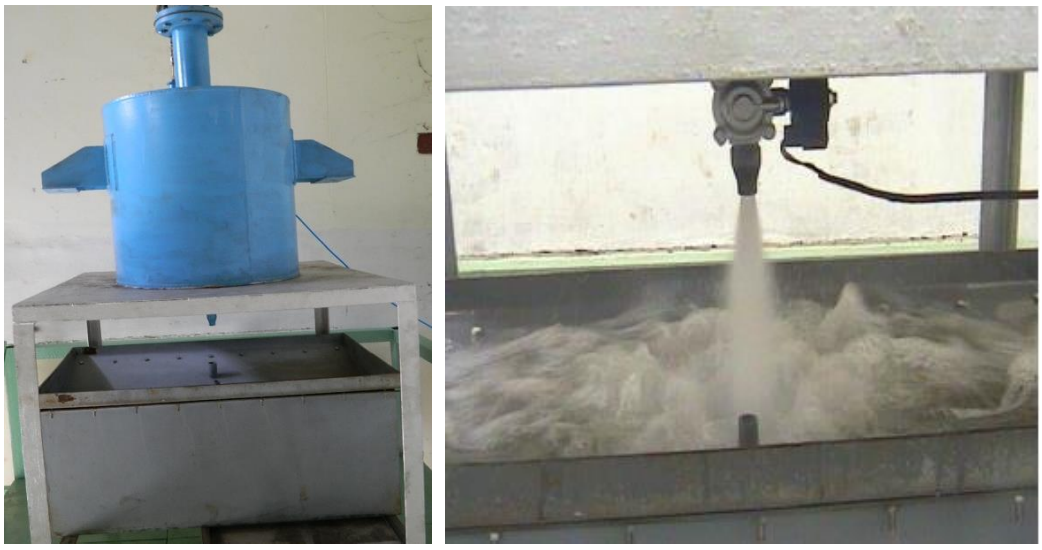

FIG. 3. Scheme of the LCT with water reservoir (left) and Slashing of water in LCT at 1 bar pressure (right)

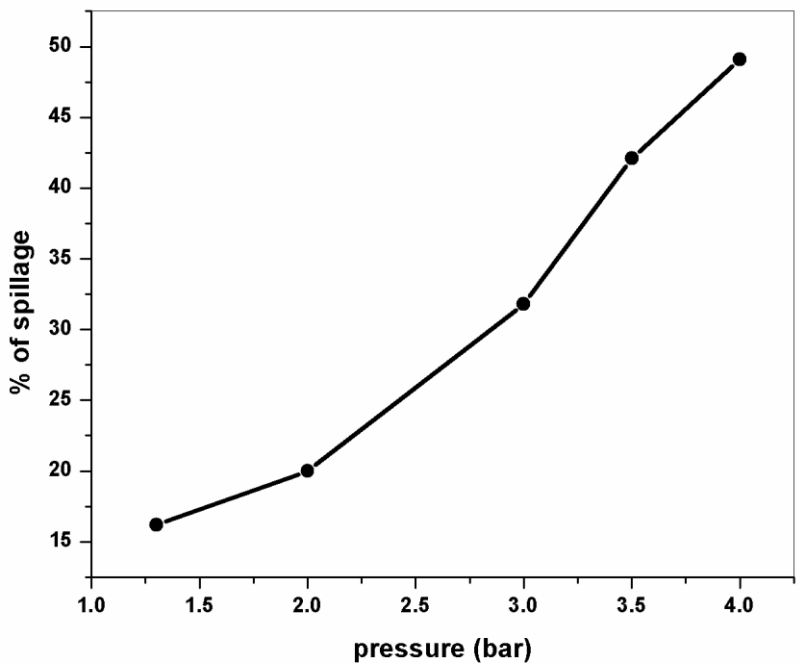

FIG.4. Percentage of spillage as a function of water pressure

PLANNED EXPERIMENTS (including time schedule)
Nil.

TRAINING ACTIVITIES
Training activities can be agreed with IGCAR Kalpakkam for the operation of experimental campaign under the supervision of IGCAR qualified staff

REFERENCES (*specification of availability*)
Nil