

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 Document Control Branch (Document Control Desk)

SUBJECT: Provides info requested by GC Sorensen 870106-1tr re
 implementation of mods to address 10CFR50.62 requirements
 for ATWS rule, including recirculation pump trip, alternate
 rod insertion sys design & standby liquid control sys.

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 TITLE: OR/Licensing Submittal: Salem ATWS Events GL-83-28

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For ATIS this includes recirculation pump trip, alternator
trip, oil pressure low, and other engine trip signals.
The ATIS also provides a means for the engine to be
started and to be stopped. The ATIS also provides a
means for the engine to be started and to be stopped.

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Washington Public Power Supply System

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April 13, 1987
G02-87-131

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Docket No. 50-397

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Gentlemen:

Subject: NUCLEAR PLANT NO. 2
OPERATING LICENSE NPF-21, RESPONSE TO REQUEST
FOR INFORMATION - NRC ATWS RULE, 10 CFR 50.62

- References:
- 1) Letter, JO Bradfute (NRC) to GC Sorensen (SS), "10CFR50.62 ATWS Rule", dated January 6, 1987
 - 2) Letter, G02-85-718, GC Sorensen (SS) to WR Butler (NRC), "Anticipated Transients Without Scram Implementation Schedule", dated October 14, 1985
 - 3) Letter, EG Adensam (NRC) to GC Sorensen (SS), "Anticipated Transients Without Scram Implementation Schedule", dated August 19, 1986
 - 4) NEDE-31096-P, Licensing Topical Report, Anticipated Transients Without Scram, Response to NRC ATWS Rule, 10CFR50.62, December 1985
 - 5) NUREG-0892, Safety Evaluation Report related to the operation of WPPSS Nuclear Project No. 2, March 1982
 - 6) Letter, G02-87-002, GC Sorensen (SS) to EG Adensam (NRC), "Request for Amendment to Technical Specification 3/4.1.5, Figure 3.1.5-1 and 3.1.5-2, Standby Liquid Control System", dated January 6, 1987
 - 7) Generic Letter 85-06, Quality Assurance Guidance for ATWS Equipment that is not Safety Related, dated April 16, 1985

The purpose of this letter is to provide the Nuclear Regulatory Commission the information requested in Reference 1. This information is provided under the requirements of 10CFR50.62(c).6.

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April 13, 1987

RESPONSE TO REQUEST FOR INFORMATION - NRC ATWS RULE, 10 CFR 50.62

The Supply System has committed to implement modifications to address the requirements of 10CFR50.62, ATWS Rule, prior to startup following the Spring 1988 refueling outage (Reference 2). Our plan for implementation was based on completing selected portions of the modifications during the refueling outages between October 1985 and Spring 1988. The NRC accepted this implementation schedule in Reference 3. These modifications will be implemented in accordance with the criteria presented in NEDE-31096-P (Reference 4). In summary, the ATWS recirculation pump trip (RPT) modifications were completed as a prerequisite to obtaining the WNP-2 operating license. The Supply System does not plan to modify the system design logic that was implemented and reviewed by the NRC (see Reference 5) prior to obtaining an operating license. The alternate rod insertion system (ARI) design has not yet been completed. Installation of those portions of ARI design that have been completed is scheduled to begin during the Spring 1987 refueling outage with final design and installation scheduled for the Spring 1988 outage. Standby liquid control system (SLC) modifications to achieve an equivalent 86 gpm - 13% sodium pentaborate decahydrate injection rate are planned for completion during the Spring 1987 outage. A request for change to the SLC system technical specifications to reflect the equivalency requirements necessary for WNP-2 has been submitted to the NRC for approval (Reference 6).

The design and installation of the ARI and SLC system modifications are being performed under plant programs that comply with the applicable portions of 10CFR50, Appendix B. Application of these programs ensures that the guidance provided by Generic Letter 85-06 (Reference 7) has been met during the design and installation of the modifications.

The WNP-2 FSAR will be revised in accordance with 10CFR50.71e to describe the plant modifications when they are implemented. A detailed description of each ATWS mitigating system is provided below.

Recirculation Pump Trip (RPT)

The WNP-2 ATWS-RPT logic provides redundant and diverse trip signals from high reactor vessel pressure and low reactor water vessel level that are separate and independent from the reactor trip system. Figure 1 provides a simplified logic diagram for RPT. The logic configuration is a one out of two for reactor water level and/or reactor pressure. Each recirculation pump drive motor has three field breakers in series. The two breakers nearest the pump drive motors are qualified as Class 1E and are the breakers that receive the trip signal from the ATWS-RPT trip logic. In addition, the low frequency motor generator set output breakers are also tripped by the RPT logic. Testability features are included in the design to allow testing of the trip sensors during recirculation system operation.



Alternate Rod Insertion System Design (ARI)

The WNP-2 ATWS-ARI system is designed to begin control rod motion insertion 15 seconds after an abnormal operating occurrence and complete control rod insertion within 25 seconds. Figure 2 is a simplified schematic showing the location of the new valves in the CRD scram air header. Figures 3 and 4 are simplified block diagrams showing the ARI system logic.

The design is redundant, physically separated and electrically independent from the reactor trip system and any other plant system and, therefore, doesn't require isolators. All equipment, including the solenoid valves, are energized to operate DC powered.

The ARI system, up to and including the solenoid valves, is testable during plant operation and provides operator information on system status in the main control room. Automatic initiation due to vessel level and pressure is supported by manual initiation, if required.

Table I is Appendix A taken from the Staff SER (Reference 1) and has been completed to show the extent of ARI design compliance with the guidelines in the BWROG Licensing Topical Report NEDE-31096-P.

Standby Liquid Control System Modifications

The SLC system will be modified to provide for 1) two pump operation, i.e., both SLC pumps can be operated simultaneously, and 2) an increase in SLC storage tank sodium pentaborate decahydrate concentrations to achieve an equivalent 86 gpm - 13% SLC injection rate. Figure 5 is a simplified flow diagram showing the changes that will be made. To provide for pump operating performance flexibility, a minimum allowable pumping rate of 41.2 gpm for a single pump and 82.4 for both pumps was established. At the minimum allowable two-pump injection rate, the minimum sodium pentaborate decahydrate concentration that will provide the required SLC injection rate is 13.6%. This concentration was determined using the equivalency formula in NEDE-31096-P (Reference 4). A maximum concentration of 15% was selected to provide operating and analysis margin while retaining the original SLC system design basis. Performance of the system during two-pump operation was evaluated to assure that sufficient pump suction NPSH was available to support both pumps and to determine if discharge piping pressure loss would prevent the delivery of the required injection rate to the vessel. Calculations show that sufficient NPSH is available and therefore no suction piping modifications are required. SLC discharge piping modifications to inject borated water via the HPCS line just external to the reactor vessel will be implemented to eliminate concerns regarding the existing discharge piping capability, i.e., excessive pressure loss through the bottom of vessel standpipe and to utilize the NRC's preferred injection location. Our emergency procedures will be revised as required to incorporate Revision 4 of the Emergency Procedures Guidelines for vessel level control and recovery during a postulated ATWS with SLC injection inside the core shroud region.



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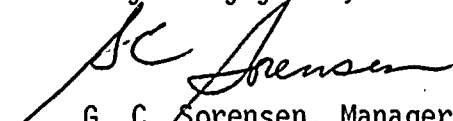
April 13, 1987

RESPONSE TO REQUEST FOR INFORMATION - NRC ATWS RULE, 10 CFR 50.62

SLC pump control logic and key lock switches will be modified to allow operation of either or both pumps. Flow monitoring instrumentation will be modified to provide SLC flow rate indication in the control room for all anticipated operating modes. Since the maximum allowable operating sodium pentaborate decahydrate concentration will be increased from 13.8% to 15.0% (resulting in the maximum saturation temperature increasing from 61°F to 68°F), heat tracing will be added to the pump suction piping from the storage tank to the suction isolation valves, and the control point of the tank heater increased from 75°F to 80°F. The changes will eliminate the potential for boron precipitation which could disable or impair the system capabilities.

If you have any questions, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing on (509) 377-2298.

Very truly yours,



G. C. Sorensen, Manager
Regulatory Programs

cc: JO Bradfute - NRC
JB Martin - NRC RV
E Revell - BPA
NS Reynolds - BLCP&R
NRC Site Inspector



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TABLE I - APPENDIX A FROM SER ON NEDE-31096-P

CHECKLIST FOR PLANT SPECIFIC REVIEW OF
ALTERNATE ROD INJECTION SYSTEM (ARI)

	<u>Conformance with ARI SER</u>
1. ARI system function time	
Rod injection motion will begin within 15 seconds and be completed within 25 seconds from ARI initiation	<u>Yes</u>
2. Safety-related requirements	
(a) Class 1E isolators are used to interface with safety-related systems	<u>No *</u>
(b). Class 1E isolators are powered from a Class 1E source	<u>No *</u>
(c) Isolator qualification documents are available for staff audit	<u>No *</u>
3. Redundancy	
The ARI system performs a function redundant to the backup scram system	<u>Yes</u>
4. Diversity from existing RTS	
(a) ARI system is energize-to-function	<u>Yes</u>
(b) ARI system uses DC powered valves	<u>Yes</u>
(c) Instrument channel components (excluding sensors but including all signal conditioning and isolation devices) are diverse from the existing RTS components.	<u>Yes</u>
5. Electrical independence from the existing RTS	
(a) ARI actuation logic separate from RTS logic	<u>Yes</u>
(b) ARI circuits are isolated from safety related circuits	<u>Yes *</u>



Conformance
with ARI SER

- | | | |
|-----|---|------------|
| 6. | Physical separation from the existing RTS | |
| | (a) ARI system is physically separated from RTS | <u>Yes</u> |
| 7. | Environmental Qualification | |
| | ARI equipments are qualified to conditions during an ATWS event up to the time the ARI function is complete | <u>Yes</u> |
| 8. | Quality Assurance | |
| | (a) Comply with Generic Letter 85-06 | <u>Yes</u> |
| 9. | Safety-related power supply | |
| | (a) ARI system power independent from RTS | <u>Yes</u> |
| | (b) ARI system can perform its function during any loss-of-offsite power event | <u>Yes</u> |
| 10. | Testability at Power | |
| | (a) ARI testable at power | <u>Yes</u> |
| | (b) Bypass features conform to bypass criteria used in RTS | <u>Yes</u> |
| 11. | Inadvertent Actuation | |
| | (a) ARI Actuation setpoints will not challenge scram | <u>Yes</u> |
| | (b) Coincident logic is utilized in ARI design | <u>Yes</u> |
| 12. | Manual Initiation | |
| | (a) Manual initiation capability is provided | <u>Yes</u> |
| 13. | Information Readout | |
| | (a) Information readout is provided in main control room | <u>Yes</u> |
| 14. | Completion of protective action once it is initiated | <u>Yes</u> |

* The WNP-2 ATWS-ARI design is separate and independent from the reactor protection system and all components are qualified as Class 1E. Therefore, isolators are not required for power or interface with other safety related systems.



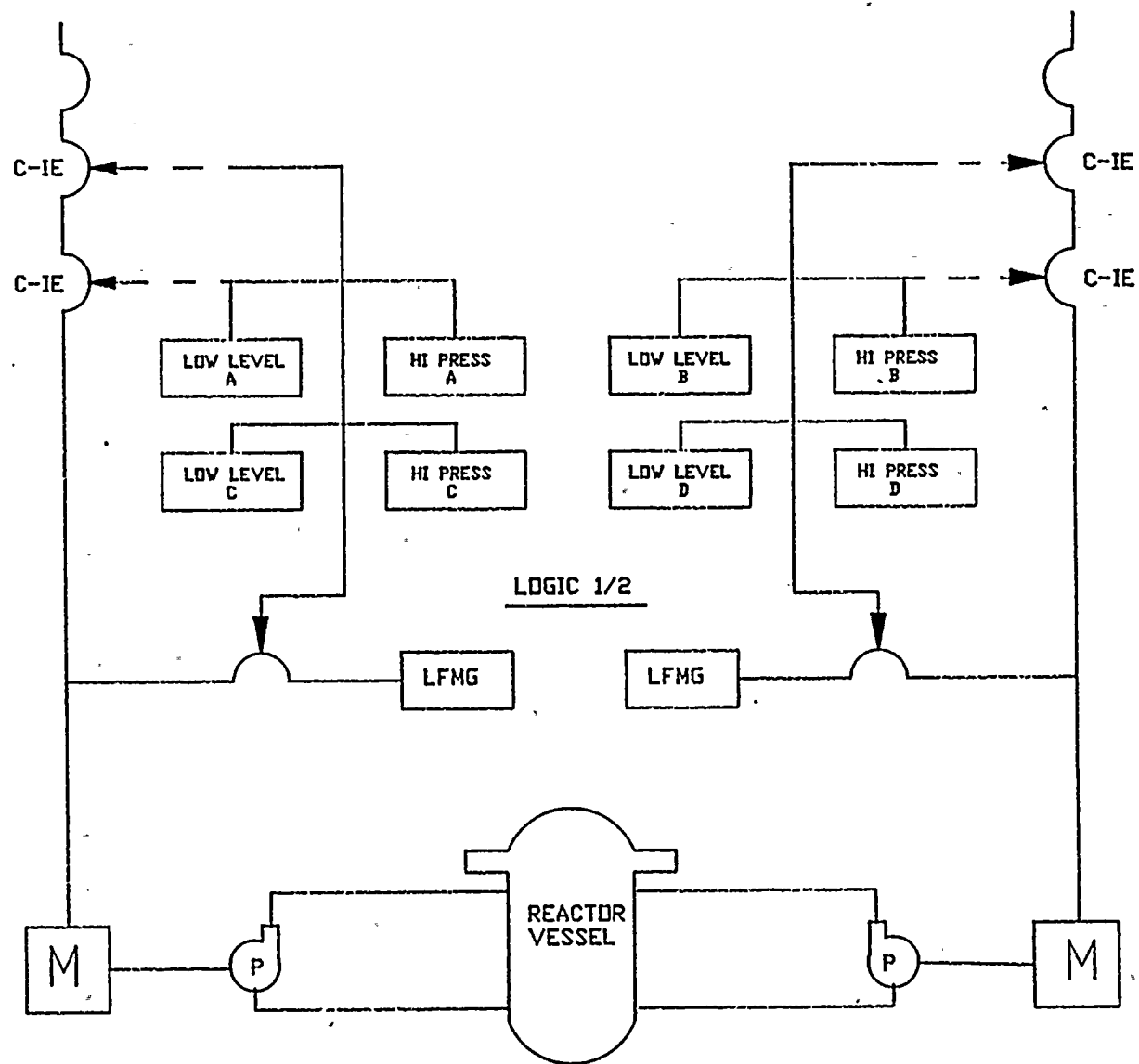
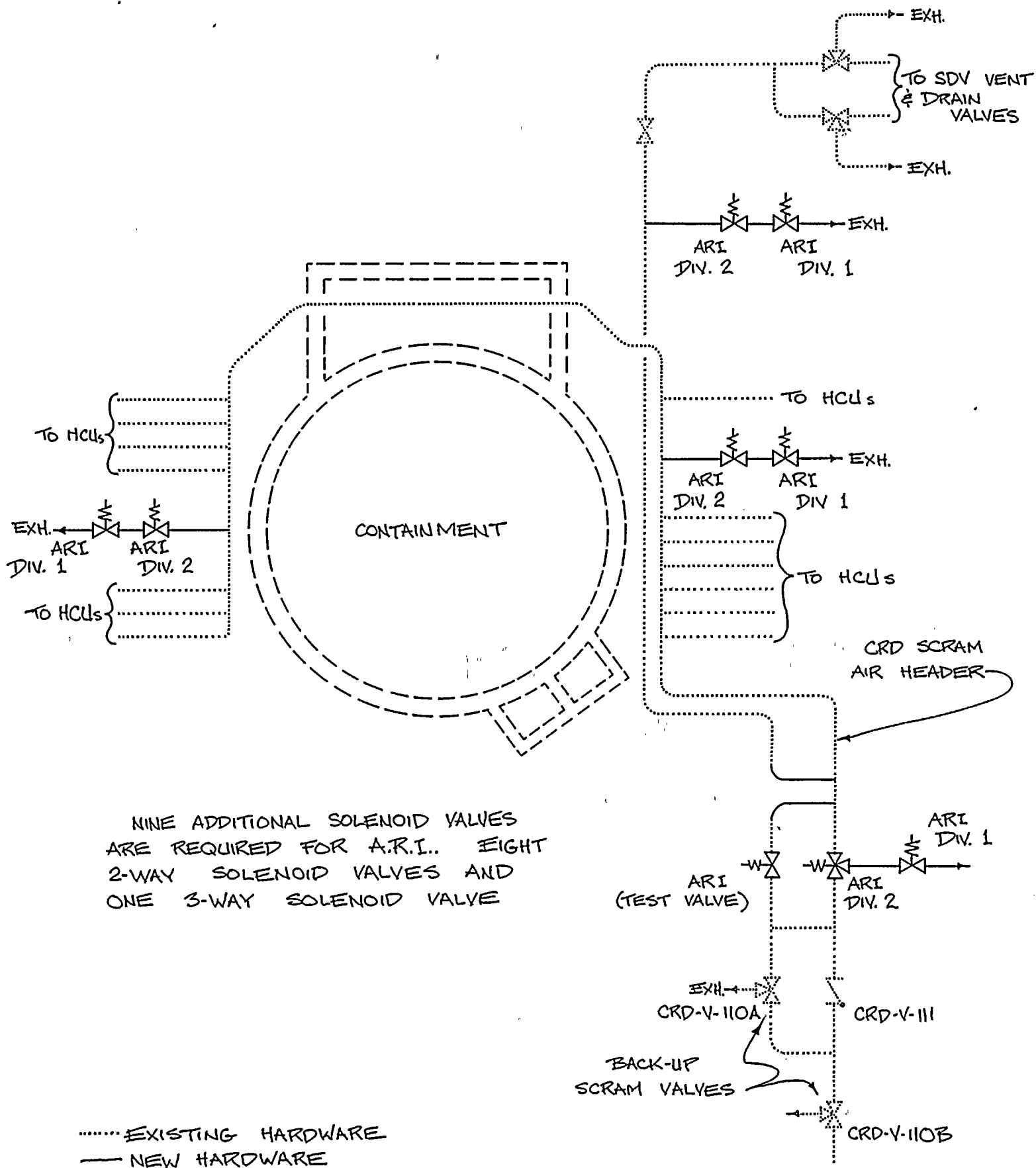


FIGURE 1
WNP-2 ATWS RECIRCULATION PUMP TRIP





NINE ADDITIONAL SOLENOID VALVES
 ARE REQUIRED FOR A.R.I.. EIGHT
 2-WAY SOLENOID VALVES AND
 ONE 3-WAY SOLENOID VALVE

FIGURE 2

WNP-2 ARI CRD SCRAM AIR HEADER



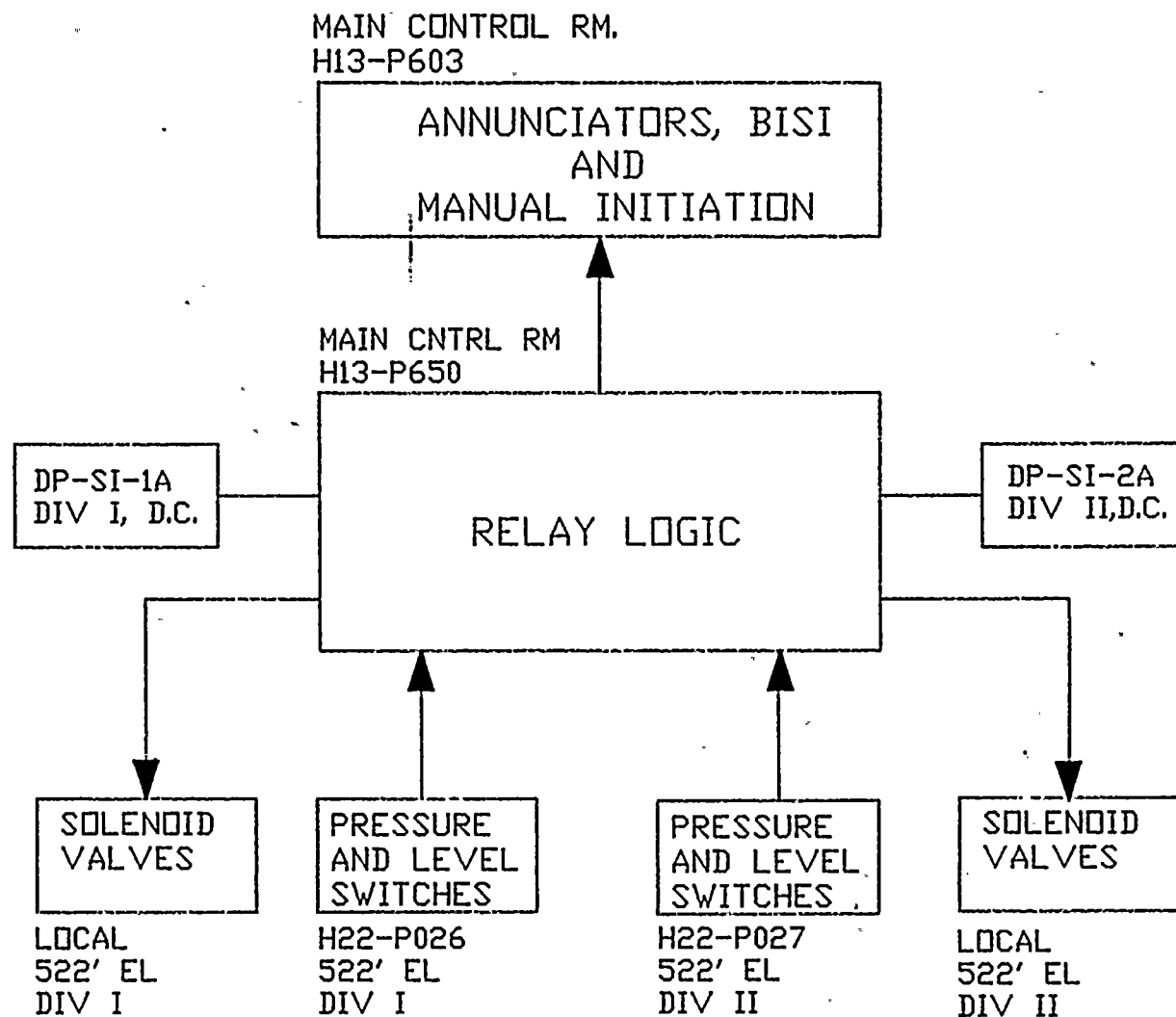


FIGURE 3

BLOCK DIAGRAM WNP-2 ALTERNATE ROD INSERTION

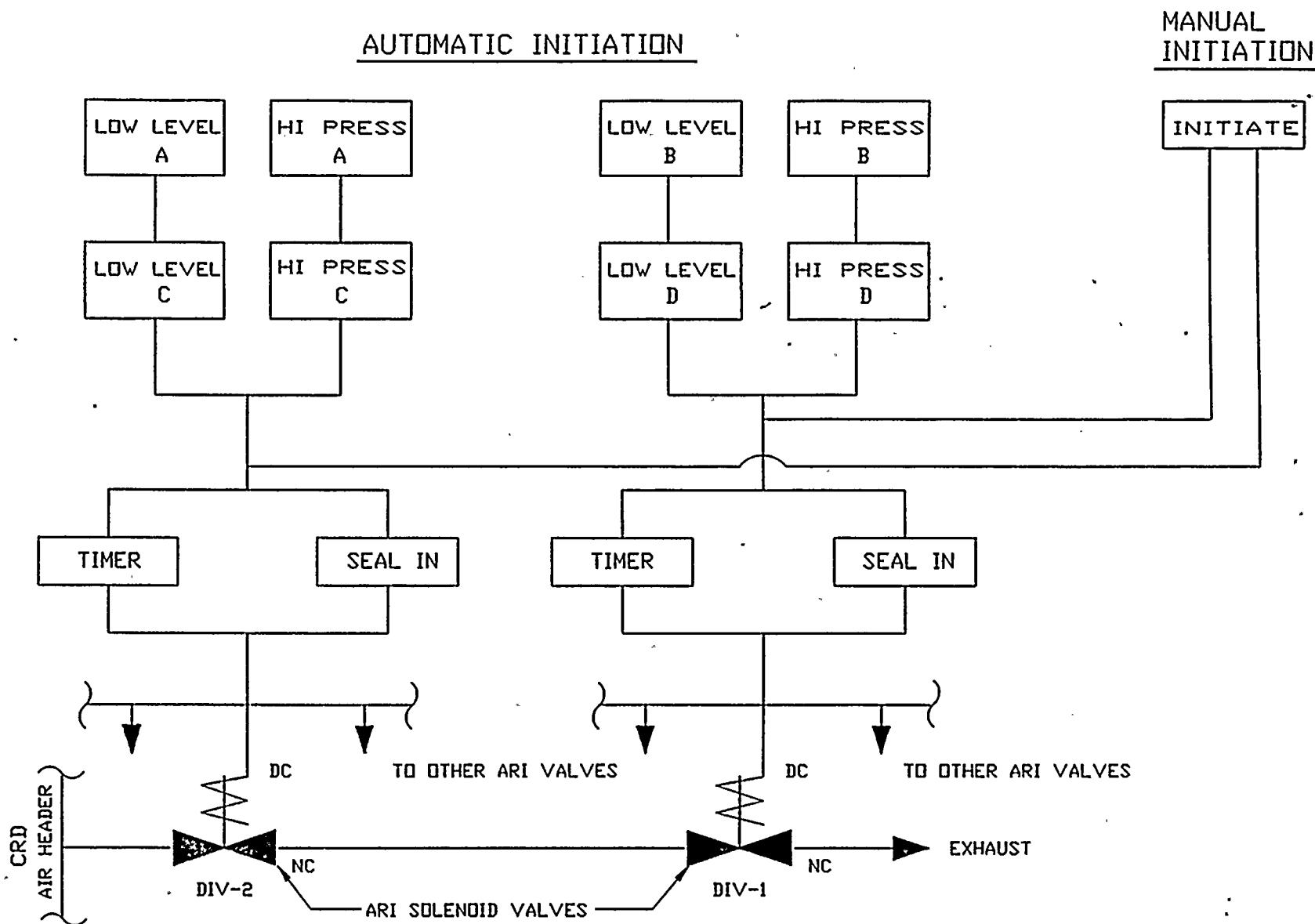
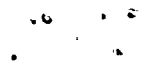


FIGURE 4

BLOCK DIAGRAM WNP-2 ALTERNATE ROD INSURTION SYSTEM



WNP-2 STANDBY LIQUID CONTROL SYSTEM (ATWS)