

## Profile SFR- 85

### Hall - IV hydraulic test facility comprising of 5/8 scale model of primary circuit of FBR, multi DSR test facility and SA cluster FIV facility

#### INDIA

NAME OF THE FACILITY Hall - IV Hydraulics Test facility comprising of 5/8 scale model of primary circuit of FBR, multi DSR test facility and SA cluster FIV measurement

ACRONYM NA

COOLANT(S) OF THE FACILITY Water

LOCATION (address) Fast Reactor Technology Group (FRTG), Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam, India

OPERATOR FRTG, IGCAR

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**STATUS OF THE FACILITY** In operation

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

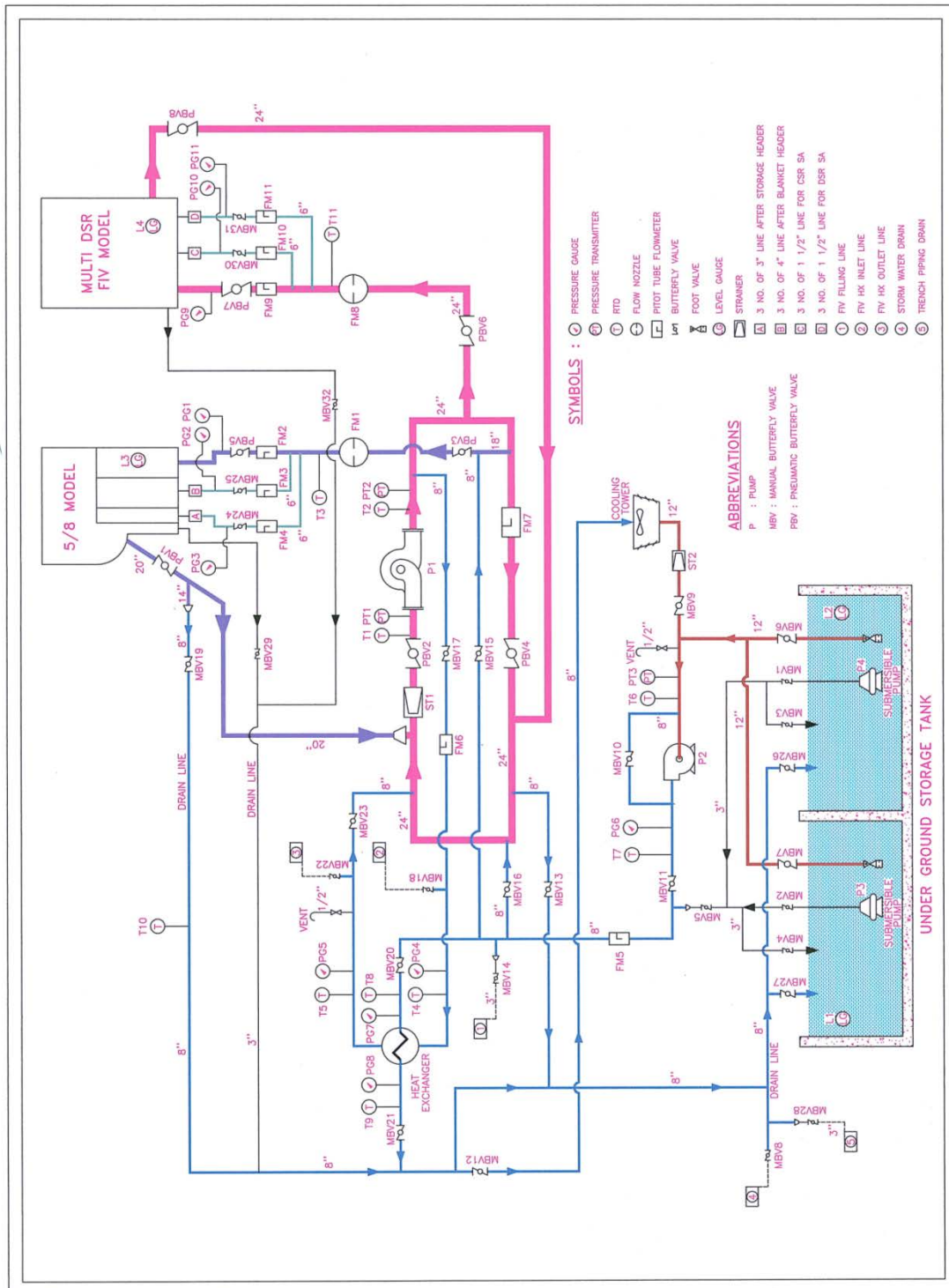
#### TECHNICAL DESCRIPTION

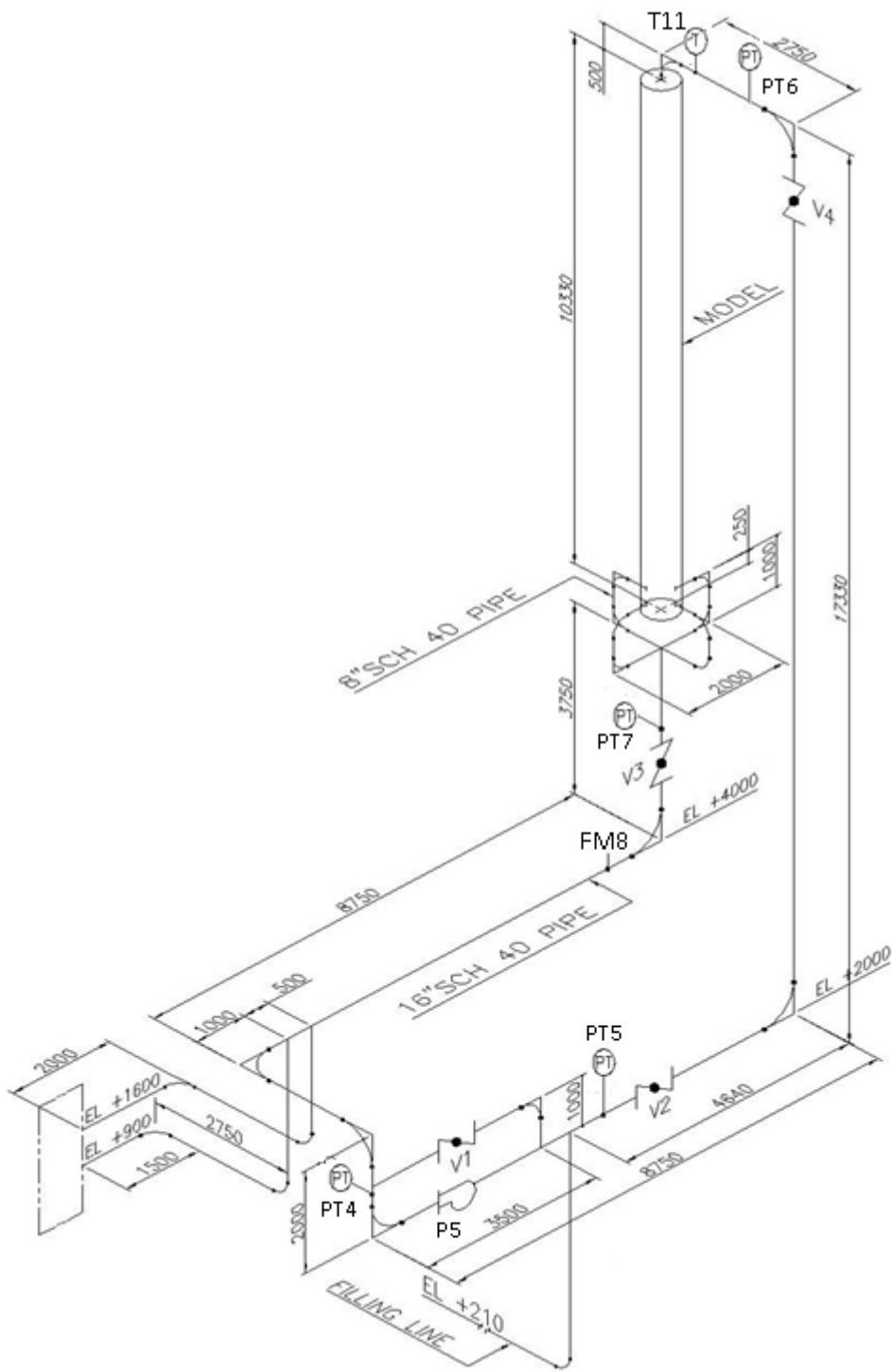
##### Description of the facility

The purpose of this facility is to carry out various experiments for validation of hydraulic design of future reactor primary components, characterization of acoustic signals during simultaneous drop of DSRs and FIV measurement of seven SA cluster. Two large pumps having capacity of 4000 m<sup>3</sup>/h at 6 bar and 1500 m<sup>3</sup>/h at 15 bar caters the required flow rate. Plate type heat exchangers are provided to maintain the water temperature during study. This facility is also equipped with a dedicated control room with data acquisition system to acquire data during experiments.

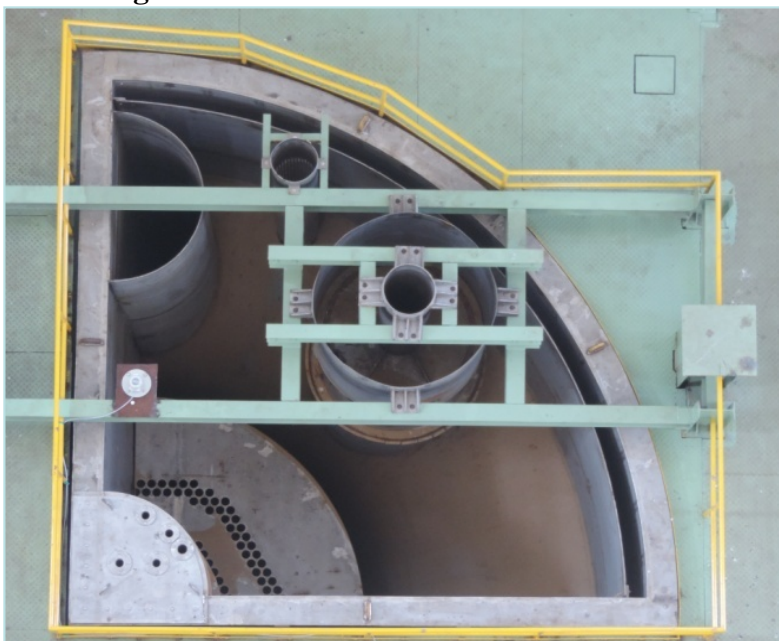
**Acceptance of radioactive materials** – No.

# Scheme/Diagram of the loop





3D Drawing/Photo



**Parameters Table**

Coolant inventory	Model + loop : 100 m <sup>3</sup> ; Reservoir Tanks capacity: 600 m <sup>3</sup>
Power	Maximum power requirement for pump operation: 1 MW
No. of test section	Three (i) 5/8 scale model test facility, (ii) Multi DSR test facility, (iii) Seven SA cluster FIV test facility
Operating temperature range	30 °C to 70 °C
Operating Pressure Design Pressure	Operating Pressure: 6 bar for for 5/8 scale and multi DSR loop; 15 bar for seven SA FIV loop.  Piping design Pressure: 10 bar for 5/8 scale and multi DSR loop; 23 bar for seven SA FIV loop.
Flow range	30 m <sup>3</sup> /h to 4000 m <sup>3</sup> /h
Coolant chemistry measurement and control  (active or not measured parameters)	Use of potable water, pH is controlled
Instrumentation	Resistance Temperature Detector, Pressure Gauge, Thermocouples, Pressure transmitters, Averaging pitot tube flow meters, Flow nozzle, Accelerometers and strain gauges for FIV measurements, Data acquisition system and control system

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

Experimental studies for mapping the flow pattern in hot pool and around IHX inlet window has been completed in 5/8 scale model of future reactor primary circuit. Free level fluctuation has been measured in this model. Various configurations of gas entrainment mitigation devices are being tested in this model. Multi DSR test facility has been commissioned. FIV measurements of seven SA cluster is in progress.

**PLANNED EXPERIMENTS (including time schedule)**

Finalization of gas entrainment mitigation devices for hot pool of future reactor: December, 2020

Completion of Seven SA FIV measurement: June, 2020

Characterization of acoustic signals due to simultaneous drop of three DSR: June, 2021

**TRAINING ACTIVITIES**

Training activities can be considered with IGCAR Kalpakkam for the operation of this experimental facility under the supervision of IGCAR qualified staff.

**REFERENCES:Nil**