ATTACHMENT A

IP3-88-004

Description of IP-3 "High Pressure Coolant Injection/Core Spray" And Emergency Feedwater Systems

Figure 1 - High Head Safety Injection Subsystem

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286
DPR-64

ATTACHMENT A

This attachment provides a brief description of the IP3 "high pressure coolant injection/core spray" system and the bases for selection of the motor-operated valves within this system to be included under the scope of IE Bulletin 85-03. Motor-operated valves are not utilized in the emergency auxiliary feedwater system at IP3.

"High Pressure Coolant Injection/Core Spray" System

IP3 is a four-loop Westinghouse pressurized water reactor plant which utilizes a safety injection system (SIS) to provide emergency core cooling and reactivity shutdown margin in the event of a loss-of-coolant accident, steam generator tube rupture, or main steam line break. The SIS consists of an active subsystem, a passive subsystem and a recirculation subsystem.

The active subsystem consists of a high head and a low head section. The high head section consists of three high head, centrifugal safety injection pumps, the boron injection tank (BIT) and use of the refueling water storage tank (RWST). The low head section consists of two centrifugal residual heat removal (RHR) pumps, two RHR heat exchangers and use of the RWST.

The passive subsystem consists of four accumulators that are filled with borated water and pressurized with nitrogen. A loss of RCS pressure is the only action required to initiate the accumulators.

The recirculation subsystem is placed into service after the active and passive subsystems have accomplished their functions and may take one of two flowpaths consisting of different components. The preferred flowpath consists of: the recirculation sump, two recirculation pumps and two RHR heat exchangers. The other flowpath consists of: the containment sump, two RHR pumps and two RHR heat exchangers. The second flowpath is used to back up the preferred flowpath in the event of system malfunction.

The IP3 SIS does not utilize a core spray subsystem in its design. The high head section of the active subsystem described above is the only portion of the IP3 SIS within the scope of IEB 85-03. This determination is consistent with the boundaries implied in IEB 85-03 for the "high pressure coolant injection/core spray" system and has been confirmed with NRC staff.

As indicated above, the high head injection subsystem consists of three high head SI pumps, the BIT and the use of the RWST. Figure 1 provides a basic outline of this subsystem. In summary, three high head pumps take suction

from the RWST and discharge into the reactor coolant system (RCS) cold legs through two high pressure injection headers. The high head pumps are arranged so that any two of the three pumps can supply borated water to both injection headers. The SI signal activates the pumps but they are unable to deliver the borated water to the cold legs until RCS pressure decreases to less than approximately 1500 psig (the shutoff head of the pumps). This portion of the SIS functions to keep the core covered when RCS pressure remains above the injection pressures of other SIS components and to aid in core flooding on large ruptures.

The selection of the specific MOV's within the high head injection subsystem to be included under the scope of the bulletin is based on their required functioning in establishing a high pressure injection flowpath from the RWST to the RCS for short-term, high pressure, cold leg injection. As indicated in Figure 1, there are a total of 23 MOV's in the high head injection portion of the IP3 SIS. Ten of these MOV's have been determined to require evaluation per IEB 85-03. Specifically, the MOV's that are associated with the high head injection flow path described above and are normally energized, regardless of whether or not they are required to change position in response to a safeguard signal, have been included in the scope of the bulletin. Those MOV's that are normally de-energized (i.e., in their "safe" position) have been excluded from the scope of the bulletin since they are not required to function in establishing the high pressure injection flow path described above and are not subject to any spurious actuation prior to or during injection phase by virtue of their de-energized condition. (It is noted, however, that certain of the MOV's excluded from the scope of the bulletin are re-energized and their positions changed during the recirculation phase, as detailed below.) The acceptability of these selection criteria were discussed and agreed to in verbal communication with NRC staff.

A brief synopsis of each of the 23 MOV's in the high head portion of the IP3 SIS is provided below.

I. MOV's in High Head Injection Subsystem Outside Scope of IEB 85-03

A.

MOV	Function
856A	High Head SI Stop (Cold Leg)
856D	High Head SI Stop (Cold Leg)
856F	High Head SI Stop (Cold Leg)
856K	High Head SI Stop (Cold Leg)

Reason for Exclusion

These valves are not required to be tested for operational readiness in accordance with 10CFR50.55a(g). These valves have their motor leads disconnected and are all locked open.

B.	MOV	Function
*	842 SIS	Mini-Flow
*	843 SIS	Mini-Flow
**	850A	SIS Pump 31 Discharge
**	850C	SIS Pump 31 Discharge
,*	851A	SIS Pump 32 Discharge
***	851B	SIS Pump 32 Discharge
*	1810	RWST Discharge

* As indicated below, Valves 842, 843 and 1810 are de-energized and maintained in their safe "open" position for the injection phase. These valves are re-energized and closed for transfer to cold leg recirculation.

** As indicated below, Valves 850A, 850C, and 851A are de-energized and maintained in their safe "open" position for the injection phase. These valves would be re-energized and closed for long-term low head recirculation for purposes of establishing containment isolation for the high head portion of the IP3 SIS.

*** As indicated below, valves 851A and 851B are de-energized and maintained in their safe "open" position for the injection phase. These valves would be re-energized and closed in the event of certain passive failures downstream of the SI pumps during recirculation phases of operation.

Reason for Exclusion

These valves are required to be tested for operational readiness in accordance with 10CFR50.55a(g). However, these valves are de-energized and maintained in their safe "open" position for the injection phase. (Discussion with NRC staff has indicated that any de-energized valves that are not required to change position for the injection phase may be excluded from the scope of IEB 85-03.)

C.	MOV	Function
*	856B	High Head SI Stop (Hot Leg)
*	856G	High Head SI Stop (Hot Leg)

* As indicated below, Valves 856B and 856G are de-energized and maintained in their safe "closed" position for the injection phase. These valves would be re-energized and opened for transfer to hot leg recirculation.

Reason for Exclusion

These valves are required to be tested for operational readiness in accordance with 10CFR50.55a(g). However, these valves are de-energized and maintained in their safe "closed" position for the injection phase. (Discussion with NRC staff has indicted that any de-energized valves that are not required to change position for the injection phase may be excluded from the scope of IEB 85-03).

II. MOV's in High Head Injection Subsystem Within Scope of IEB 85-03

MOV	Function
856C	High Head SI Stop (Cold Leg)
856E	High Head SI Stop (Cold Leg)
856H	High Head SI Stop (Cold Leg)
856J	High Head SI Stop (Cold Leg)
887A	SIS Pump 32 Suction Isolation
887B	SIS Pump 32 Suction Isolation
1835A	BIT Isolation
1835B	BIT Isolation
1852A	BIT Isolation
1852B	BIT Isolation

FIGURE 1

Indian Point 3 Nuclear Power Plant
High Head Safety Injection Subsystem