18.5 DEVELOPMENT OF WATER HYDRAULIC VALVES

These special purpose valves have been developed for controlling the water hydraulic actuators of fuelling machine.

- **Differential Pressure Reducing Valve for high pressure drop (DPRV)**

The DPRV is used for controlling the force developed by the fuelling machine water hydraulic actuators. A constant differential pressure is required to be maintained between pressure housing and actuators supply line for proper operation of actuators, which are located inside it. The differential pressure should remain constant even if there are fluctuations in fuelling machine pressure, pump supply pressure, actuator flow etc. This critical requirement is achieved by fast response DPRV.

In-house developed DPRVs are being used at all new reactors. Anti cavitation DPRV has also been developed. It can handle large pressure drop across it and give excellent performance. These valves are both of 30 lpm (220MWe PHWR) and 70 lpm (540MWe PHWR) capacity.

- **Auto Differential Pressure Control Valve (ADPCV)**

This valve has been developed to control the actuator force as well as direction of motion of the actuator. It works on the principle similar to DPRV except the differential pressure for advance and retract direction of actuator can be varied by fuelling machine control program remotely. This single valve replaces large number of imported components in Ram-B and Ram-C water hydraulic circuit of fuelling machine.
as many imported components like control valves and controllers in water hydraulic supply system for fuelling machine. The valve is completely indigenous.

**High Flow Servo Valve (HFSV)**

High Flow Servo Valve has been designed and developed to meet the requirement of high flow (1100 lpm) with precise control (2% accuracy). The current design consists of two modules, high flow control valve and a pressure compensator. It doesn’t contain any dynamic elastomeric seal.

It is under manufacture and testing of the valve has been planned at the Integral Thermal Facility (ITF), BARC.

**3-Way Ball Valve**

A passive 3-way ball valve has been designed for Emergency Core Cooling System (ECCS) of AHWR. It will divert ECCS supply to either inlet header or ECCS header depending upon which header has failed. The ball valve actuates with the help of differential pressure between two headers and same working fluid is being used to actuate the ball valve. It also has motorized actuator attachment, which is normally kept detachable.