Profile SFR-68

SGI

RUSSIA

General information

NAME OF THE FACILITY	Facility "SGI" for studies of thermohydraulic characteristics of atomic power plants.
ACRONYM	Facility "SGI"
Coolant technology	Water
LOCATION (address)	FSUE "State Scientific Centre of the Russian Federation – Institute for Physics and Power Engineering named after A.I. Leypunsky", State Corporation "Rosatom", Russian Federation
OPERATOR	State Corporation "Rosatom"
CONTACT PERSON (name, address, institute, function, telephone, email):	Mikheev Aleksandr Sergeevich Bondarenko Sq. 1, Obninsk, Kaluga Region, 249033, Russia Head of Laboratory, phone number: +7 484 39 9-84-39, mikheyev@ippe.ru.
STATUS OF THE FACILITY	In operation.
START OF OPERATION (date):	1971. In 1996 SGI facility was registered in the State Register of Measuring Instruments and approved for use in the Russian Federation.
MAIN RESEARCH FIELD(S)	☐ Zero power facility for V&V and licensing purposes x Design basis accidents and beyond the design basis accidents x Thermohydraulics ☐ Coolant technology ☐ Materials ☐ Systems and equipment ☐ Scientific instruments

TECHNICAL DESCRIPTION

Description of the facility

The test facility "SGI" is purposed for hydraulic investigations of flowing parts of reactors equipment including design of reactor and heat exchange equipment of NPP in isothermal conditions. The gauge length allows to obtain necessary data on velocity and pressure fields for verification of computer codes.

Facility "SGI" is designed for studies in isothermal conditions of hydraulic characteristics of nuclear reactor models' flow parts, heat-exchange equipment, and other equipment of atomic power plants in order to get the necessary pressure fields and flow rates for design optimization.

The primary equipment of the SGI facility includes: three pumps with engines powered by frequency converters, flow meters of flow meter manifolds, pipeline system with isolation

and control valves, pressure and dump tanks, two measuring tanks with a flow switch, four coolers, two heaters, three distillers, and control and instrumentation devices.
The facility has two closed circulation loops. All the assembly units are made from X18H10T stainless steel.
When the facility is in operation, the selected pump takes in water from the 10 m^3 dump tank and feeds it into the cold or hot loop, after which the water passes through the flow meter manifold, the test model, and is discharged back into the dump tank. The facility makes it possible to perform measurements at constant head and flow rate up to 10 m^3/h using a 7 m^3 pressure tank located at the elevation of 10.8 m. The flow rate can be measured both by flow meters and using the volume-time method. For this purpose, there are two 0.8 m^3 measuring tanks with a flow switch. The flow switch is designed to feed water either to the measuring tanks, or to the dump tank. The changeover time is 25 ms.
Circuit pipelines are manufactured from 1X18H9T steel with the following diameters: ∅106×3; ∅150×3.
The distillers are used for periodic water makeup into the loop.
The measurements are performed using the standard hydrometric methods.
Recording of gage readings is carried out using an automated system of data acquisition and processing and is followed by on-line analysis of the data obtained.

Acceptance of radioactive materials
No.

Scheme/Diagram

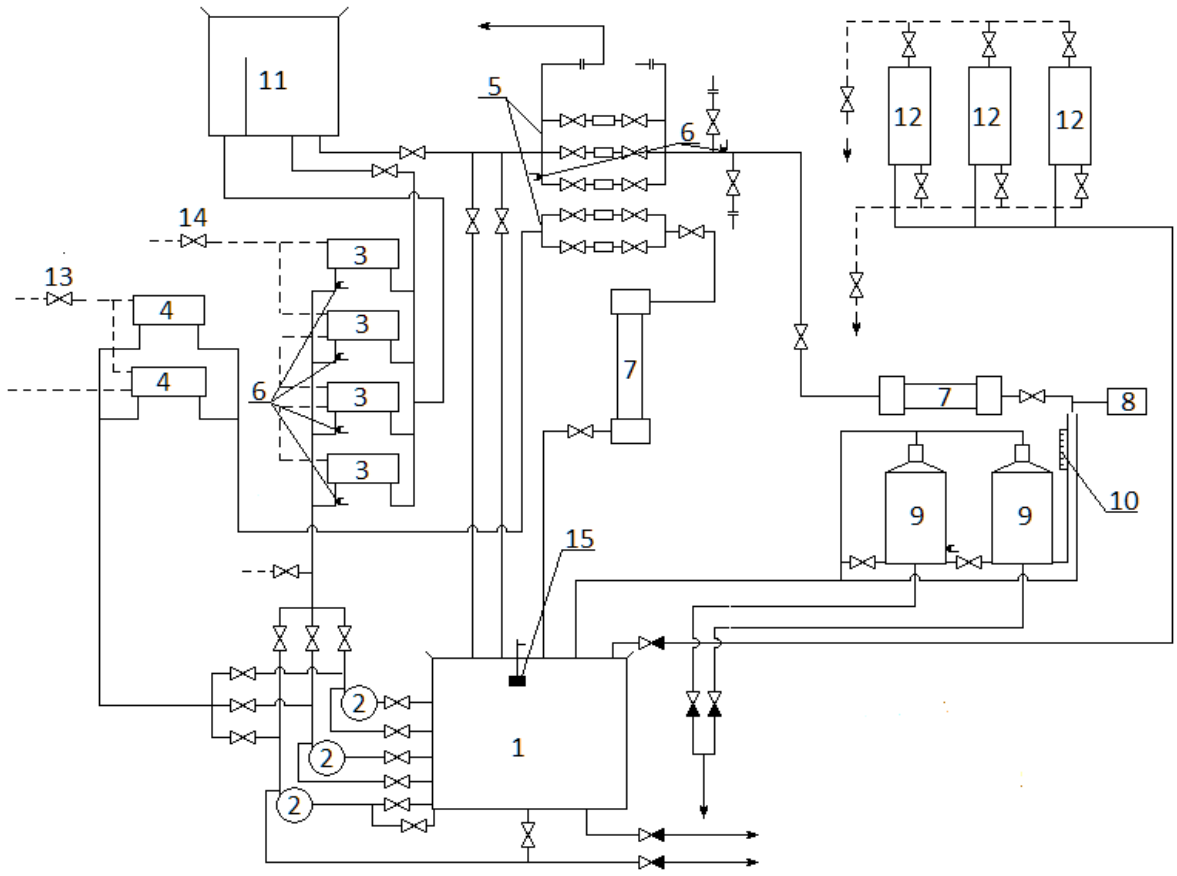

FIG. 1. Technological scheme of the water hydraulic facility "SGI":

1 – dump tanks, 2 – pumps, 3 – coolers, 4 – heaters, 5 – flow meter manifolds, 6 – resistance temperature detector, 7 – working sections, 8 – changeover device, 9 – measuring tanks, 10 – measuring tanks scale, 11 – pressure tank, 12 – distillers, 13 – how water valve, 14 – cold water valve, 15 – level meter.

3D drawing/photo

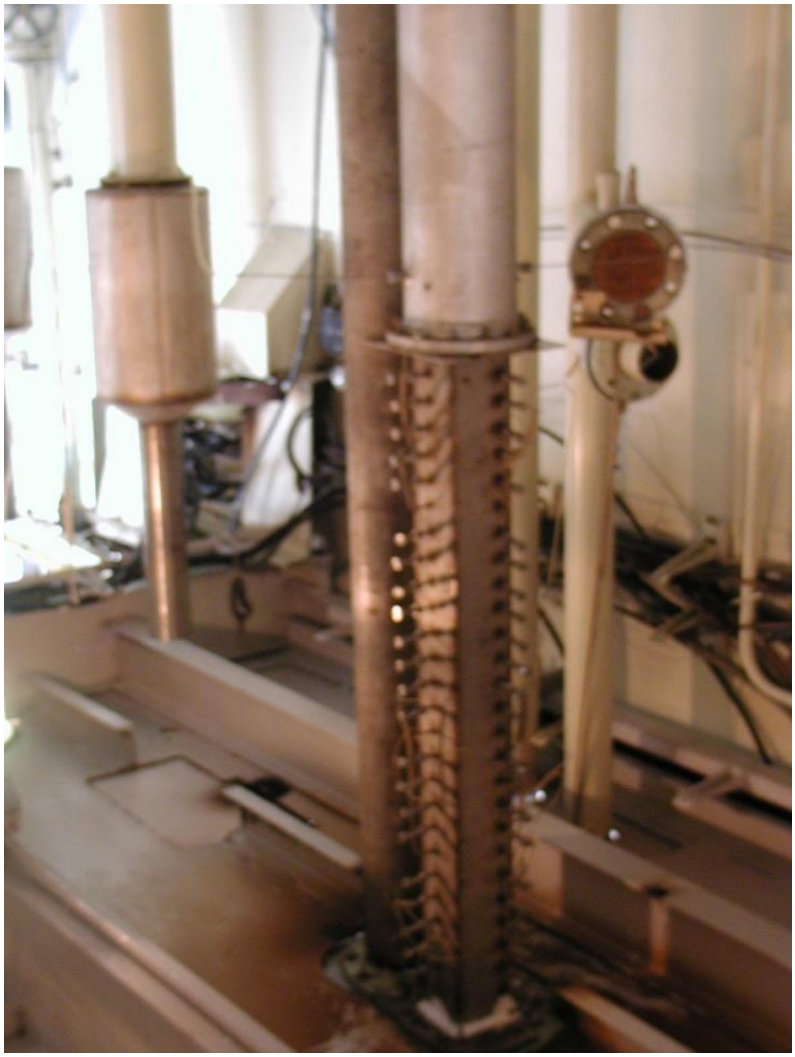

FIG. 2. View of the wWater hydraulic facility "SGI"

Parameters table

Coolant inventory	Distilled water (less than 10 m^3)
Power	250 kW
Test section No.1	*Characteristic dimensions* Stainless pipeline 100 mm in diameter
	Static/dynamic experiments Stationary and dynamic experiments
	Temperature range in the test section 10-80°C
	Working pressure 2,5 MPa
	Flow range 1-150 m^3/h
Sensor equipment	• Differential pressure sensors-transducers of Metran-100 and Metran-150 type (manufactured at Chelyabinsk plant); • electromagnetic and turbine flow meters.

COMPLETED EXPERIMENTAL CAMPAIGNS: MAIN RESULTS AND ACHIEVEMENTS

- Series of studies on hydrodynamic justification of passive emergency protection assemblies designs with hydraulically weighted rod for BR-10, BN-600, BN-800 reactors;
- Studies of hydraulic characteristics of a fragment of Brest OD-300 reactor facility emergency protection system;
- Studies of heat-exchange equipment for food industry;
- Series of hydrotests of assembly models for prospective reactors;
- Studies are underway on verification and calibration of devices for commercial accounting of energy carriers;

PLANNED EXPERIMENTS (INCLUDING TIME SCHEDULE)

Studies on hydrotests of models of cores and prospective reactors assemblies.

TRAINING ACTIVITIES

Training activities for researchers at the SGI facility must be coordinated with Rosatom State Corporation.

REFERENCES (specification of availability and language)

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