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September 28, 1982

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Director, Office of Nuclear Reactor Regulation
Attention: D. M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket 50-206
Safety Injection System Modifications
San Onofre Nuclear Generating Station
Unit 1

Our letter dated March 30, 1982 provided the schedule for replacement of the Safety Injection System Hydraulic Valves, and the status of a study of an alternative of modifying the Safety Injection System based on a dedicated SI system (new feedwater pumps) design. We indicated that replacement valves were ordered and could be installed during the first refueling outage following valve delivery in late 1984. We also indicated that as an alternative to replacing the hydraulic valves, we were continuing to perform preliminary engineering on a dedicated SI system to determine feasibility, cost and schedule. The purpose of this letter is to inform you that we have chosen to establish a dedicated SI system (new feedwater pumps) alternative and are cancelling our order for replacement valves.

An overview of the dedicated SI system was provided to representatives of the Regulatory Staff during a meeting on September 8, 1982. Enclosure 1 to this letter provides more detailed information on the conceptual design of the dedicated SI system alternative. In summary, this system relies on a set of new feedwater pumps which would allow the current feedwater/SI pumps to become dedicated to the SI function. This design eliminates the need for extensive sequencing and interlocking of the eight hydraulic valves. A new power source will be incorporated to power the new feedwater pumps.

As indicated in the schedule of Enclosure 1 to this letter, these modifications are scheduled to be implemented during the refueling outage for

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Cycle 10 which should occur in mid-1985. It should be noted that this date is equivalent to the implementation date for the replacement valves project, now being terminated. It is our intention to adhere to this schedule. However, should other major projects be given higher priority during the integrated assessment, the schedule may require adjustment.

If you have any questions in this matter, please contact me.

Very truly yours,

VP Buskin

Enclosure

SAFETY INJECTION SYSTEM MODIFICATIONS
SAN ONOFRE NUCLEAR GENERATING STATION, UNIT 1
SI PUMPS DEDICATION/NEW FEEDWATER PUMPS
CONCEPTUAL DESIGN INFORMATION

BACKGROUND

Reference A describes an event at San Onofre Unit 1 which involved the failure of the Hydraulic Valves between the safety injection/feedwater pumps and the safety injection system headers. This failure resulted in a modification of these valves and implementation of an interim SIS valve surveillance program. In Reference B, SCE committed to submit a schedule for replacement of the hydraulic valves and to study SIS design and performance to determine if major redesign is warranted. Reference C provided the status of the valve replacement project and a conceptual assessment of SIS redesign based on three alternatives. Reference D provided a schedule for replacement of the valves, further results of our conceptual engineering of design alternatives, and our commitment to further study the Dedicated SI Pumps alternative design to determine if redesign is warranted.

On September 8, 1982 at a meeting with members of the Regulatory Staff, our decision to proceed with SIS redesign based on a dedicated SIS pumps/new feedwater pumps concept was discussed. This enclosure presents the conceptual description of the system as presented at that meeting. A description of any major refinements will be submitted if they become necessary during further preliminary and final engineering.

OBJECTIVE OF REDESIGN

The objective of the SIS redesign is to minimize the reliance on extensive sequencing of the SIS hydraulic valves at San Onofre Unit 1. An alternative design is being engineered to have minimum impact on existing systems and components.

DEDICATED SIS/NEW FEEDWATER PUMPS SYSTEM DESCRIPTION

General Description

The feedwater pumps at San Onofre Unit 1 currently have dual functions. They are used to supply feedwater to steam generators during normal operation and inject borated water to the reactor for emergency cooling when needed. Figure 1 represents the schematic flow diagram of the as-built system for reference. The switchover from the feedwater function to safety injection function relies on the alignment of the safety injection system valves (HV 851 A & B, HV 852 A & B, HV 853 A & B, and HV 854 A & B) located upstream and downstream of the feedwater pumps. Due to the failure of HV's 851 A & B in 1981, a conceptual study has been conducted with the objective of separating the feedwater and safety injection systems so that the safety injection function would not rely on the alignment of these valves. The addition of new dedicated feedwater pumps has been selected as the best method of separating these systems.

The new feedwater pump modification includes the addition of a pair of feedwater pumps with the associated piping, valves, power source, instrumentation and controls. These modifications will leave the existing feedwater pumps, currently shared by the feedwater and safety injection systems to be exclusively available for the safety injection function. Thus, the feedwater system and safety injection system will be separated. The only modifications to the SIS will be capping off piping connections previously associated with the feedwater system, and modifying electrical and control circuits to reflect the system design.

Figure 2 shows the proposed modifications to the existing piping and the new feedwater pump arrangement. Additional piping, isolation valves (HV-852 and HV-854 valves may be salvaged for this purpose), and check valves for the new feedwater pumps will be required. The low pressure and the high pressure heater bypass connections, located upstream and downstream of the existing feedwater pumps, and the flow elements (FE13 and 14) for both east and west feedwater trains will be left intact. The feedwater recirculation lines will be rerouted to the new pumps. For the west feedwater train, the manual auxiliary feedwater flow path connection will be relocated.

A new power source will be provided to feed the new feedwater pumps.

As-built instrumentation and controls common to both the safety injection and feedwater systems will be dedicated to the safety injection system operation. All instrumentation and controls used exclusively for the as-built feedwater system will be utilized in the new feedwater trains.

Implementation of this modification will eliminate the need for valve sequencing between the feedwater and safety injection systems. Replacement valves will no longer be required and are being cancelled. Once the systems are separated, there will not be continuous pressure from the feedwater system on the hydraulic valves (HV853 A&B and HV851 A&B). This will eliminate the high pressure on the valve seats which contributed to the earlier problems. In addition, by isolating the two systems the valves will no longer require sequencing and interlocks to prevent condensate from being supplied to the SIS. The requirement for maintaining the remaining SIS valves normally closed will be further evaluated as engineering progresses.

Feedwater Pumps

A. New Feedwater Pump Configuration

Two new feedwater pumps, one for each train, with performance characteristics of the existing feedwater pumps are required. Major pump manufacturers have preliminarily indicated that pumps meeting specified hydraulic requirements can be delivered with a lead time between 10 and 15 months.

B. New Pump Locations

Various possible locations on the east and west side of the plant were evaluated primarily based on physical feasibilities, comparison of turbine cycle efficiency, and degree of physical modification required. Some locations were eliminated due to lack of space or the necessity of extensive physical modifications. However, studies conducted to date indicate that there are locations on both sides of the turbine building that could meet the requirements for locating the new pumps.

Power Supply

A non-safety related power supply dedicated to the new feedwater pumps motors will be required for this design.

A new 30 MVA, 230 kV-4.36 kV, 3 \emptyset transformer, similar to the existing spare "C" transformer, with a provision for installation of FA/FA cooling, will be installed.

The new transformer is presently planned to be installed near the fence at the south side of the plant with the switchgear room located nearby.

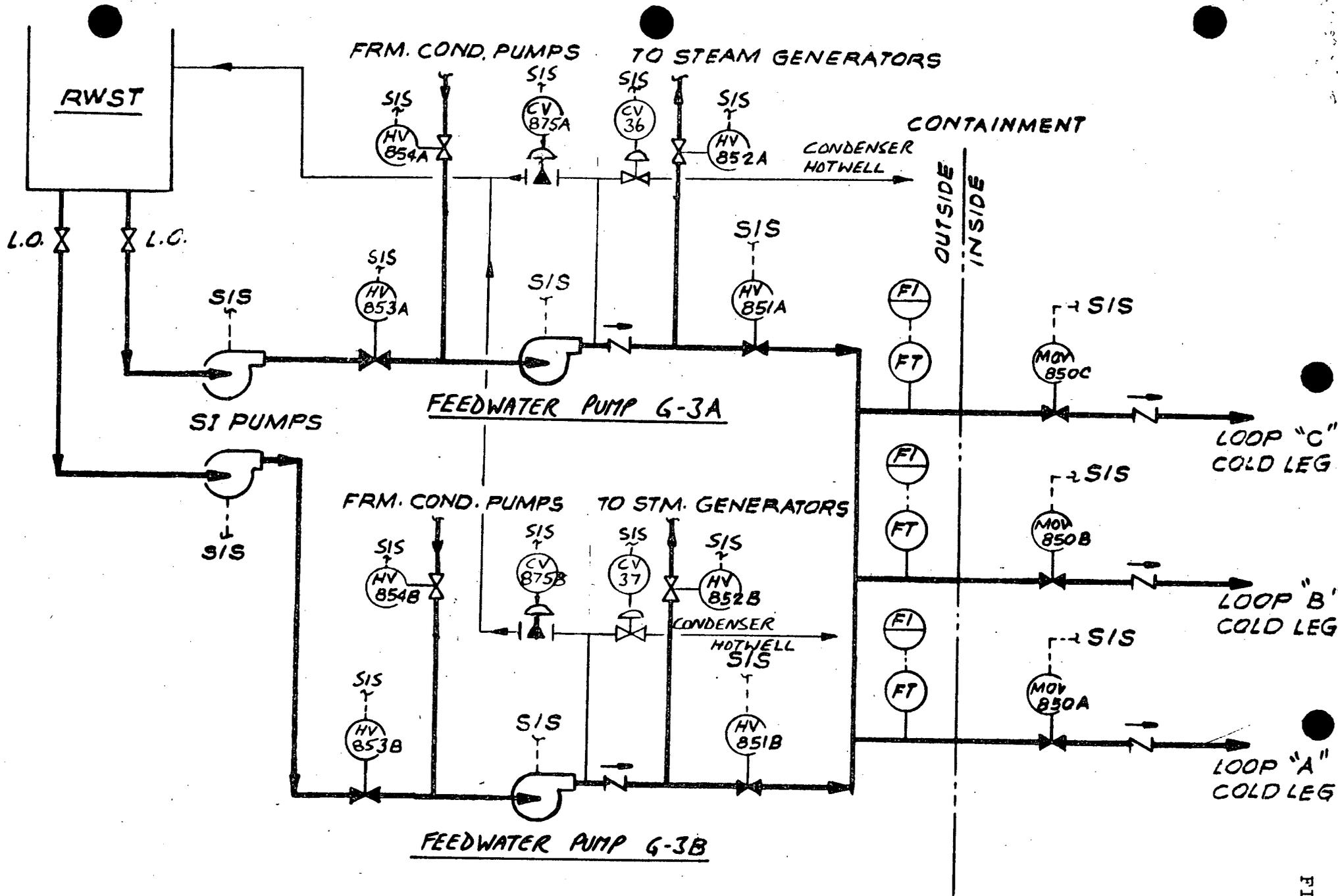
Control and Logic Modification

The control logic for the following components will require revision to implement the proposed design.

- a. SI discharge valves HV-851 A & B,
- b. SI suction valves HV-853 A & B,
- c. FW discharge valves HV-852 A & B,
- d. FW suction valves HV-854 A & B,
- e. Feedwater pump recirculation valves CV875 A & B,
- f. Feedwater pump recirculation valves CV36 and CV37,
- g. Condensate and feedwater pumps' start/stop controls.

SCHEDULE

Figure 3 represents a conceptual schedule for performing engineering, procurement and construction to modify the Safety Injection System by adding two new feedwater pumps.



AS BUILT SYSTEM

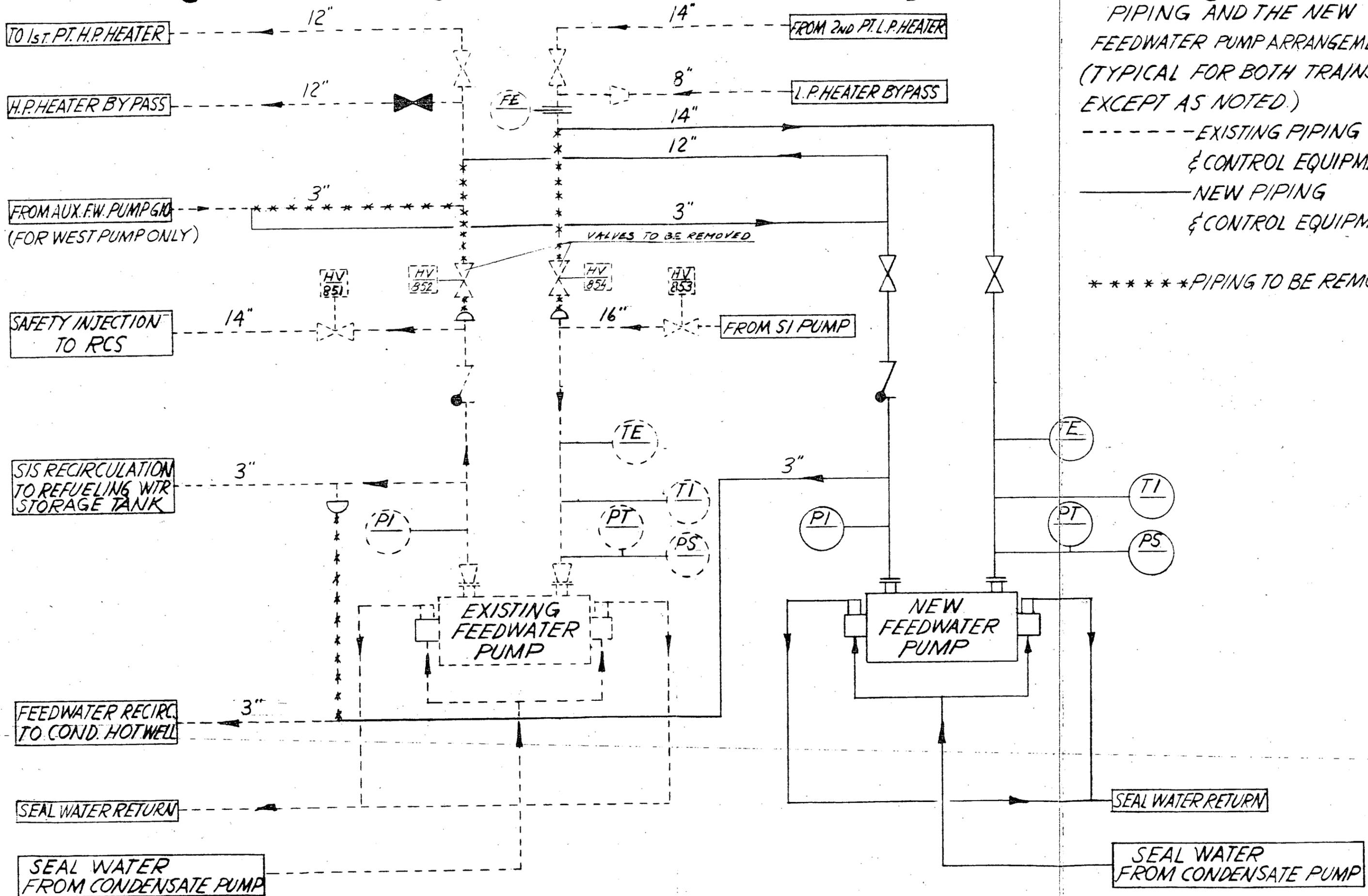
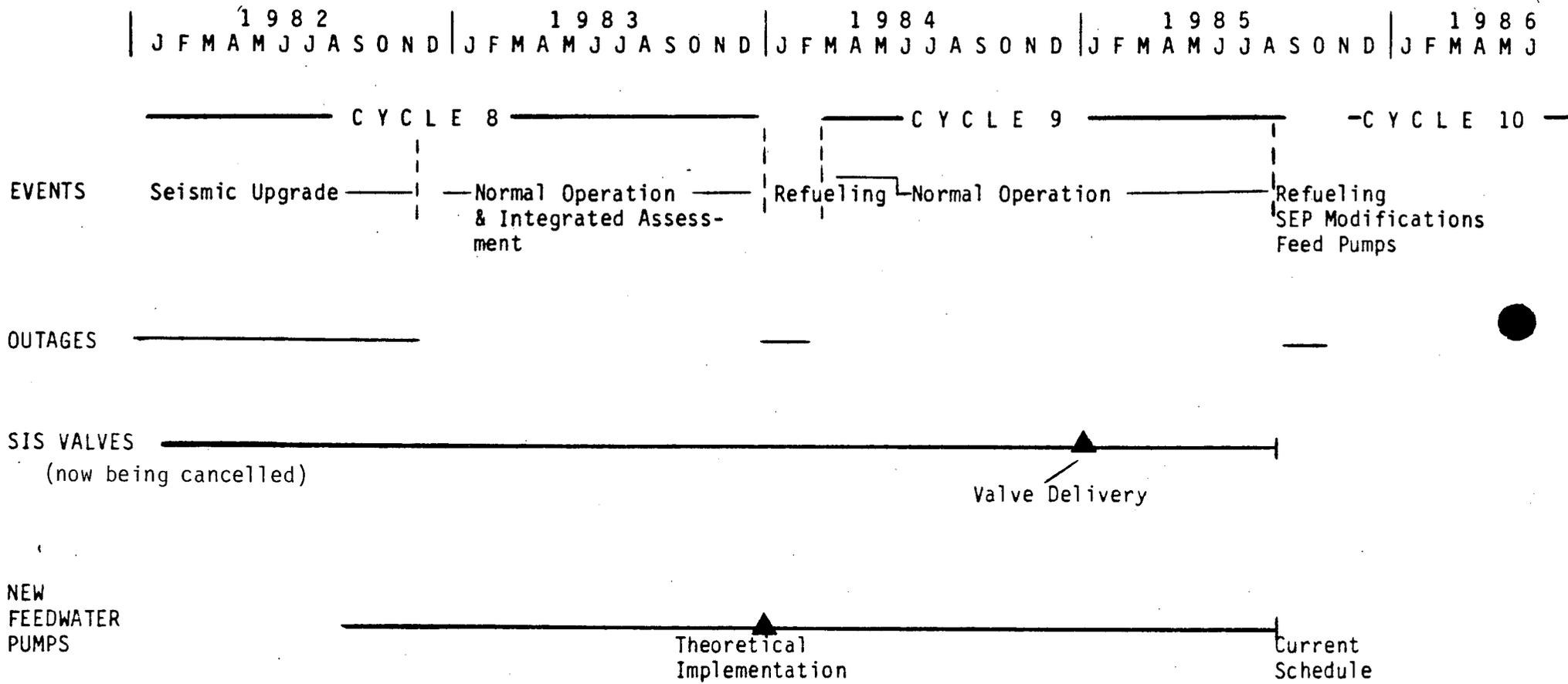


FIG. 2. MODIFICATIONS TO THE EXISTING PIPING AND THE NEW FEEDWATER PUMP ARRANGEMENT (TYPICAL FOR BOTH TRAINS EXCEPT AS NOTED.)

----- EXISTING PIPING & CONTROL EQUIPMENT
 _____ NEW PIPING & CONTROL EQUIPMENT
 ***** PIPING TO BE REMOVED



I N T E G R A T E D S C H E D U L E

Figure 3