SSAR MODIFICATION PAGES

List of Figures (Continued)

List of Figures (Continued)

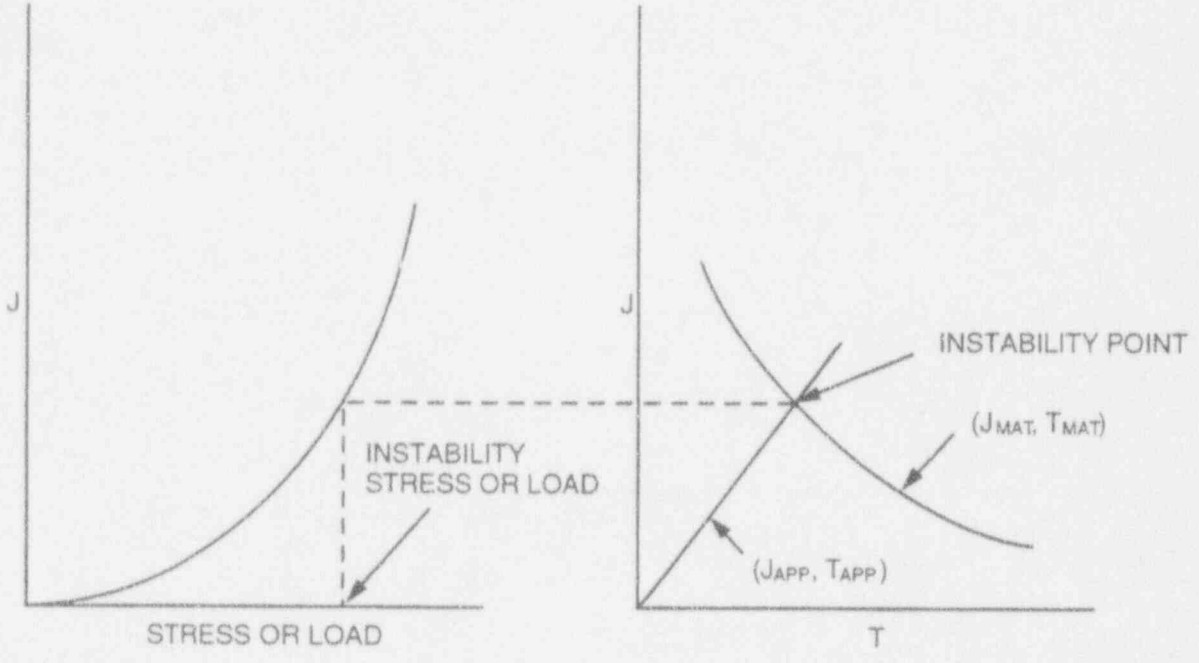


Figure 3E-14 Schematic Illustration of Tearing Stability Evaluation

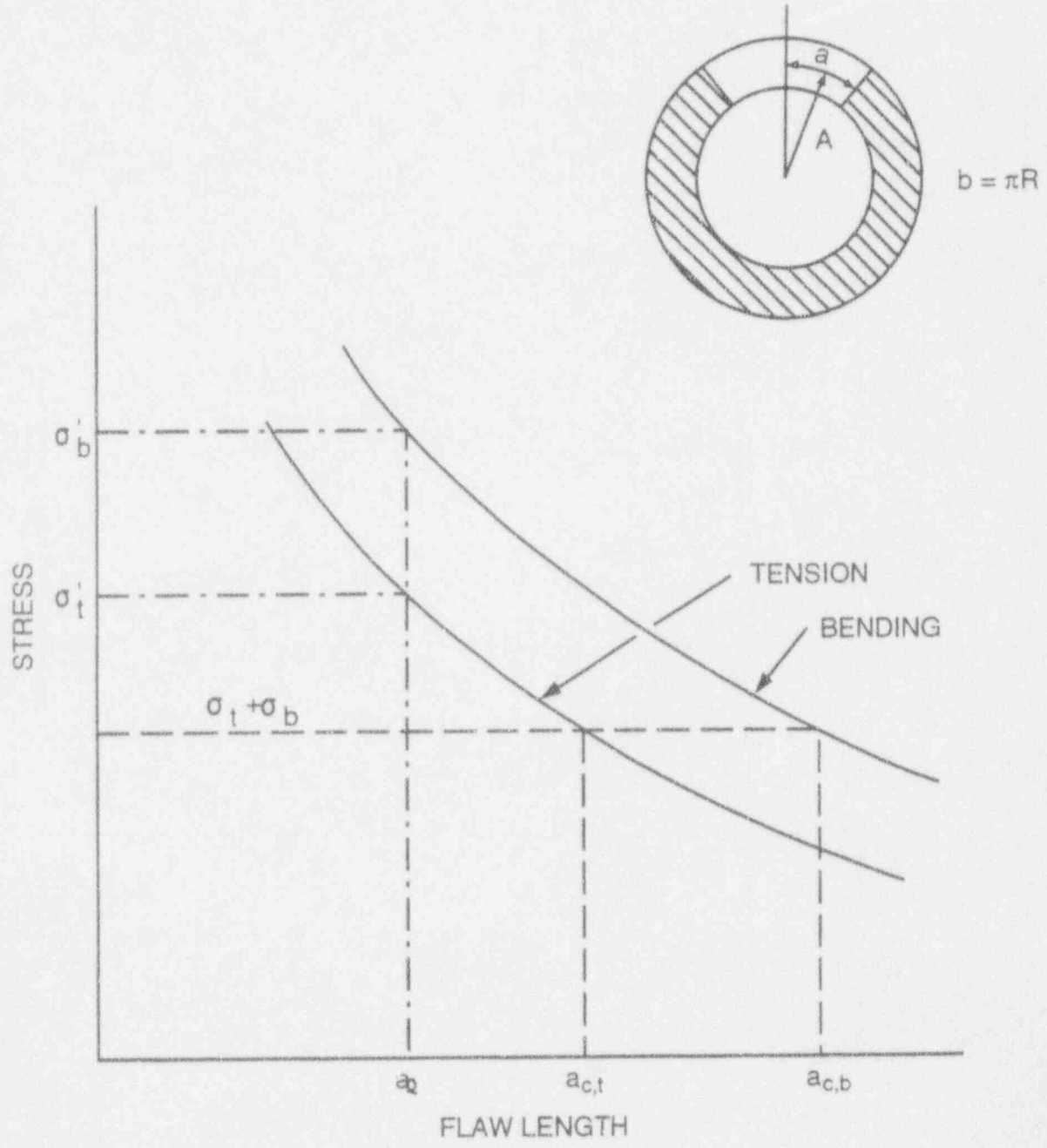


Figure 3E-15 A Schematic Representation of Instability Tension and Bending Stresses as a Function of Flaw Strength

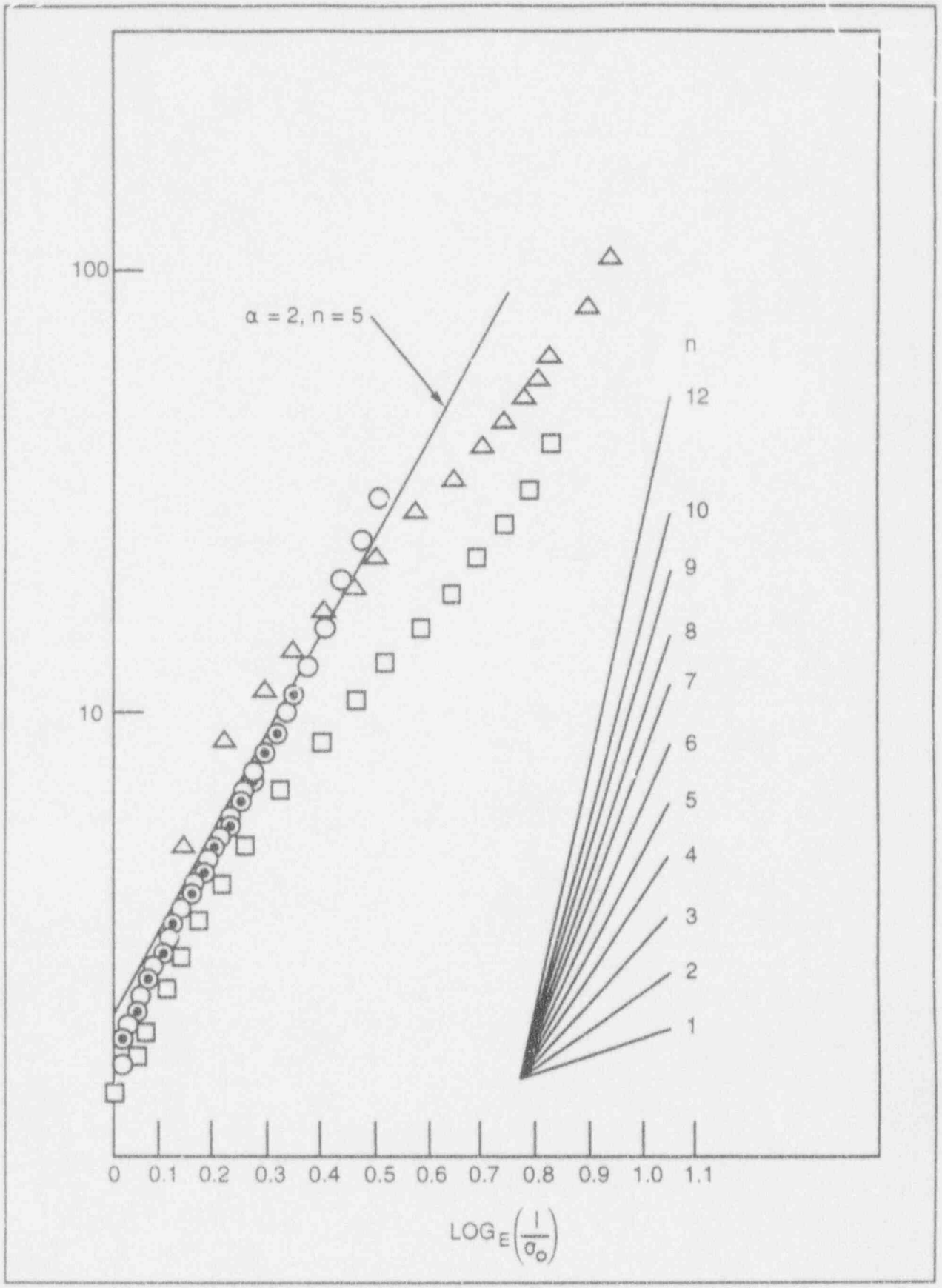


Figure 3E-16 SA 333 Grade 6 Stress-Strain Data at 288°C in the Ramberg-Osgood Format

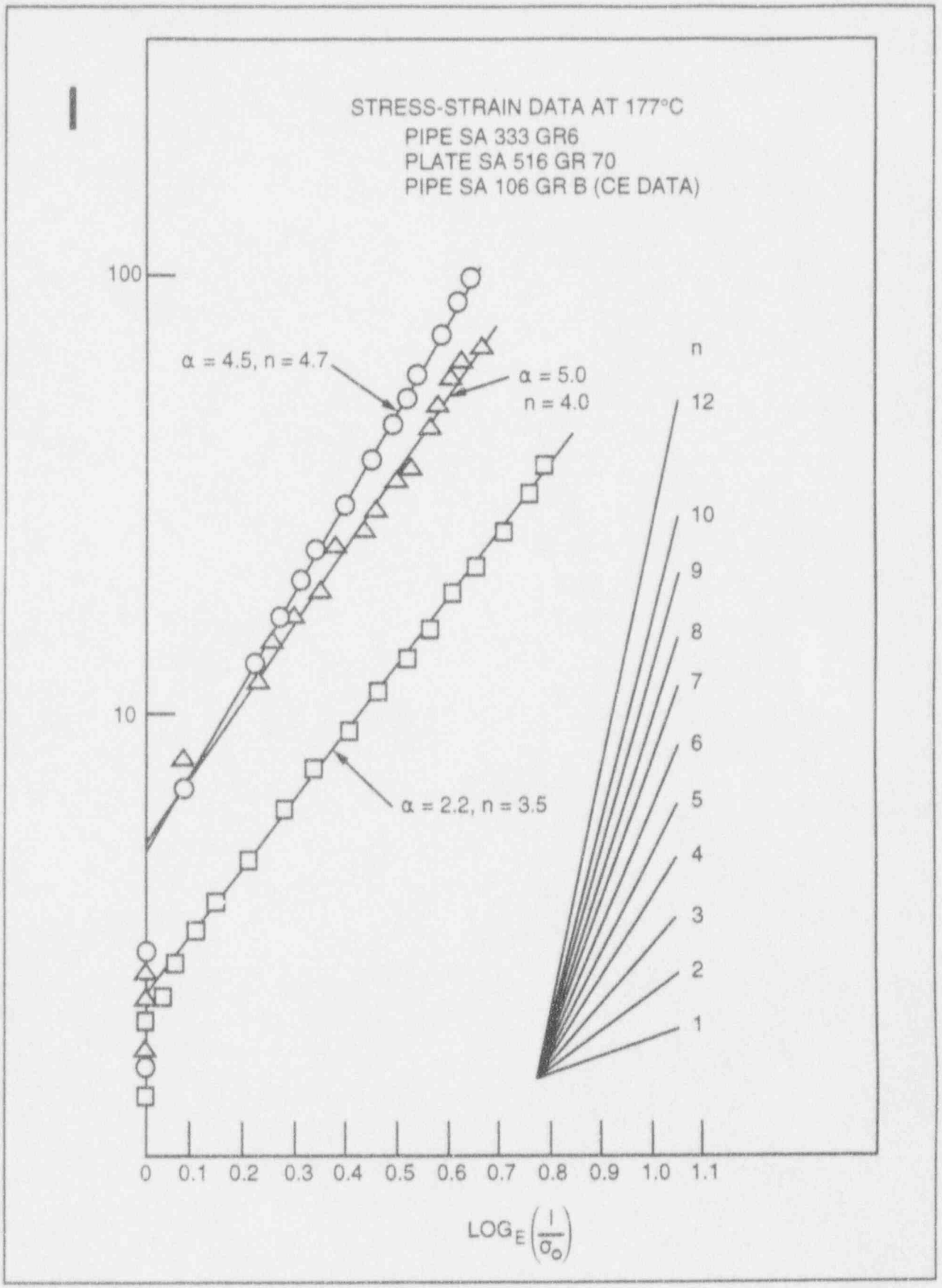


Figure 3E-17
Carbon Steel Stress-Strain Data at 177°C in the Ramberg-Osgood Format

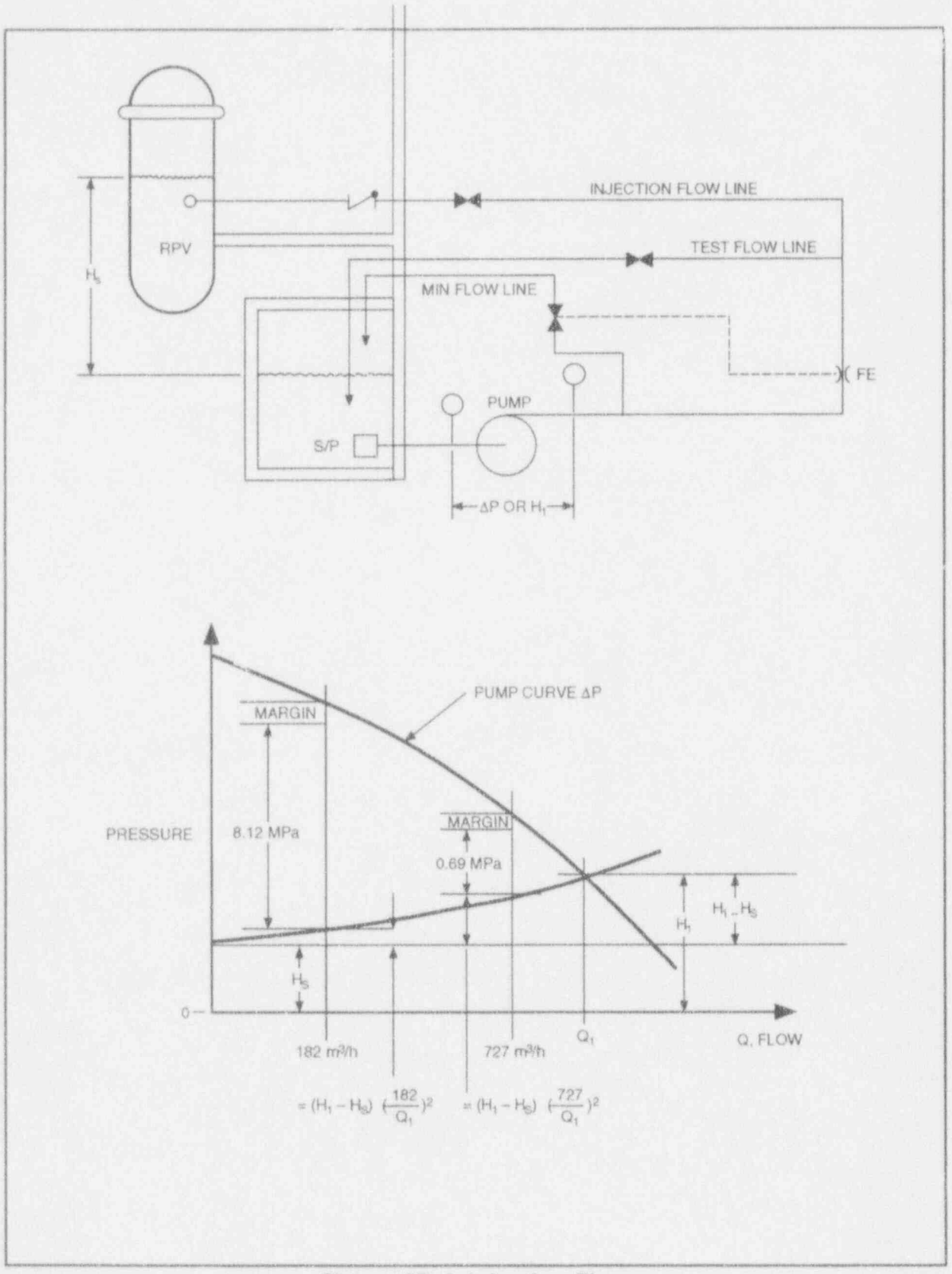


Figure 6D-1 Injection Flow

Certain localized events are evaluated at other than the above-mentioned conditions. These conditions are discussed pertinent to the appropriate event.

The power/flow operating map for a plant may differ from that used in the system response analysis given in this chapter. Differences in the map will not change the designation of limiting events. The operating map used at a plant will be provided by the COL applicant to the USNRC for information (Subsection 4.4.2.1).

15.0.4.5 Evaluation of Results

The results of the system response analyses are presented in Table 15.0-2. Based on these results, the limiting events have been identified. Reasons why the other events are not limiting are given in the event documentation. The limiting events which establish CPR operating limit include:

(1) **Limiting Pressurization Events:** Inadvertent closure of one turbine control valve and generator load rejection with all bypass valve failure.

(2) **Limiting Decrease in Core Coolant Temperature Events:** Feedwater Controller Failure—Maximum Demand

For the core loading in Figure 4.3-1, the resulting initial core MCPR operating limit is 1.17. The operating limit based on the plant loading pattern will be provided by the COL applicant to the USNRC for information (Subsection 15.0.5.2 for COL license information requirement).

Results of the transient analyses for individual plant reference core loading patterns will differ from the results shown in this chapter. However, the relative results between core associated events do not change. Therefore, only the results of the identified limiting events given in Table 15.0-4 will be provided by the COL applicant to the USNRC for information (Subsection 15.0.5.1).

15.0.4.5.1 Effect of Single Failures and Operator Errors

The effect of a single equipment failure or malfunction or operator error is provided in Appendix 15A.

15.0.4.5.2 Analysis Uncertainties

The analysis uncertainties meet the criteria in Appendix 4B.

A summary of applicable accidents is provided in Table 15.0-5, which compares GE calculated amount of failed fuel to that used in worst-case radiological calculations for the core shown in Figure 4.3-1. Radiological calculations for a plant initial core will be provided by the utility to the USNRC for information (see Subsection 15.0.5 for COL license information requirements).

15.0.4.5.3 Barrier Performance

The significant areas of interest for internal pressure damage are the high-pressure portions of the reactor coolant pressure boundary (i.e., the reactor vessel and the high pressure pipelines attached to the reactor vessel). The plant shall meet the criteria in Appendix 4B.

15.0.4.5.4 Radiological Consequences

This chapter describes the consequences of radioactivity release for the core loading in Figure 4.3-1 during three types of events: (1) incidents of moderate frequency (anticipated operational occurrences); (2) infrequent incidents (abnormal operational occurrences); and (3) limiting faults (design basis accidents). For all events whose consequences are limiting, a detailed quantitative evaluation is presented. For nonlimiting events, a qualitative evaluation is presented or results are referenced from a more limiting or enveloping case or event.

15.0.5 COL License Information

15.0.5.1 Anticipated Operational Occurrences (AOO)

The results of the events identified in Subsection 15.0.4.5 for plant core loading will be provided by the COL applicant referencing the ABWR design to the USNRC for information.

15.0.5.2 Operating Limits

The operating limit resulting from the analyses normally provided in this subsection will be provided by the COL applicant referencing the ABWR design to the USNRC for information.

15.0.5.3 Design Basis Accidents

Results of the design basis accidents, including radiological consequences, will be provided by the COL applicant referencing the ABWR design to the USNRC for information.

reactor. The low level (L3) scram trip function meets the single-failure criterion. Four of the RIPs are tripped at Level 3.

15.2.7.3 Core and System Performance

The results of this transient simulation are presented in Figure 15.2-12. Feedwater flow terminates at approximately 5 seconds. Subcooling decreases, causing a reduction in core power level and pressure. As power level is lowered, the turbine steam flow starts to drop off because the pressure regulator is attempting to maintain pressure for the first 10 seconds. Water level continues to drop until, first, the recirculation flow is runback at Level 4 (L4) and then the vessel level (L3) scram trip setpoint is reached, whereupon the reactor is shut down and the four RIPs are tripped. Vessel water level continues to drop to the L2 trip. At this time, the remaining six RIPs are tripped and the RCIC operation is initiated. MCPR remains considerably above the safety limit, because increases in heat flux are not experienced. Therefore, this event does not have to be reanalyzed for specific core configurations.

15.2.7.4 Barrier Performance

The consequences of this event do not result in any temperature or pressure transient in excess of the criteria for which the fuel, pressure vessel or containment are designed; therefore, these barriers maintain their integrity and function as designed.

15.2.7.5 Radiological Consequences

The consequences of this event do not result in any fuel failure. Therefore, no analysis of the radiological consequences is required.

15.2.8 Feedwater Line Break

Refer to Subsection 15.6.6.

15.2.9 Failure of RHR Shutdown Cooling

The RHR System performs low pressure core cooling, containment heat removal, containment spray and shutdown cooling functions. The RHR System has three independent divisions, each of which contains the necessary piping, pumps, valves, heat exchangers, instrumentation and electrical power for operation. Each division also has its own cooling water supply, diesel generator and room cooling system. For the shutdown cooling function, each division has its own suction line from and return line to the RPV. Thus, each of the three RHR divisions is completely independent of the other divisions in its shutdown cooling function. The RHR System reduces the primary system temperature to 51.7°C within 24 hours of plant shutdown.

Normally, in evaluating component failure considerations associated with RHR System shutdown cooling mode operation, active pumps, valves or instrumentation would be

assumed to fail. If the single active failure criterion is applied to the RHR System, one of the three RHR divisions would be inoperable. However, the two operable RHR divisions could achieve cold shutdown to 100°C within 36 hours after reactor shutdown.

Failure of offsite power is another case which could affect the shutdown cooling function. The plant will have two independent offsite power supplies. If either or both offsite power supplies are lost, each RHR division has its own diesel generator which will permit operating that division at its rated capacity. Application of the single active failure criterion would still leave two RHR divisions operational.

The RHR System description and performance evaluation in Subsection 5.4.7 describes the models, assumptions and results for shutdown cooling with two RHR divisions operational.

15.2.10 COL License Information

15.2.10.1 Radiological Effects of MSIV Closures

COL applicants will evaluate the radiological effects of the inadvertent closure of MSIVs for the final plant design and the site parameters (Subsection 15.2.4.5.3).

15.2.11 References

15.2-1 F. G. Brutshscy, et al., *Behavior of Iodine in Reactor Water During Plant Shutdown and Startup*, August 1972 (NEDO-10585).

15.2-2 H. Careway, V. Nguyen, and P. Stancavage, *Radiological Accident—The CONAC03 CODE*, December 1981 (NEDO-21143-1).

15.3 Decrease in Reactor Coolant System Flow Rate

15.3.1 Reactor Internal Pump Trip

15.3.1.1 Identification of Causes and Frequency Classification

15.3.1.1.1 Identification of Causes

Reactor internal pump (RIP) motor operation can be tripped off by design for intended reduction of other transient core and RCPB effects, as well as randomly by unpredictable operational failures. Intentional tripping will occur in response to:

(1) Reactor vessel water level L3 setpoint trip (4 RIPs)

(2) Reactor vessel water level L2 setpoint trip (the other 6 RIPs)

(3) TCV fast closure or stop valve closure (the same 4 RIPs as L3 trip)

(4) High pressure setpoint trip (the same 4 RIPs as L3 trip)

(5) Motor overcurrent protection (single pump)

(6) Motor overload and short circuit protection (single pump)

Random tripping will occur in response to:

(1) Operator error.

(2) Loss of electrical power source to the pumps.

(3) Equipment or sensor failures and malfunctions which initiate the above intended trip response. However, all trip logics use redundant digital designs. Single failures in the UAT or MPT and/or their protection circuits can result in loss of preferred power source to the plant.

Thus, the worst single-failure event is a loss of electrical power bus, which supplies power to RIPs. Since four buses are used to supply power to the RIPs, the worst single failure can only cause three RIPs to trip.

A loss of AC power to station auxiliaries may cause RIPs to trip. However, not all RIPs would be tripped at the same time due to the M-G sets. Transients caused by a loss of AC power are discussed in Subsection 15.2.6.

The effect of an additional single failure on this event (i.e., trip of three RIPs) is the tripping of additional RIPs. For example, if an additional power bus fails at the same time, the number of RIPs tripped are five or six, instead of three. However, the

probability of this occurring is low . This event should be classified as a limiting fault. In this analysis, the trip of all RIPs is provided to bound the events of low probability.

When a rapid core flow reduction caused by a trip of all RIPs is sensed, a reactor scram is initiated to terminate the power generation. The core flow reduces rapidly due to the relatively small inertia of the RIPs. However, natural circulation is still available to keep the reactor core covered and cooled.

15.3.1.1.2 Frequency Classification

15.3.1.1.2.1 Trip of Three Reactor Internal Pumps

This transient event is categorized as one of moderate frequency.

15.3.1.1.2.2 Trip of All Reactor Internal Pumps

This event is categorized as an infrequent low probability event with special acceptance for fuel failure (see Subsection 15.3.1.5.2).

15.3.1.2 Sequence of Events and Systems Operation

15.3.1.2.1 Sequence of Events

15.3.1.2.1.1 Trip of Three Reactor Internal Pumps

Table 15.3-1 lists the sequence of events for Figure 15.3-1.

15.3.1.2.1.2 Trip of All Reactor Internal Pumps

Table 15.3-2 lists the sequence of events for Figure 15.3-2.

15.3.1.2.1.3 Identification of Operator Actions

15.3.1.2.1.3.1 Trip of Three Reactor Internal Pumps

Because no scram occurs for trip of three RIPs, no immediate operator action is required. As soon as possible, the operator should verify that no operating limits are being exceeded. The operator should also determine the cause of failure prior to returning the system to normal operation.

15.3.1.2.1.3.2 Trip of All Reactor Internal Pumps

The operator should ascertain that the reactor scram is initiated. If the main turbine and feedwater pumps are tripped resulting from reactor water level swell, the operator should regain control of reactor water level through RCIC operation, monitoring reactor water level and pressure after shutdown. When both reactor pressure and level are under control, the operator should secure RCIC as necessary. The operator should also determine the cause of the trip prior to returning the system to normal operation.

transients. Maintenance planned for performance during refueling outages must be conducted in such a way that it will have little or no impact on plant safety, on outage length or on other maintenance work.

The COL applicant will provide a complete O-RAP to be reviewed by the NRC. See Subsection 17.3.13.3 for COL license information

17.3.10 Owner/Operator's Reliability Assurance Program

The O-RAP that will be prepared and implemented by the ABWR owner/operator will make use of the information provided by GE-NE. This information will help owner/operator determine activities that should be included in the O-RAP. Examples of elements that might be included in an O-RAP are:

(1) **Reliability Performance Monitoring:** Measurement of the performance of equipment to determine that it is accomplishing its goals and/or that it will continue to operate with low probability of failure.

(2) **Reliability Methodology:** Methods by which the plant owner/operator can compare plant data to the SSC data in the PRA.

(3) **Problem Prioritization:** Identification, for each of the risk- significant SSCs, of the importance of that item as a contributor to its system unavailability and assignment of priorities to problems that are detected with such equipment.

(4) **Root Cause Analysis:** Determination, for problems that occur regarding reliability of risk-significant SSCs, of the root causes, those causes which, after correction, will not recur to again degrade the reliability of equipment.

(5) **Corrective Action Determination:** Identification of corrective actions needed to restore equipment to its required functional capability and reliability, based on the results of problem identification and root cause analysis.

(6) **Corrective Action Implementation:** Carrying out identified corrective action on risk-significant equipment to restore equipment to its intended function in such a way that plant safety is not compromised during work.

(7) **Corrective Action Verification:** Post-corrective action tasks to be followed after maintenance on risk significant equipment to assure that such equipment will perform its safety functions.

(8) **Plant Aging:** Some of the risk-significant equipment is expected to undergo age related degradation that will require equipment replacement or refurbishment.

(9) **Feedback to Designer:** The plant owner/operator will periodically compare performance of risk-significant equipment to that specified in the PRA and D-RAP, as mentioned in item 1, above, and, at its discretion, may feedback SSC performance data to plant or equipment designers in those cases that consistently show performance below that specified.

(10) **Programmatic Interfaces:** Reliability assurance interfaces related to the work of the several organizations and personnel groups working on risk-significant SSCs.

The plant owner/operator's O-RAP will address the interfaces with construction, startup testing, operations, maintenance, engineering, safety, licensing, quality assurance and procurement of replacement equipment.

17.3.11 D-RAP Implementation

An example of implementation of the D-RAP is given for the Standby Liquid Control System (SLCS). The purpose of the SLCS is to inject neutron absorbing poison into the reactor, upon demand, providing a backup rector shutdown capability independent of the control rods. The system is capable of operating over a wide range of reactor pressure conditions. The SLCS may or may not be identified by the final PRA as a significant contributor to CDF or to offsite risk. For the purpose of this example, it is assumed that the SLCS is identified as a significant contributor to CDF or to offsite risk.

17.3.11.1 SLCS Description

During normal operation, the SLCS is on standby, only to function in event the operators are unable to control reactivity with the normal control rods. The SLCS consists of a boron solution storage tank, two positive displacement pumps, two motor operated injection valves (provided in parallel for redundancy), and associated piping and valves used to transfer borated water from the storage tank to the reactor pressure vessel (RPV). The borated solution is discharged through the "B" high pressure core flooder (HPCF) subsystem sparger. A schematic diagram of the SLCS, showing major system components, is presented in Figure 17.3-7. Some locked open maintenance valves and some check valves are not shown. Key equipment performance requirements are:

(1)	Pump flow per pump	11.35 m^3/h per pump
(2)	Maximum reactor pressure (for injection)	8.6 MPa
(3)	Pumpable volume in storage tank (minimum)	23,090.9 L

Design provisions to permit system testing include a test tank and associated piping and valves. The tank can be supplied with demineralized water which can be pumped in a closed loop through either pump or injected into the reactor.

The SLCS uses a dissolved solution of sodium pentaborate as the neutron-absorbing poison. This solution is held in a heated storage tank to maintain the solution above its saturation temperature. The SLCS solution tank, a test water tank, the two positive displacement pumps, and associated valving are located in the secondary containment on the floor elevation below the operating floor. This is a Seismic Category I structure, and the SLCS equipment is protected from phenomena such as earthquakes, tornados, hurricanes and floods as well as from internal postulated accident phenomena. In this area, the SLCS is not subject to conditions such as missiles, pipe whip, and discharging fluids.

The pumps are capable of producing discharge pressure to inject the solution into the reactor when the reactor is at high pressure conditions corresponding to the system relief valve actuation. Signals indicating storage tank liquid level, tank outlet valve position, pump discharge pressure and injection valve position are available in the control room.

The pumps, heater, valves and controls are powered from the standby power supply or normal offsite power. The pumps and valves are powered and controlled from separate buses and circuits so that single active failures will not prevent system operation. The power supplied to one motor-operated injection valve, storage tank discharge valve, and injection pump is from Division 1, 480 VAC. The power supply to the other motor-operated injection valve, storage tank outlet valve, and injection pump is from Division II, 480 VAC. The power supply to the tank heaters and heater controls is connectable to a standby power source. The standby power source is Class 1E from an onsite source and is independent of the offsite power.

All components of the system which are required for injection of the neutron absorber into the reactor are classified Seismic Category I. All major mechanical components are designed to meet ASME Code requirements as shown below.

Component	ASME Code Class	Design Conditions	
		Pressure	Temperature
Storage Tank	2	Static Head	66°C
Pump	2	10.8 MPaG	66°C
Injection Valves	1	10.8 MPaG	66°C
Piping Inboard of Injection Valves	1	8.6 MPaG	302°C

17.3.11.2 SLCS Operation

The SLCS is initiated by one of three means: (1) manually initiated from the main control room; (2) automatically initiated if conditions of high reactor pressure and power level not below the Anticipated Transient Without Scram (ATWS) permissive power level exist for 3 minutes; or (3) automatically initiated if conditions of RPV water level below the Level 2 setpoint and power level not below the ATWS permissive power level exist for 3 minutes. The SLCS provides borated water to the reactor core to introduce negative reactivity effects during the required conditions.

To meet its negative reactivity objective, it is necessary for the SLCS to inject a quantity of boron which produces a minimum concentration of 850 ppm of natural boron in the reactor core at 20°C. To allow for potential leakage and imperfect mixing in the reactor system, an additional 25% (220 ppm) margin is added to the above requirement. The required concentration is achieved accounting for dilution in the RPV with normal water level and including the volume in the residual heat removal shutdown cooling piping. This quantity of boron solution is the amount which is above the pump suction shutoff level in the storage tank, thus allowing for the portion of the tank volume which cannot be injected.

17.3.11.3 Major Differences from Operating BWRs

The SLCS design is very similar to that of operating BWRS. Automatic actuation of the ABWR SLCS is similar to that incorporated in some operating BWRS. Because of the larger ABWR RPV volume, the pumping capacity has been increased from 9.8 to 11.4 m^3/h per pump. Injection of SLCS solution through the HPCF sparger has been shown by boron mixing tests to give better mixing than the operating plant injection through a standpipe.

Injection valves of operating plants are leak-proof explosive valves to keep boron out of the reactor during SLCS testing. In the ABWR the injection valves are motor operated

and a suction pipe fill system keeps the lines filled with distilled water at slightly higher pressure than that of the boron storage tank to preclude entry of boron into the reactor.

The motor-operated injection valves provide the following advantages over explosive valves:

(1) Radiation exposure to personnel is potentially reduced during testing and maintenance because less work will be required at the valves.

(2) Post-injection containment isolation capability is enhanced because the motor operated valves can be closed following boron injection. Explosive valves cannot be reclosed to provide containment isolation.

17.3.11.4 SLCS Fault Tree

The top level fault tree for the SLCS is shown in Figure 17.3-8, with the top gate defined as failure to deliver 11.4 m^3/h of borated water from the storage tank to the RPV. Details providing input to most of the events in Figure 17.3-8 are contained in the several additional branches to the fault tree.

It is assumed that the SLCS has been identified by the PRA as a system making significant contribution to CDF. A listing of the SLCS components or events by Fussell-Vesely Importance was made, and those SSCs with greatest importance are given in Table 17.3-1. No SSCs appear to be risk-significant because of aging or common cause considerations. The seven most significant components are listed in Table 17.3-2, so these SSCs should be considered as risk-significant candidates for O-RAP activities

17.3.11.5 System Design Response

The seven SLCS risk-significant components identified in Table 17.3-2 as having high importance in the SLCS fault tree are now considered for redesign or for O-RAP activities, as noted above. The flow chart of Figure 17.3-1 guides the designer.

Two of the events in Table 17.3-2 result from flow of SLCS fluid being diverted through relief valves back to pump suction rather than into the RPV. Since gate and check valve failures (which could result in relief valve operation) are accounted for by separate events, the relief valve failures of concern can be considered to be valve body failures or inadvertent opening of the relief valves. Plugging of the suction lines from the storage tank could result from some contamination of the tank fluid or collection of foreign matter in the tank. The pump failures to start upon demand could result from electrical or mechanical problems at the pumps or their control circuits.

Two AC electrical system failures that contribute to SLCS failure are identified in Table 17.3-2. No further details of electrical system failures or maintenance are

included here. That leaves the five components noted above for special attention with regard to reducing the risk of system failure.

(1) Redesign

The design evaluation of Figure 17.3-1 is used by the designer. The design assessment shows that the component failure rates are the same as those used in the PRA, so there is no need to recalculate the PRA. Also, no one SSC has a major impact on SLCS unavailability, so redesign or reselection of components is not required and the seven components are identified for consideration by the O-RAP.

Redesign considerations, if they had been required, would have included trying to identify more reliable relief valves and pumps and suction lines less likely to plug. The latter might be achieved by using larger diameter pipes or multiple suction lines. Pump and valve reliability might be enhanced by specific design changes or by selection of a different component. Any such redesign would have to be evaluated by balancing the increase in reliability against the added complication to plant equipment and layout.

(2) Failure Mode Identification

If redesign is not necessary, or after redesign has been completed, the appropriate O-RAP activities would be identified for the three SLCS component types identified by the fault tree and discussed above. This begins with determining the likely failure modes that will lead to loss of function, following the steps in Figure 17.3-2. The components of SLCS have adequate failure history to identify critical failure modes, so Assessment Paths A and C (Figures 17.3-3 and 17.3-5, respectively) would be followed to define the failure modes for consideration.

For the SLCS relief valves, past experience with similar valves shows that the major failure modes are fluid leakage from the valve body and a spurious opening as result of failure of the spring, the spring fastener, the valve stem or the disk. Past pump failures fall into two general categories, electrical problems resulting in failure to start on demand and mechanical problems that cause a running pump to stop or fail to provide rated flow. The plugging of fluid lines generally results from presence of sediment or precipitation of compounds from saturated fluid.

Following the flow chart of Figure 17.3-3, the designer would determine more details about each failure mode, including pieceparts most likely to fail and the frequency of each failure mode category or piecepart failure. This would result in a list of the dominant failure modes to be considered for the O-RAP.

18.5 Remote Shutdown System

The Remote Shutdown System (RSS) provides a means to safely shut down the plant from outside the main control room. It provides control of the plant systems needed to bring the plant to hot shutdown, with the subsequent capability to attain cold shutdown, in the event that the control room becomes uninhabitable.

The RSS design is described in Subsections 7.4.1.4 and 7.4.2.4. All of the controls and instrumentation required for RSS operation are identified in Subsection 7.4.1.4.4 and in Figure 7.4-2.

The RSS uses conventional, hardwired controls and indicators to maintain diversity from the main control room. These dedicated devices are arranged in a mimic of the interfacing systems process loops.

Evaluation of alternate design approaches for reliability and confirmation of the adequacy of the RSS design is COL license information (Subsection 18.8.6).

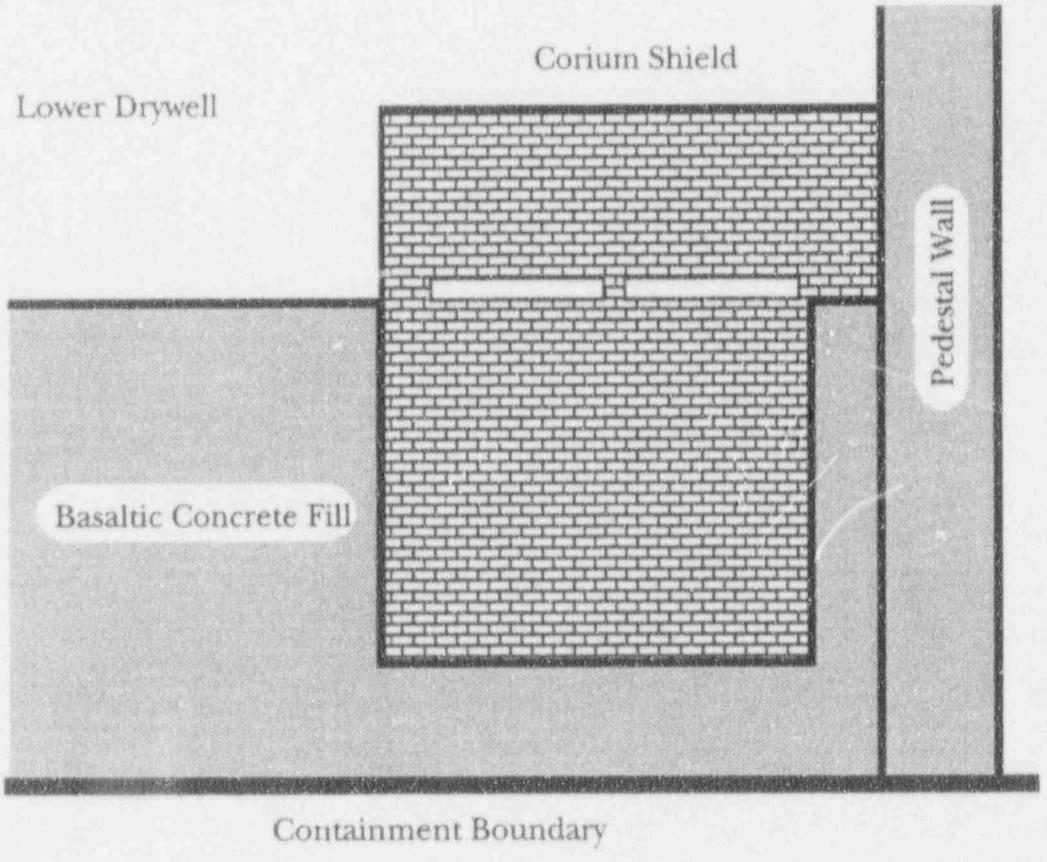


Figure 19ED-1 Conceptual Design of Lower Drywell Floor Drain Sump Shield

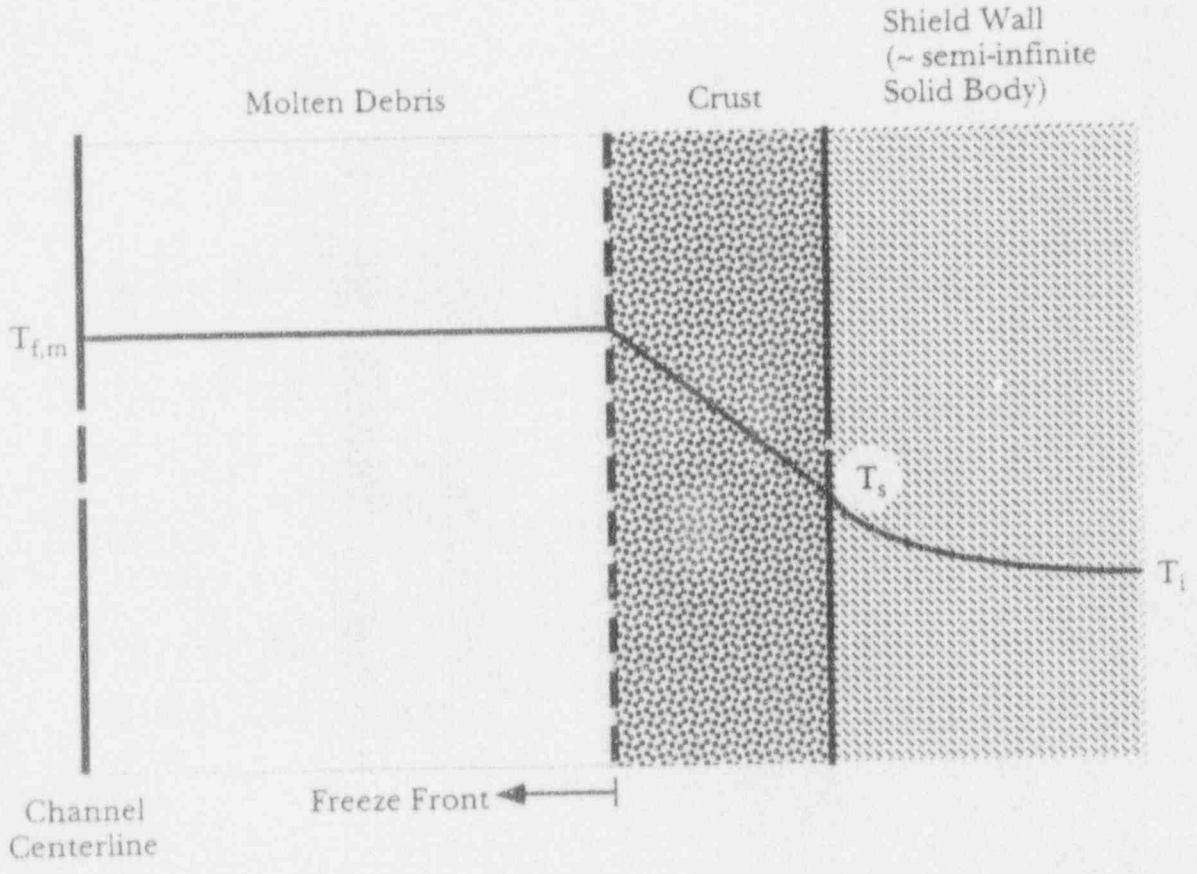


Figure 19ED-2 Temperature Profile in Channel Region

19L-5 A. Villemeur, et al. (Electricite de France), *Living Probabilistic Safety Assessment of a French 1300 MWe PWR Nuclear Power Plant Unit: Methodology, Results and Teachings*, Published at TUV-Workshop on Living PSA Application, Hamburg, FRG, May 7-8, 1990.

19L-6 *Advanced Light Water Reactor Requirements Document, Appendix A: PRA Key Assumptions and Ground Rules*, Draft, EPRI, August 1988.

19L-7 *Recommended Technical Specifications for Fuel Loading*, service information letter No. 372, General Electric, June 1982.

Table 19L-1 ABWR Modes of Operation

Mode*	Title	Reactor Mode Switch Position	Average Reactor Coolant Temperature, K (°C)
1	Power Operation	Run	Any temperature
2	Startup	Startup/Hot Standby	Any temperature
3	Hot Shutdown	Shutdown	>366.45 K (> 93.3°C)
4	Cold Shutdown	Shutdown	≤366.45 K (≤ 93.3°C)
5	Refueling	Shutdown or Refuel	≤366.45 K (≤93.3°C)†

* In Modes 1 through 4, fuel is in the reactor vessel with the reactor vessel head closure bolts fully tensioned. In Mode 5, fuel is in the reactor vessel with the reactor vessel head closure bolts less than fully tensioned or with the head removed.

† Technical specification states "any temperature", but in this mode the temperature will be below boiling point.

19Q.12.4 Reliability Goals (Input to RAP)

The following assumed system unavailabilities were determined to be important in minimizing shutdown risk and are included in the ABWR Reliability Assurance Program:

System	Unavailability (Per Demand)
RHR (SDC)	7E-2 per division
RHR (LPFL)	4E-2 per division
HPCF	5E-2
CRD	5E-4
CTG	5E-2
EDG	4E-3
Offsite Power	1E-3
ADS	6E-6
DC Power	7E-6

19Q.12.5 Conclusions

The ABWR has been evaluated for risks associated with shutdown conditions and for all postulated events, the risk has been determined to be low. Multiple means of removing decay heat and supplying inventory makeup have been identified that along with appropriate Technical Specifications and outage procedures result in acceptably low shutdown risk levels for the ABWR.

Table 19Q-1 ABWR Features That Minimize Shutdown Risk

Category	Feature	Shutdown Risk Capability
Decay Heat Removal (DHR)	Residual Heat Removal (RHR) System	Three independent (100% capacity) divisions of RHR and support systems for normal DHR. Each RHR division has several DHR modes (e.g., SDC, SPC).
	Reactor Coolant Temperature Measurement	During shutdown, reactor coolant temperature is determined by measuring Reactor Water Cleanup (CUW) inlet water temperature.
	Shutdown Cooling Nozzle	The shutdown cooling mode of RHR uses suction piping that connects directly to a nozzle on the RPV instead of to an external piping system. This reduces the probability of losing RHR pump suction due to air entrapment or cavitation.
	Safety Relief Valves	Can be used as alternate means of decay heat removal by venting steam to the suppression pool. They are also actuated to depressurize the RPV to allow use of low pressure RHR or other low pressure systems.
	Suppression Pool	A potential heat sink and makeup source for decay heat removal. Pool temperature is monitored in the control room to indicate trends in pool temperature. This large heat sink allows sufficient time for appropriate operator actions.
	Reactor Water Cleanup System (CUW)	Can be used under certain conditions to remove decay heat. See Subsection 19Q.7 and Attachment 19QB for more details on this feature.
	RPV Boiling	When the RPV head is removed, boiling is an effective (although not preferred) heat transfer method as long as RPV water level can be maintained by available makeup sources.
	Condenser	The main condenser (if available) can be used for DHR.
	Remote Shutdown Panel (Two Divisions)	Cold Shutdown can be achieved and maintained from outside the control room if the control room is uninhabitable due to fire, toxic gas, or other reasons. The remote shutdown panel is powered by Class 1E power to ensure availability following a Loss Of Preferred Power (LOPP). Controls are hard wired and thus not dependent on multiplexing systems. A minimum set of monitored parameters and controls are included to ensure the ability to achieve and maintain cold shutdown.

CDM MODIFICATION PAGES

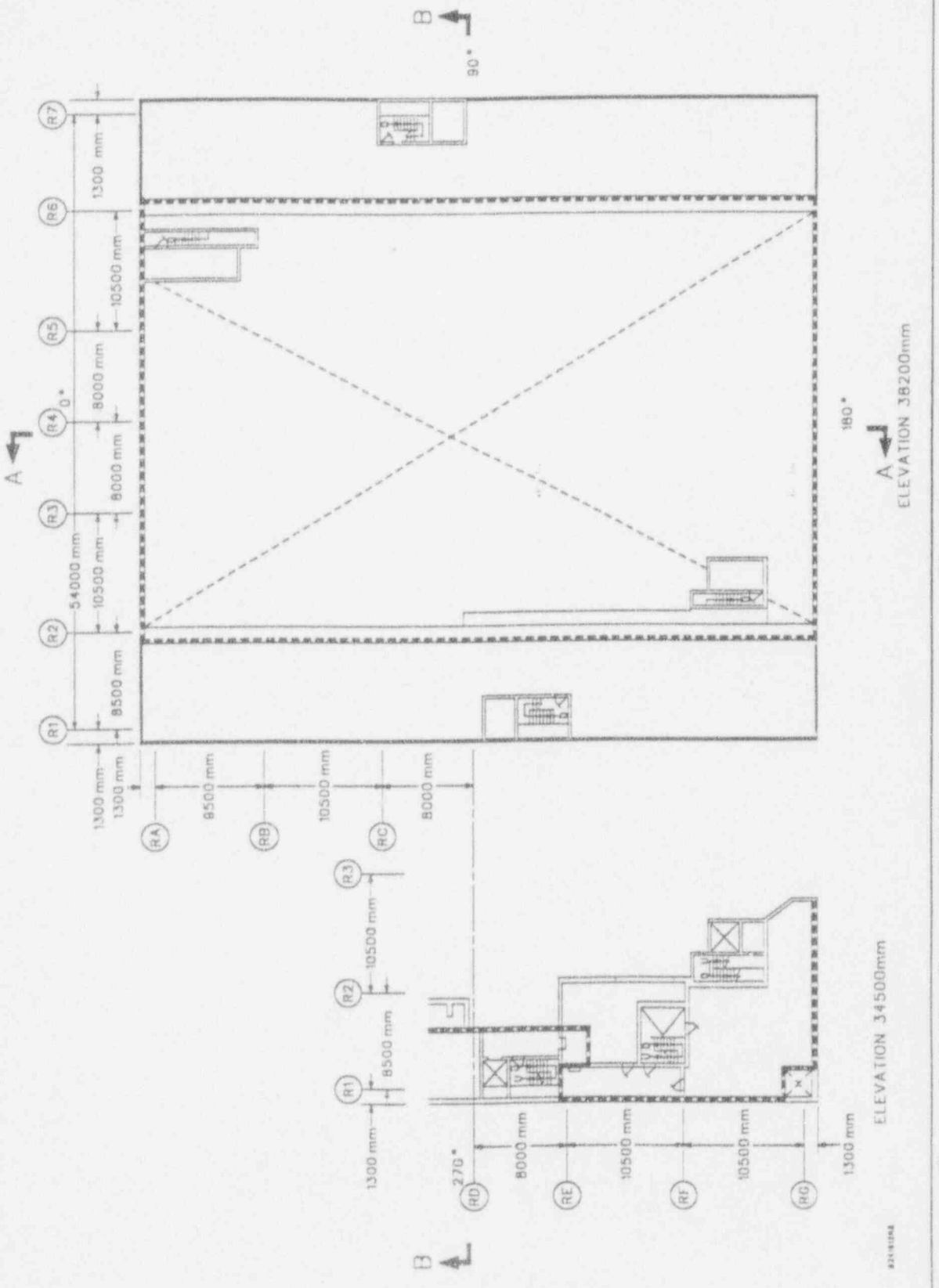


Figure 2.15.10o Reactor Building Arrangement—Elevations 34500 mm and 38200 mm

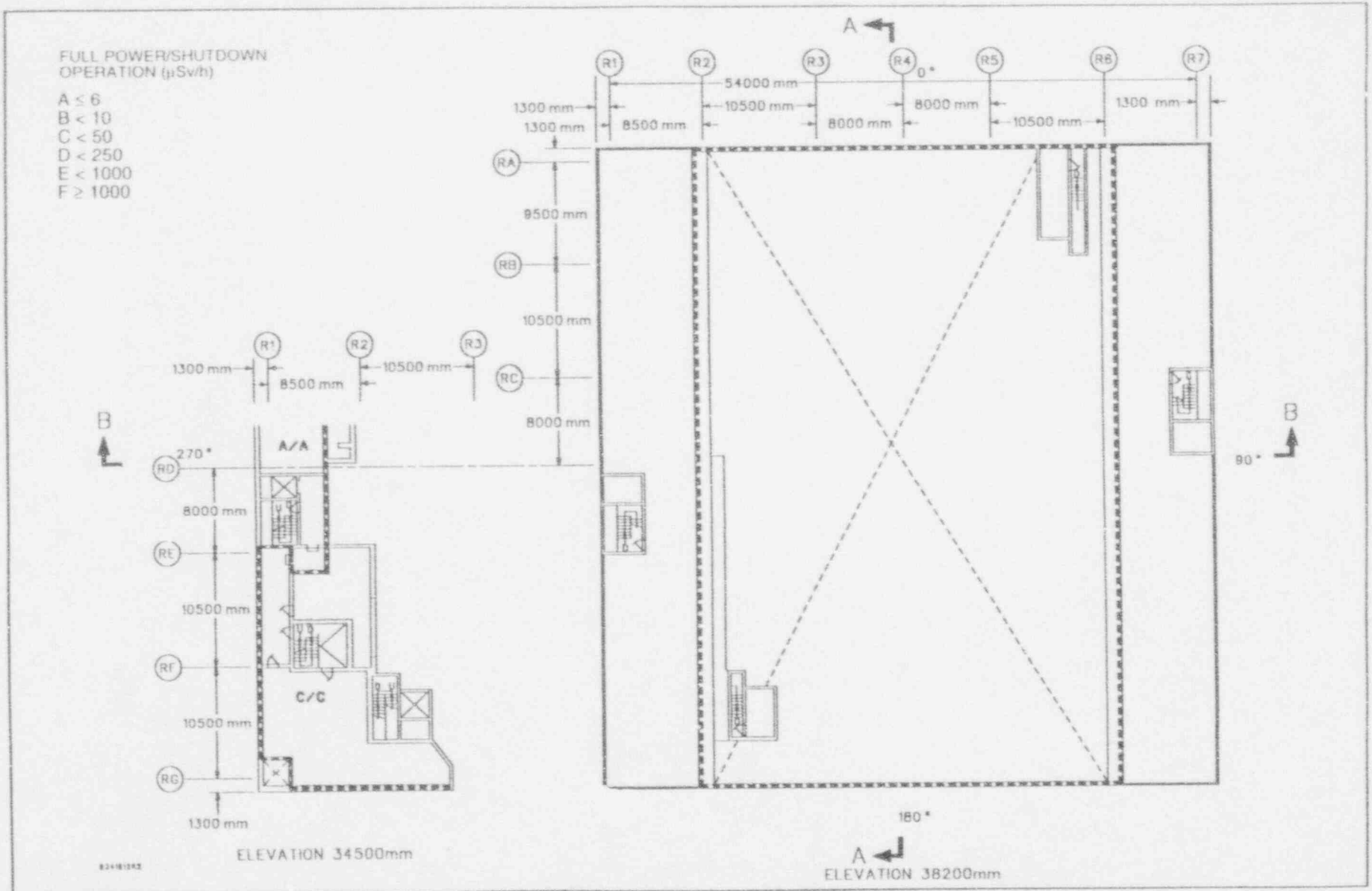
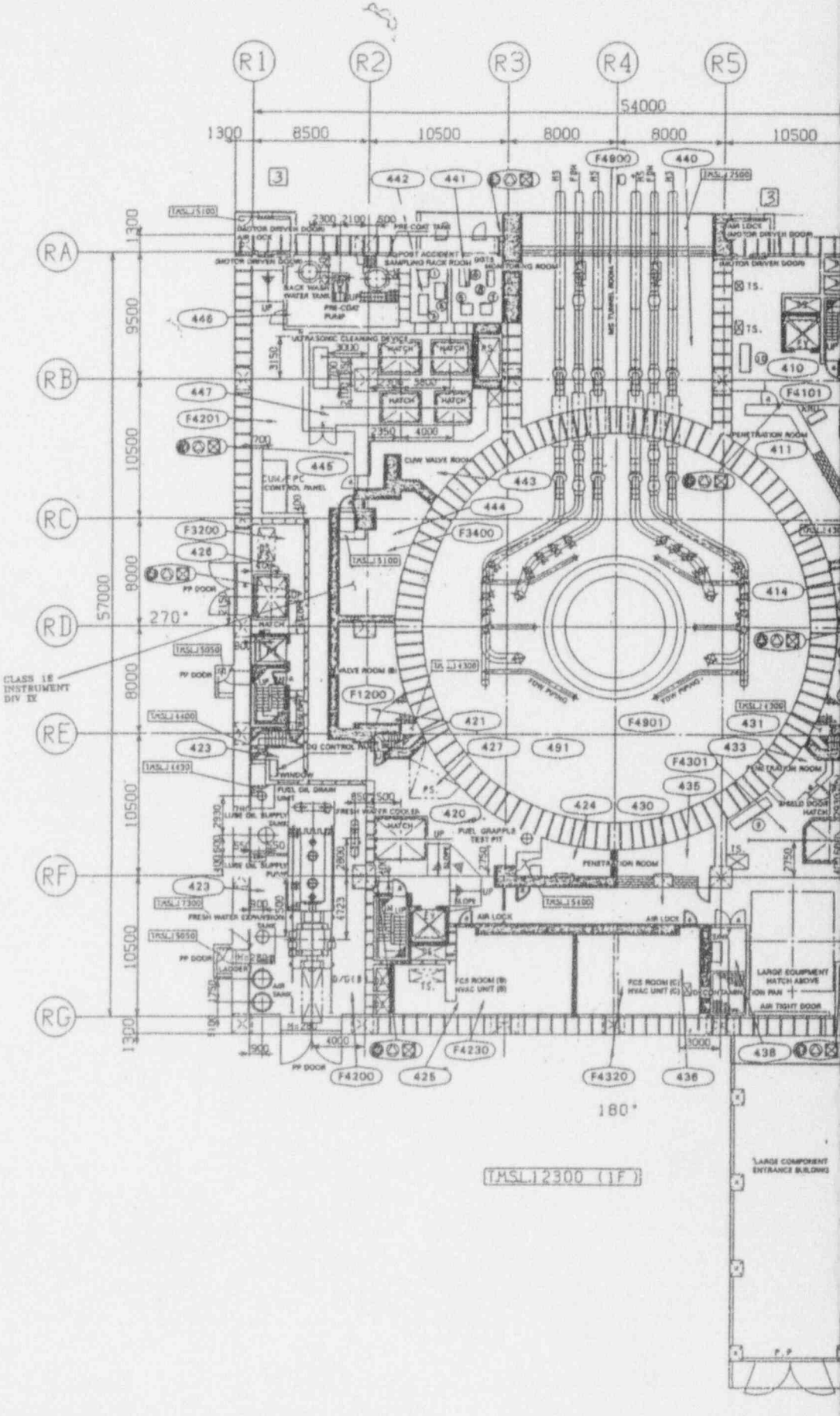
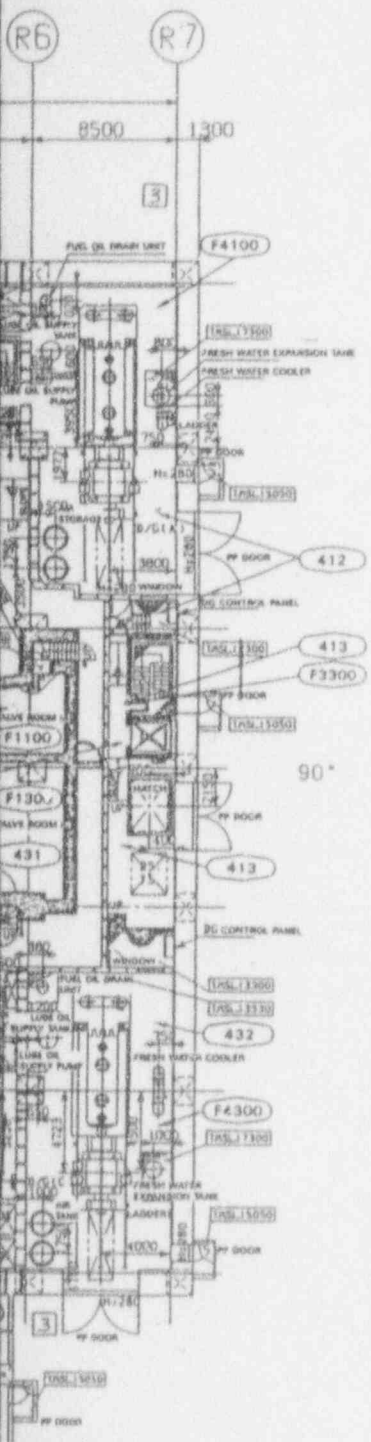


Figure 3.2n Reactor Building Radiation Zone Map for Full Power and Shutdown Operations—Elevations 34500 mm and 38200 mm

ENGINEERING DRAWING ADDITIONS
(SSAR)


R1
R2
R3
R4
R5
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
9500
10500
8000
8000
10500
1300
57000
270°
180°
CLASS 1E INSTRUMENT DIV IX
TMSL 12300 (1F)
LARGE COMPONENT ENTRANCE BUILDING
LARGE EQUIPMENT HATCH ABOVE
AIR TIGHT DOOR
AIR LOCK
VALVE ROOM (B)
CUW PC CONTROL PANEL
CUW VALVE ROOM
SAMPLING RACK ROOM
PENETRATION ROOM
FUEL GRAPPLE TEST PIT
FUEL OIL DRAIN TANK
FRESH WATER EXPANSION TANK
FCS ROOM (B) HVAC UNIT (B)
FCS ROOM (C) HVAC UNIT (C)
F4900
F4101
F4201
F3200
F3400
F1200
F4901
F4301
F4200
F4230
F4320
440
441
442
443
444
445
446
447
410
411
414
420
421
423
424
425
426
427
430
431
433
435
436
438
491

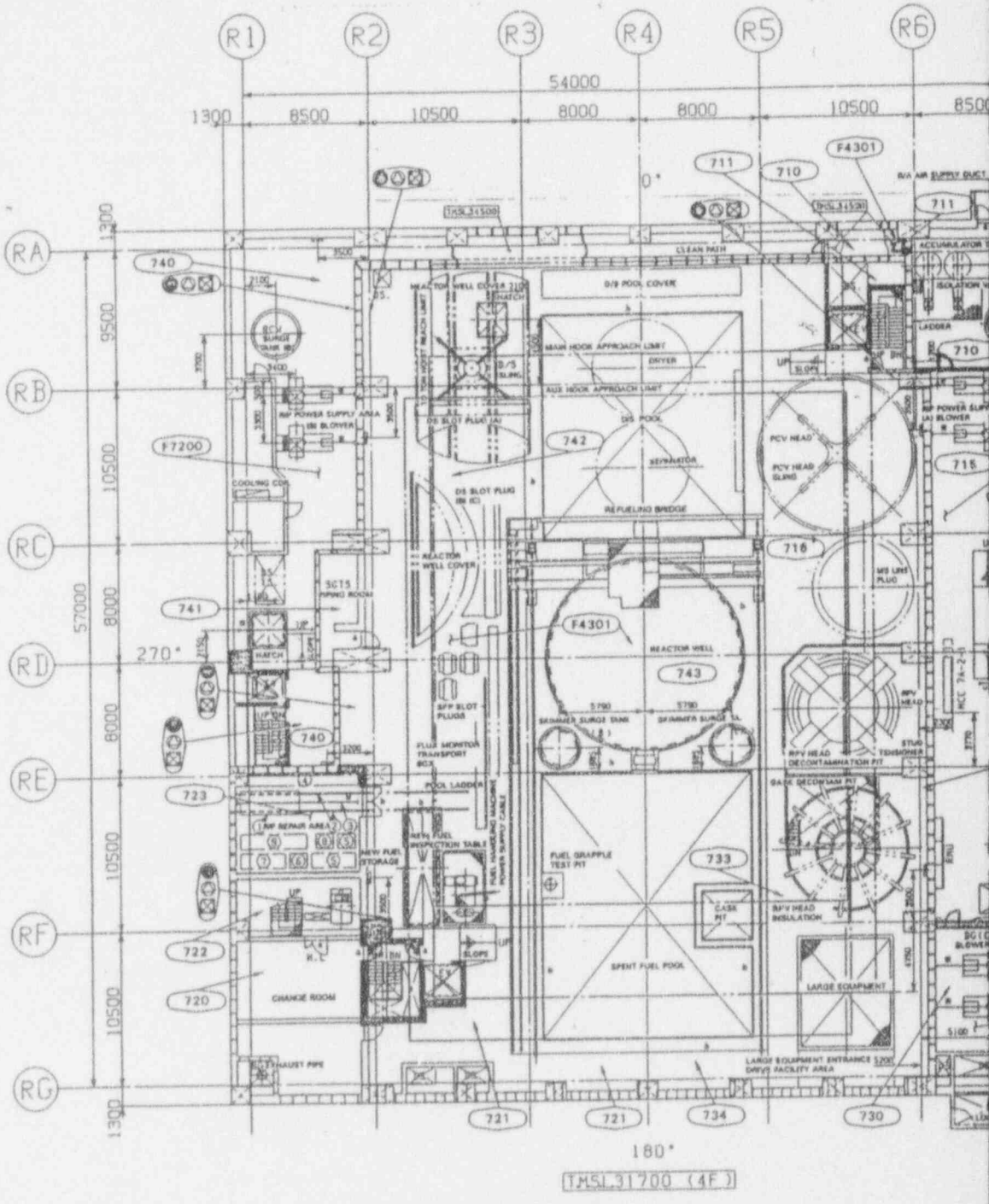


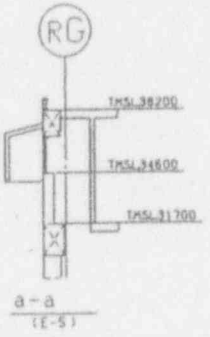
(REMARKS)
EQUIPMENT
PRE COAT PUMP
FUEL HANDLING MACHINE TEST PIT
DIESEL GENERATOR ROOMS 412, 423, AND 432 HAVE A
SUNKEN FLOOR AT 12,000mm WITH A GRATING FLOOR AT 12,300mm.

INSTRUMENT RACK LIST

	(NO.) NAME
H22-P031	1. POST ACCIDENT SAMPLE TRANSFER RACK
H22-P032	2. POST ACCIDENT SAMPLE RECOVERY RACK
H22-P033	3. POST ACCIDENT SAMPLING LOCAL OPERATING PANEL
H22-P035	5. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (A)
H22-P036	6. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (B)
H22-P037	7. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P038	8. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P039	9. CONTAINMENT VESSEL PRESSURE, LEAK TEST RACK
H22-P040	10. REACTOR CONTAINMENT VESSEL DEW POINT RECORDER RACK

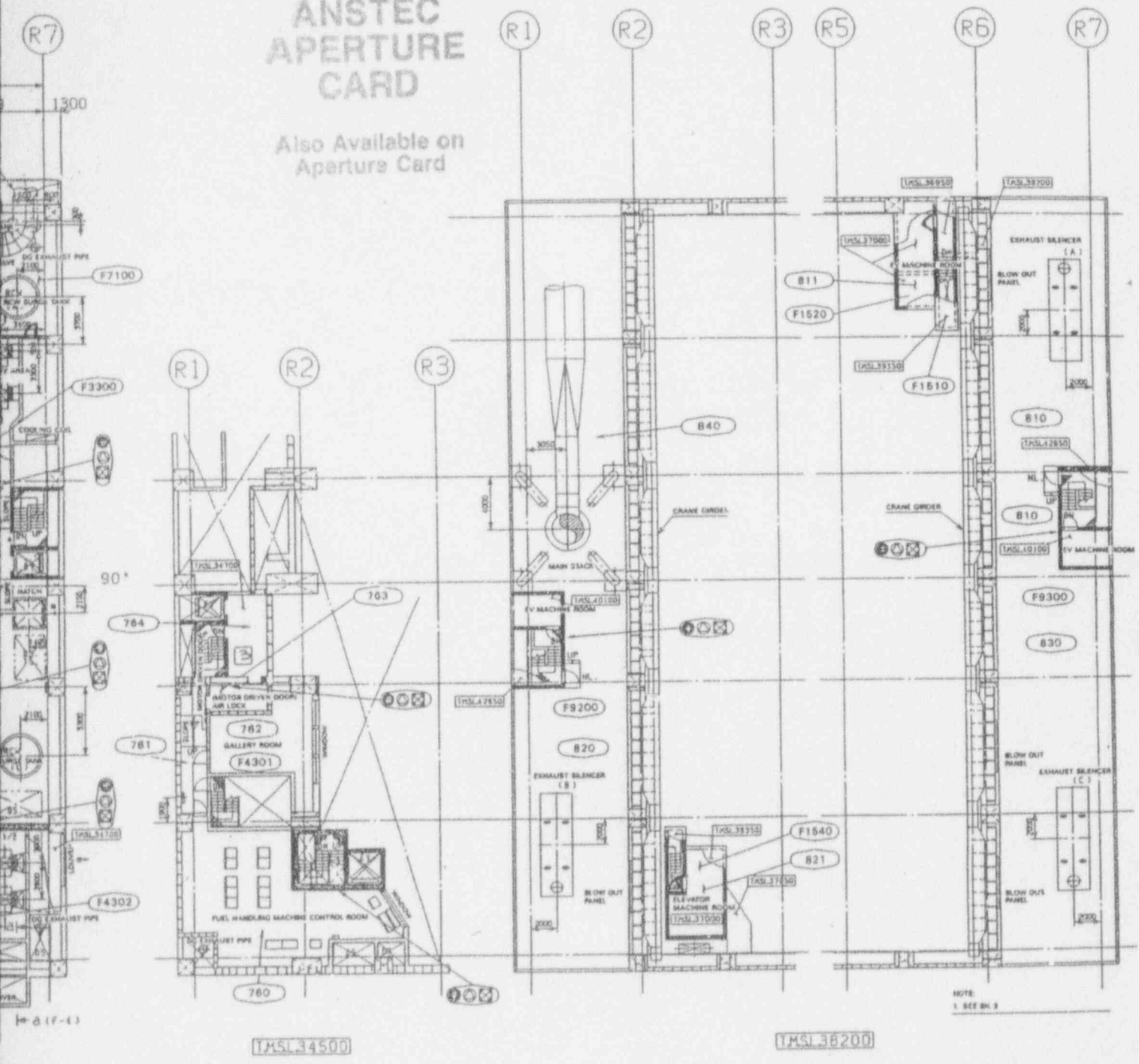
Figure 1.2-8 REACTOR BUILDING, ARRANGEMENT PLAN AT ELEVATION 12300mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
8500
RA
RB
RC
RD
RE
RF
RG
1300
9500
10500
8000
8000
10500
10500
1300
57000
0°
90°
180°
270°
TMSL 31700 (4F)
740
741
742
743
F7200
F4301
711
710
716
723
722
720
721
734
730
733
REACTOR WELL COVER
D/S POOL COVER
REFUELING BRIDGE
SEPARATOR
SPENT FUEL POOL
FUEL GRAPPLE TEST PIT
CASK PIT
CHANGE ROOM
LARGE EQUIPMENT
REACTOR WELL
RPV HEAD INSULATION
RPV HEAD DECONTAMINATION PIT
POOL LADDER
NEW FUEL STORAGE
NEW FUEL INSPECTION TABLE
RPV REPAIR AREA
SGTS PIPING ROOM
EXHAUST PIPE
LARGE EQUIPMENT ENTRANCE
DRYER
SKIMMER SURGE TANK
MAIN HOOK APPROACH LIMIT
AUX HOOK APPROACH LIMIT


RG
TMSL 38200
TMSL 34600
TMSL 31700

a – a
(E-5)

(NO)



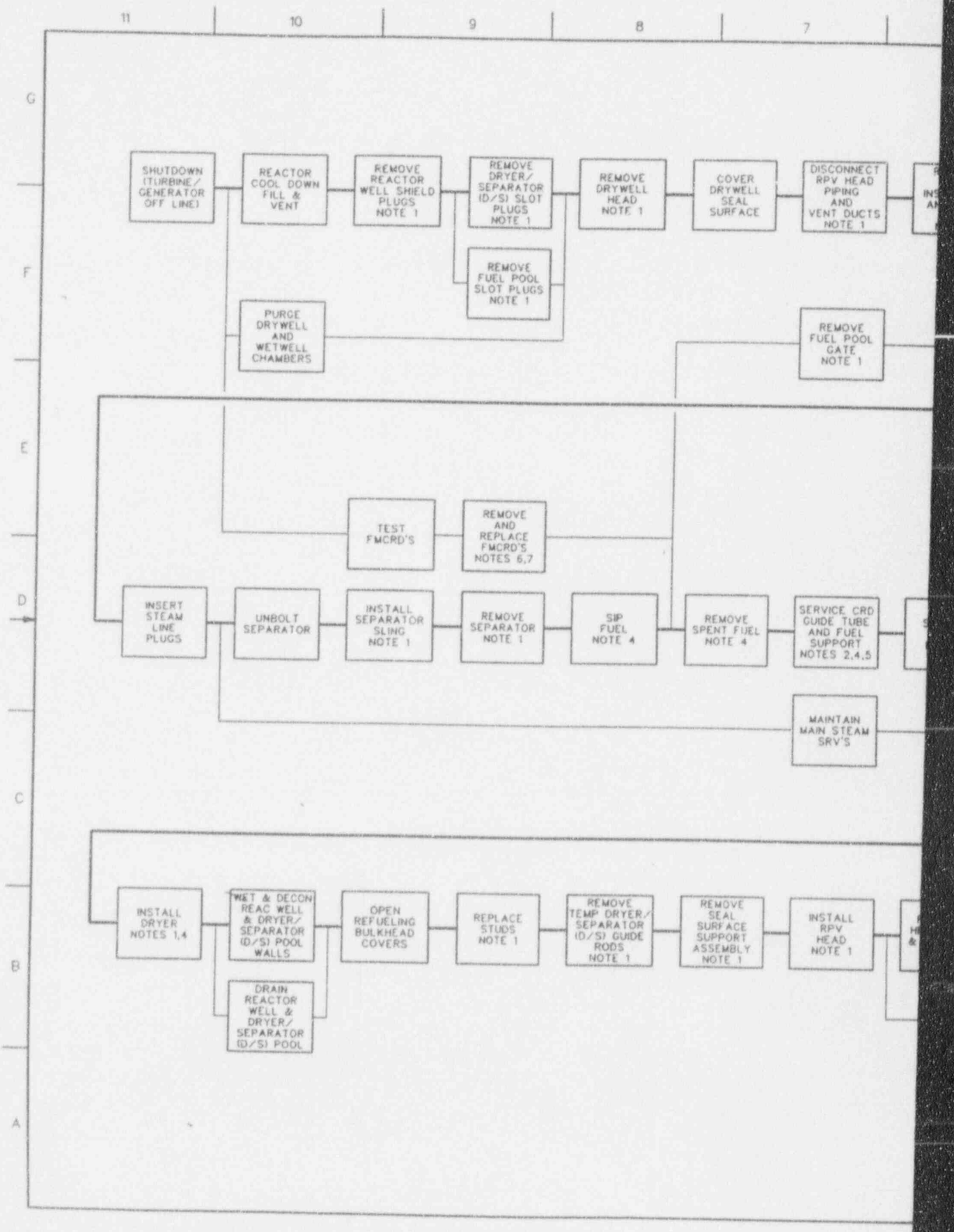
RACK NAME

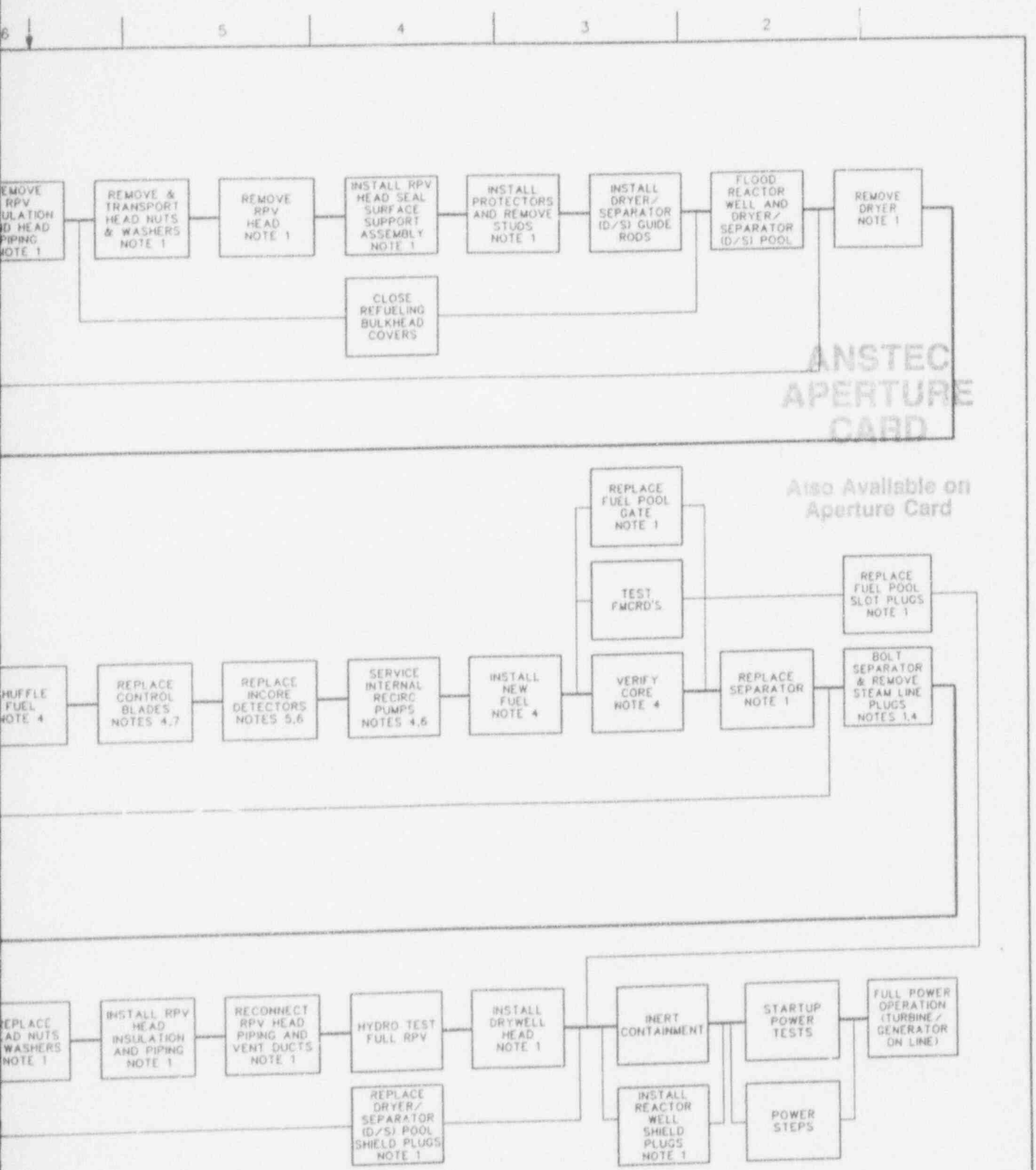
SPECTION POOL
EMPORARY INSTALLED RAIL
ONO-RAIL
EMPORARY INSTALLED RAIL STORAGE AREA
PELLER SHAFT GRAPPLE STORAGE AREA
FFUSER WEAR RING GRAPPLE STORAGE AREA
FFUSER STRETCH TUBE GRAPPLE STORAGE AREA
PPER PLUG STORAGE AREA
P UPPER PORTION HANDLING CONNECTOR ROD STORAGE AREA

(REMARKS)
EQUIPMENT
D/S POOL
SPENT FUEL STORAGE POOL

9404180300 -02

Figure 1.2-12 REACTOR BUILDING, ARRANGEMENT PLAN AT ELEVATION 31700/38200mm

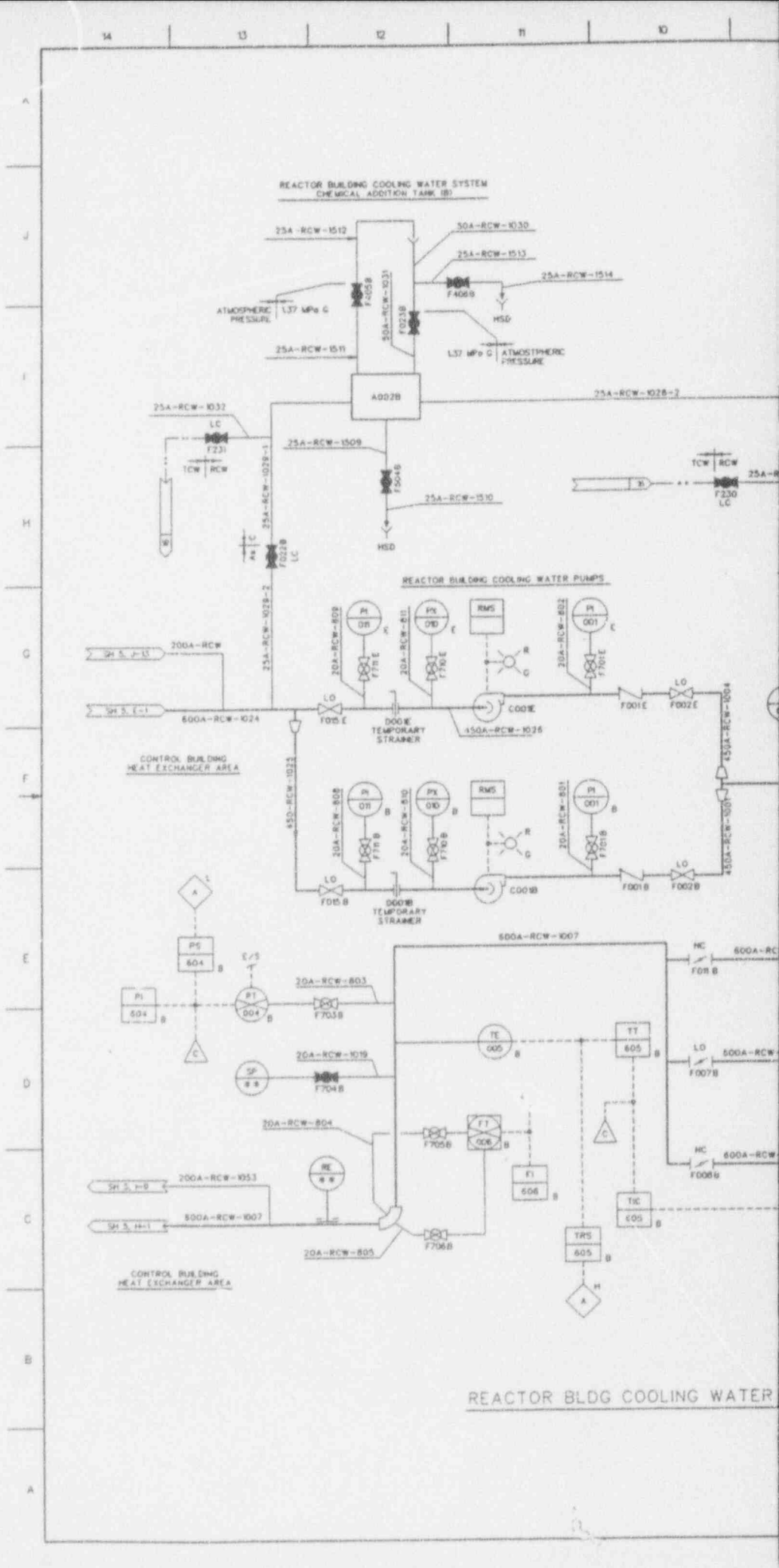

11
10
9
8
7
G
F
E
D
C
B
A
SHUTDOWN (TURBINE/ GENERATOR OFF LINE)
REACTOR COOL DOWN FILL & VENT
REMOVE REACTOR WELL SHIELD PLUGS NOTE 1
REMOVE DRYER/ SEPARATOR (D/S) SLOT PLUGS NOTE 1
REMOVE DRYWELL HEAD NOTE 1
COVER DRYWELL SEAL SURFACE
DISCONNECT RPV HEAD PIPING AND VENT DUCTS NOTE 1
REMOVE FUEL POOL SLOT PLUGS NOTE 1
PURGE DRYWELL AND WETWELL CHAMBERS
REMOVE FUEL POOL GATE NOTE 1
TEST FMCRD'S
REMOVE AND REPLACE FMCRD'S NOTES 6,7
INSERT STEAM LINE PLUGS
UNBOLT SEPARATOR
INSTALL SEPARATOR SLING NOTE 1
REMOVE SEPARATOR NOTE 1
SIP FUEL NOTE 4
REMOVE SPENT FUEL NOTE 4
SERVICE CRD GUIDE TUBE AND FUEL SUPPORT NOTES 2,4,5
MAINTAIN MAIN STEAM SRV'S
INSTALL DRYER NOTES 1,4
WET & DECON REAC WELL & DRYER/ SEPARATOR (D/S) POOL WALLS
DRAIN REACTOR WELL & DRYER/ SEPARATOR (D/S) POOL
OPEN REFUELING BULKHEAD COVERS
REPLACE STUDS NOTE 1
REMOVE TEMP DRYER/ SEPARATOR (D/S) GUIDE RODS NOTE 1
REMOVE SEAL SURFACE SUPPORT ASSEMBLY NOTE 1
INSTALL RPV HEAD NOTE 1

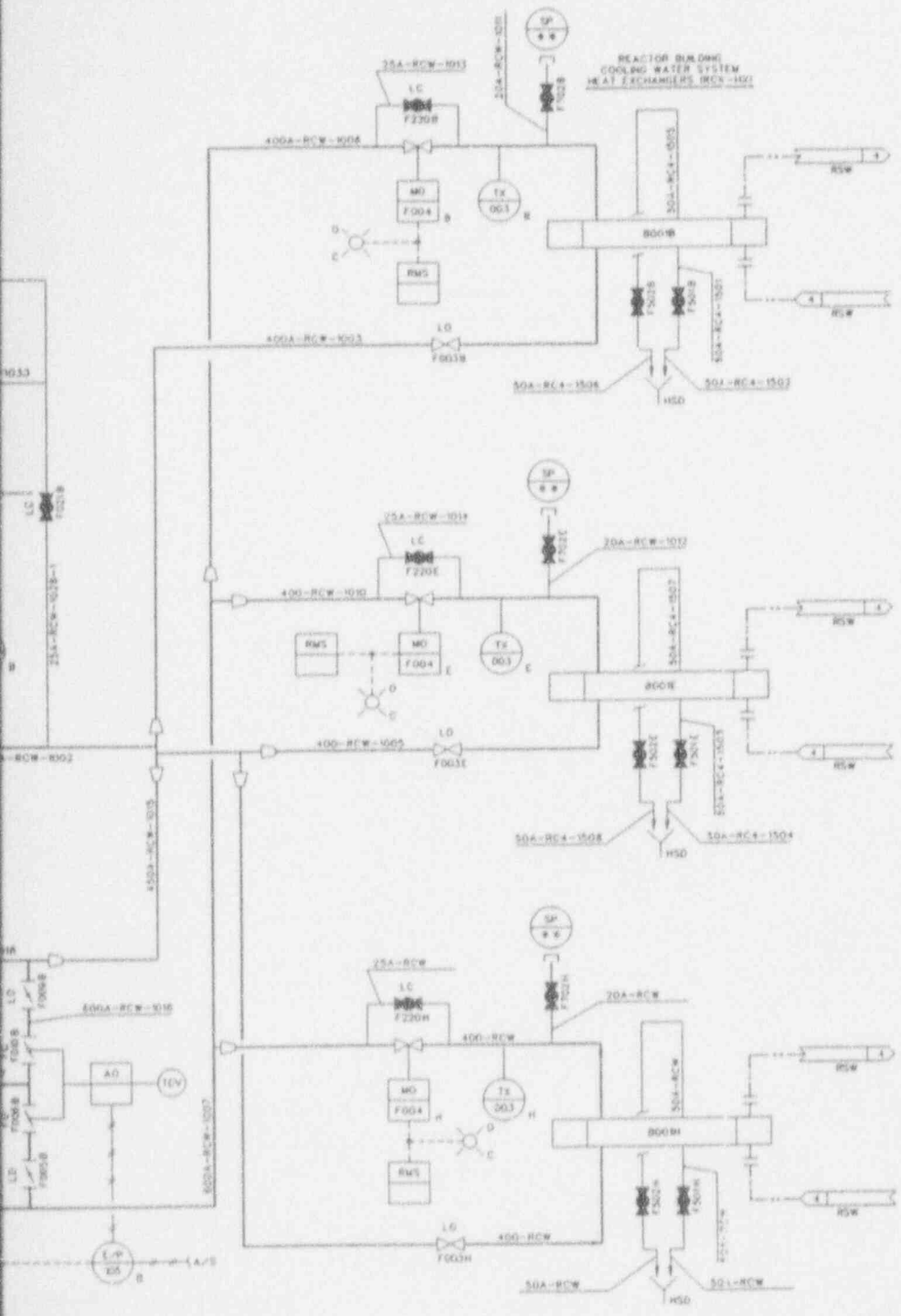


NOTES

1. REACTOR BUILDING CRANE REQUIRED.
2. ADDITIONAL NON-ROUTINE OPERATION TO BE PERFORMED AS REQUIRED.
3. HEAVY LINE BETWEEN OPERATIONS INDICATES ANTICIPATED CRITICAL PATH DURING A NORMAL OUTAGE.
4. PLATFORM REQUIRED OVER REACTOR.
5. NON-ROUTINE WORK.
6. WORK MAY BE PERFORMED INTERMITTENTLY WITH MOVING FUEL BUT NOT SIMULTANEOUSLY.
7. TECHNICAL SPEC RESTRICTIONS APPLY.

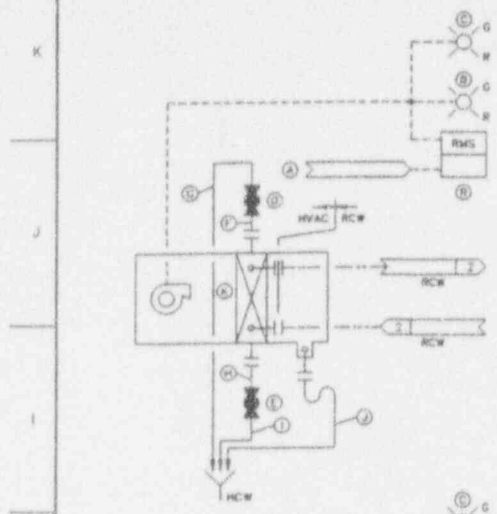
FIGURE 9.1-12 PLANT REFUELING AND SERVICING SEQUENCE


REACTOR BUILDING COOLING WATER SYSTEM
CHEMICAL ADDITION TANK (B)
25A-RCW-1512
50A-RCW-1030
25A-RCW-1513
25A-RCW-1514
ATMOSPHERIC PRESSURE
L37 kPa G
F2058
50A-RCW-1031
F0238
F4069
HSD
25A-RCW-1511
L37 kPa G
ATMOSPHERIC PRESSURE
A002B
25A-RCW-1028-2
25A-RCW-1032
LC
F231
TCW
RCW
25A-RCW-1509
25A-RCW-1029-1
F5048
25A-RCW-1510
HSD
F230
LC
REACTOR BUILDING COOLING WATER PUMPS
25A-RCW-1029-2
F022B
LC
200A-RCW
SH 5, J-13
SH 5, E-1
600A-RCW-1024
20A-RCW-809
PI
011
E
F711E
20A-RCW-810
PDI
010
E
F710E
RMS
20A-RCW-802
PI
001
E
F701E
LO
F001E
F002E
C001E
F015E
D001E
TEMPORARY STRAINER
450A-RCW-1026
450A-RCW-1004
CONTROL BUILDING HEAT EXCHANGER AREA
450A-RCW-1022
20A-RCW-808
PI
011
B
F710B
20A-RCW-810
PDI
010
B
F710B
RMS
20A-RCW-801
PI
001
B
F701B
LO
F001B
F002B
C001B
F015B
D001B
TEMPORARY STRAINER
450A-RCW-1005
600A-RCW-1007
PS
604
B
E/S
PI
604
B
PT
004
B
20A-RCW-803
F703B
TE
005
B
TT
605
B
HC
F011B
LO
F007B
20A-RCW-1019
SF
F704B
20A-RCW-804
F705B
FT
006
B
FI
606
B
HC
F008B
TIC
605
B
TRS
605
B
RE
SH 5, H-8
SH 5, H-1
200A-RCW-1053
600A-RCW-1007
20A-RCW-805
F706B
CONTROL BUILDING HEAT EXCHANGER AREA
REACTOR BLDG COOLING WATER

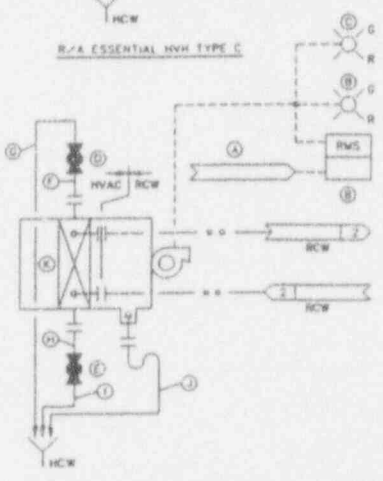


9404180300-04

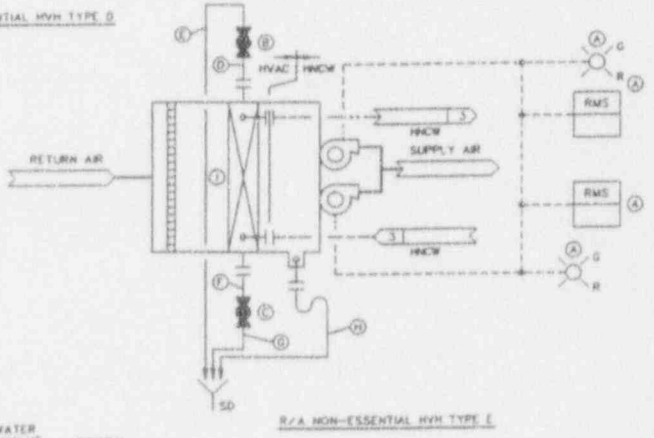
FIGURE 9.2-1 REACTOR BUILDING COOLING WATER SYSTEM P&ID (Sheet 4 of 9)



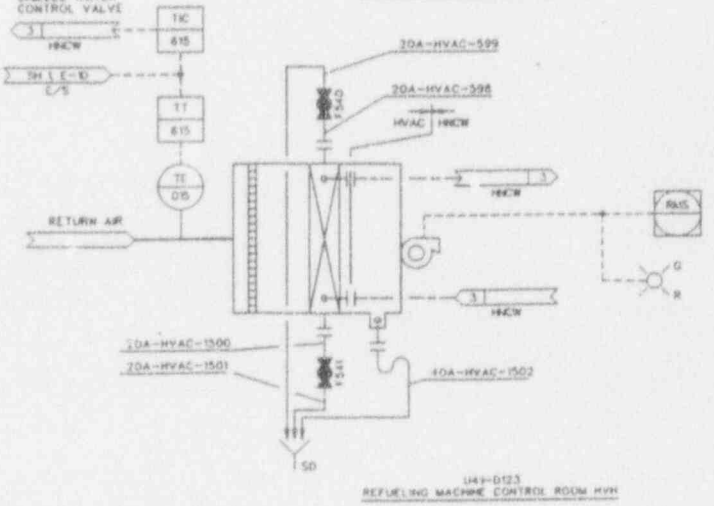
R/A ESSENTIAL HVH TYPE C



R/A ESSENTIAL HVH TYPE D



R/A NON-ESSENTIAL HVH TYPE E



U41-0123
REFUELING MACHINE CONTROL ROOM HVH

TABLE 3:

TYPE	EQ.
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
D	U41-(
C	U41-(
C	U41-(

TABLE 4 :

TYPE	EQ.
E	U41-(
E	U41-(
E	U41-(
E	U41-(
E	U41-(
D	U41-(
D	U41-(

TYPE	
MV504	
MV504	
MV504	
MV504	
MV504	
MV504	
MV504	
MV504	
MV504	

ESSENTIAL HVH

NO.	HVH NAME	HVH INITIATION SIGNAL (A)	PANEL NO. (B)	(C)	VALVE NO. (D)	VALVE NO. (E)	PIPING SIZE & NO. (F)	PIPING SIZE & NO. (G)	PIPING SIZE & NO. (H)	PIPING SIZE & NO. (I)	PIPING SIZE & NO. (J)	COOLING COIL (K)
0101	RCIC PUMP ROOM HVH	RCIC PUMP START SIGNAL			F504	F505	20A-HVAC -508	20-HVAC -509	25-HVAC -510	20-HVAC -511	40-HVAC -512	B101
0102	HPCF PUMP (C) ROOM HVH	HPCF PUMP (C) START SIGNAL			F506	F507	-513	-514	-515	-516	-517	B102
0103	RHR PUMP (A) ROOM HVH	RHR PUMP (A) START SIGNAL			F508	F509	-518	-519	-520	-521	-522	B103
0104	RHR PUMP (C) ROOM HVH	RHR PUMP (C) START SIGNAL			F510	F511	-523	-524	-525	-526	-527	B104
0105	RHR PUMP (B) ROOM HVH	RHR PUMP (B) START SIGNAL			F512	F513	-528	-529	-530	-531	-532	B105
0106	HPCF PUMP (B) ROOM HVH	HPCF PUMP (B) START SIGNAL			F514	F515	-533	-534	-535	-536	-537	B106
0107	FCS ROOM HVH (C)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F516	F517	-538	-539	-540	-541	-542	B107
0108	FCS ROOM HVH (B)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F518	F519	-543	-544	-545	-546	-547	B108
0111	SGTS ROOM HVH (C)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F524	F525	-558	-559	-560	-561	-562	B111
0112	SGTS ROOM HVH (B)	SECONDARY CONTAINMENT ISOLATION SIGNAL			F526	F527	-563	-564	-565	-566	-567	B112
0113	CAMS (A) ROOM HVH	SECONDARY CONTAINMENT ISOLATION SIGNAL			F528	F529	-568	-569	-570	-571	-572	B113
0114	CAMS (B) ROOM HVH	SECONDARY CONTAINMENT ISOLATION SIGNAL			F530	F531	-573	-574	-575	-576	-577	B114

NON-ESSENTIAL HVH (NON-SAFETY RELATED)

NO.	HVH NAME	PANEL NO. (A)	VALVE NO. (B)	VALVE NO. (C)	PIPING SIZE & NO. (D)	PIPING SIZE & NO. (E)	PIPING SIZE & NO. (F)	PIPING SIZE & NO. (G)	PIPING SIZE & NO. (H)	COOLING COIL (I)
0121A	R/A MS TUNNEL HVH (A) NOTE 3		F538	F537	20A-HVAC -588	20A-HVAC -589	20A-HVAC -590	20A-HVAC -591	40A-HVAC -592	B121A
0121B	R/A MS TUNNEL HVH (B) NOTE 3		F538	F539	20A-HVAC -593	20A-HVAC -594	20A-HVAC -595	20A-HVAC -596	40A-HVAC -597	B121B
0115	R/A SPCU (A) ROOM		F	F	20A-HVAC -1503	20A-HVAC -1504	20A-HVAC -1505	20A-HVAC -1506	40A-HVAC -1507	B115
0123	R/A REFUELING MACHINE CONTROL ROOM HVH		F	F	20A-HVAC -598	20A-HVAC -599	20A-HVAC -1500	20A-HVAC -1501	40A-HVAC -1502	B123
0109	FPC PUMP (A) ROOM HVH		F520	F521	-548	-549	-550	-551	-552	B109
0110	FPC PUMP (B) ROOM HVH		F522	F523	-553	-554	-555	-556	-557	B110

NOTES:

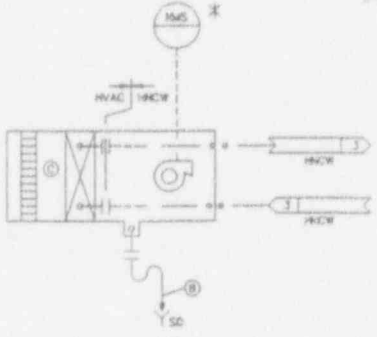
1. PIPING MATERIALS FOR VENT AND DRAIN SHALL BE CS.
2. PIPING DESIGN/QUALITY CLASSIFICATION SHALL BE 7G EXCEPT OTHERWISE SPECIFIED.
3. THESE HVH'S CAN BE COMBINED INTO A COMMON COIL.
4. THESE FCU'S ARE IN CONTROL BUILDING.

REFERENCE DOCUMENTS:

	MPL NO.
1. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030
2. REACTOR BLDG COOLING WATER SYS P&ID	P21-1010
3. HVAC NORMAL COOLING WATER SYS P&ID	P24-1010

TABLE 5 : NON-ESSENTIAL FAN COIL UNIT (FCU) (NON-SAFETY RELATED)

EQ. NO.	HVH NAME	PIPE SIZE & NO. (B)	COOLING COIL (C)
0141-0131A	RIP/TMCRD AUTO EXCHANGER CONTROL PANEL ROOM FCU (A)	20A-HVAC -1514	B131A
0141-0131B	RIP/TMCRD AUTO EXCHANGER CONTROL PANEL ROOM FCU (B)	20A-HVAC -1515	B131B
0141-0131C	RIP/TMCRD AUTO EXCHANGER CONTROL PANEL ROOM FCU (C)	20A-HVAC -1516	B131C
0141-0132A	MG SET ROOM (A) FCU NOTE 4	20A-HVAC -1517	B132A
0141-0132B	MG SET ROOM (C) FCU NOTE 4	20A-HVAC -1518	B132B
0141-0133A	NON-DIVISIONAL ELECTRICAL EQUIPMENT ZONE FCU NOTE 4	20A-HVAC -1519	B133
0141-0134A	ISI ROOM FCU (A)	20A-HVAC -1512	B134A
0141-0134B	ISI ROOM FCU (B)	20A-HVAC -1513	B134B

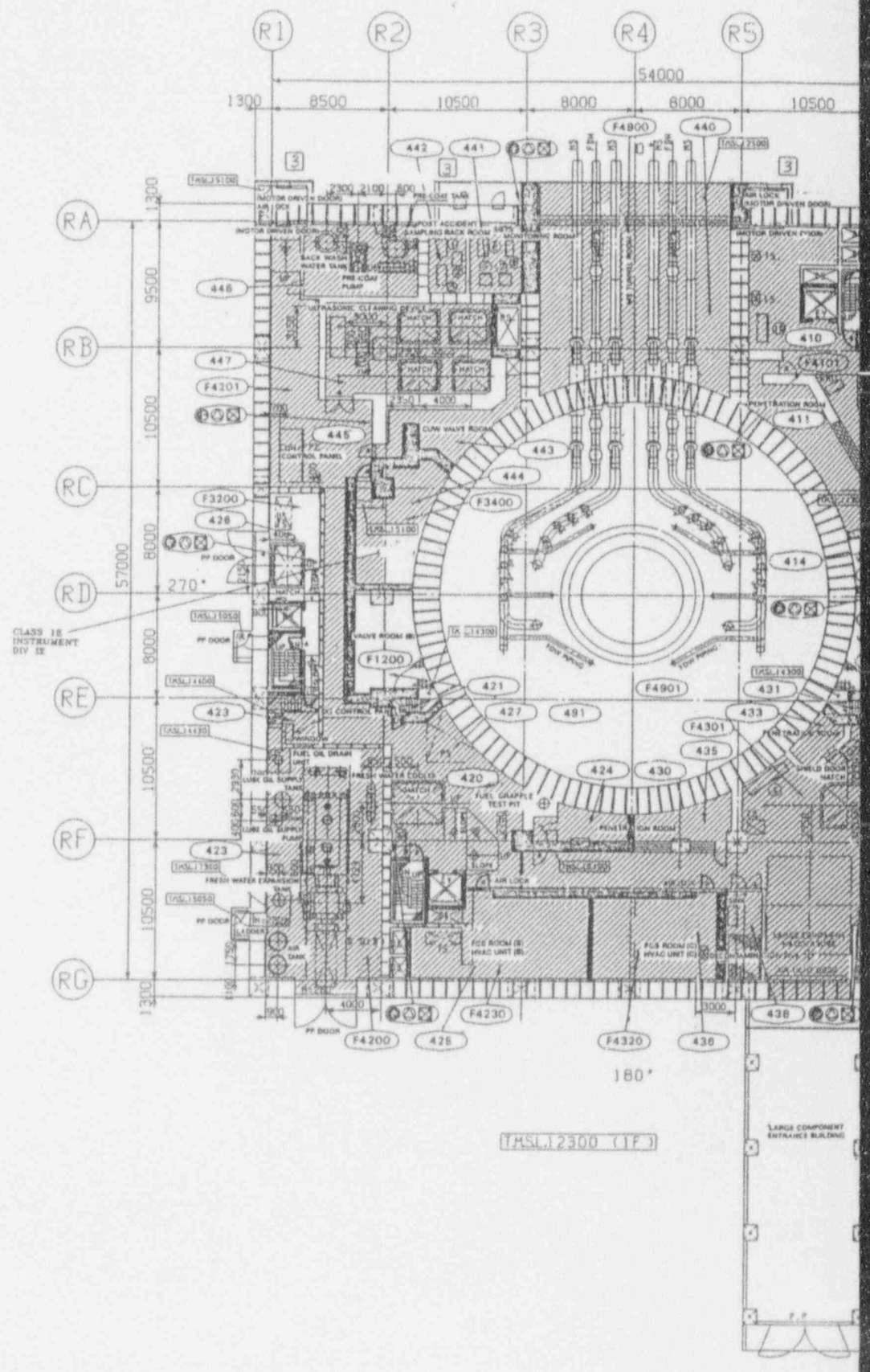


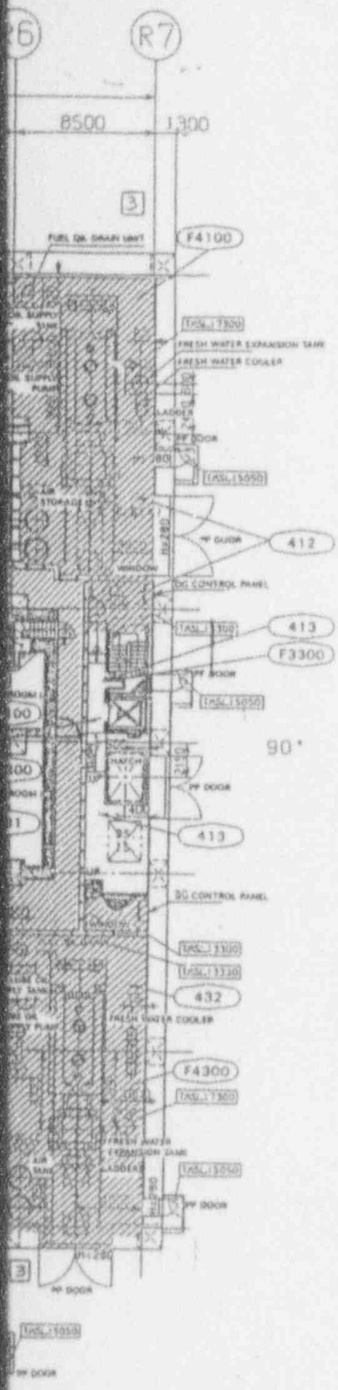
R/A NON-ESSENTIAL FAN COIL UNIT TYPE HV504

R/B AND C/B HVAC

9404180300-05

FIGURE 9.4-3 SECONDARY CONTAINMENT HVAC SYSTEM (Sheet 2 of 3)


R1
R2
R3
R4
R5
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
9500
10500
8000
57000
8000
10500
1300
270°
180°
CLASS 1E INSTRUMENT DIV II
F4900
440
442
441
446
447
F4201
445
F3200
426
F3400
444
443
410
F4101
411
414
F1200
421
F4901
431
423
427
491
433
F4301
435
420
424
430
423
438
F4230
F4200
428
F4320
436
TMSL 12300 (1F)
LARGE COMPONENT ENTRANCE BUILDING

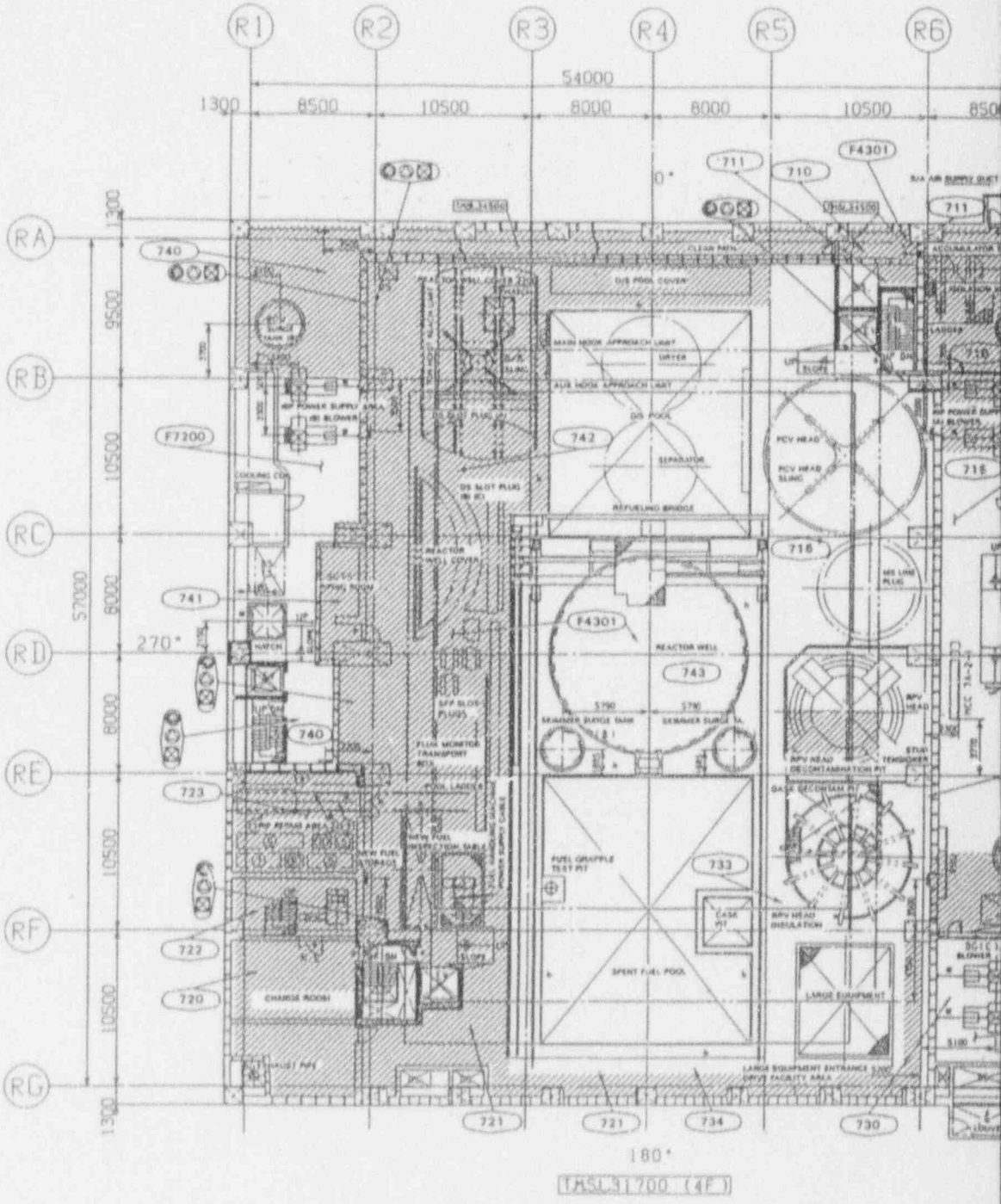


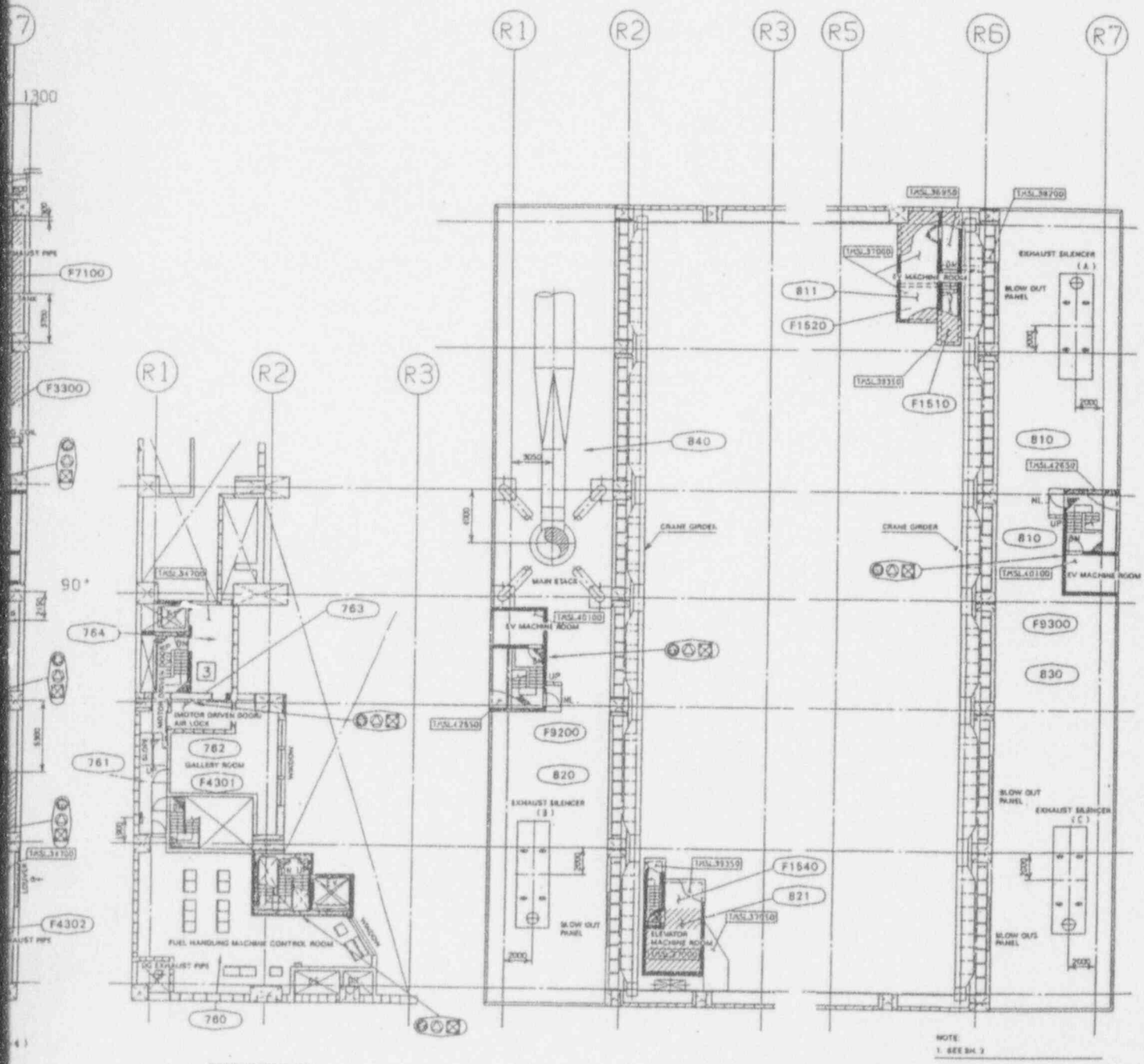
(REMARKS)
EQUIPMENT
PRE COAT PUMP
FUEL HANDLING MACHINE TEST PIT
DIESEL GENERATOR ROOMS 412, 423, AND 432 HAVE A
SUNKEN FLOOR AT 12,000mm WITH A GRATING FLOOR AT 12,300mm.

INSTRUMENT RACK LIST

	(NO) NAME
H22-P031	1. POST ACCIDENT SAMPLE TRANSFER RACK
H22-P032	2. POST ACCIDENT SAMPLE RECOVERY RACK
H22-P033	3. POST ACCIDENT SAMPLING LOCAL OPERATING PANEL
H22-P035	5. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (A)
H22-P036	6. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (B)
H22-P037	7. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P038	8. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P039	9. CONTAINMENT VESSEL PRESSURE, LEAK TEST RACK
H22-P040	10. REACTOR CONTAINMENT VESSEL DEW POINT RECORDER RACK

Figure 9A.4-4 REACTOR BUILDING FIRE PROTECTION AT ELEVATION 12,300mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
57000
9500
10500
8000
8000
10500
1300
0°
270°
180°
TMSL 31700 (4F)
740
741
742
743
F4301
F7200
711
710
718
723
722
720
721
734
730
733
DS POOL COVER
REFUELING BRIDGE
SEPARATOR
REACTOR WELL
SPENT FUEL POOL
CHARGE ROOM
FUEL GRAPPLE TEST PIT
RPV HEAD INSULATION
LARGE EQUIPMENT
TMSL 36200
TMSL 34600
TMSL 31700



NOTE
1. SEE SH. 2

RACK NAME

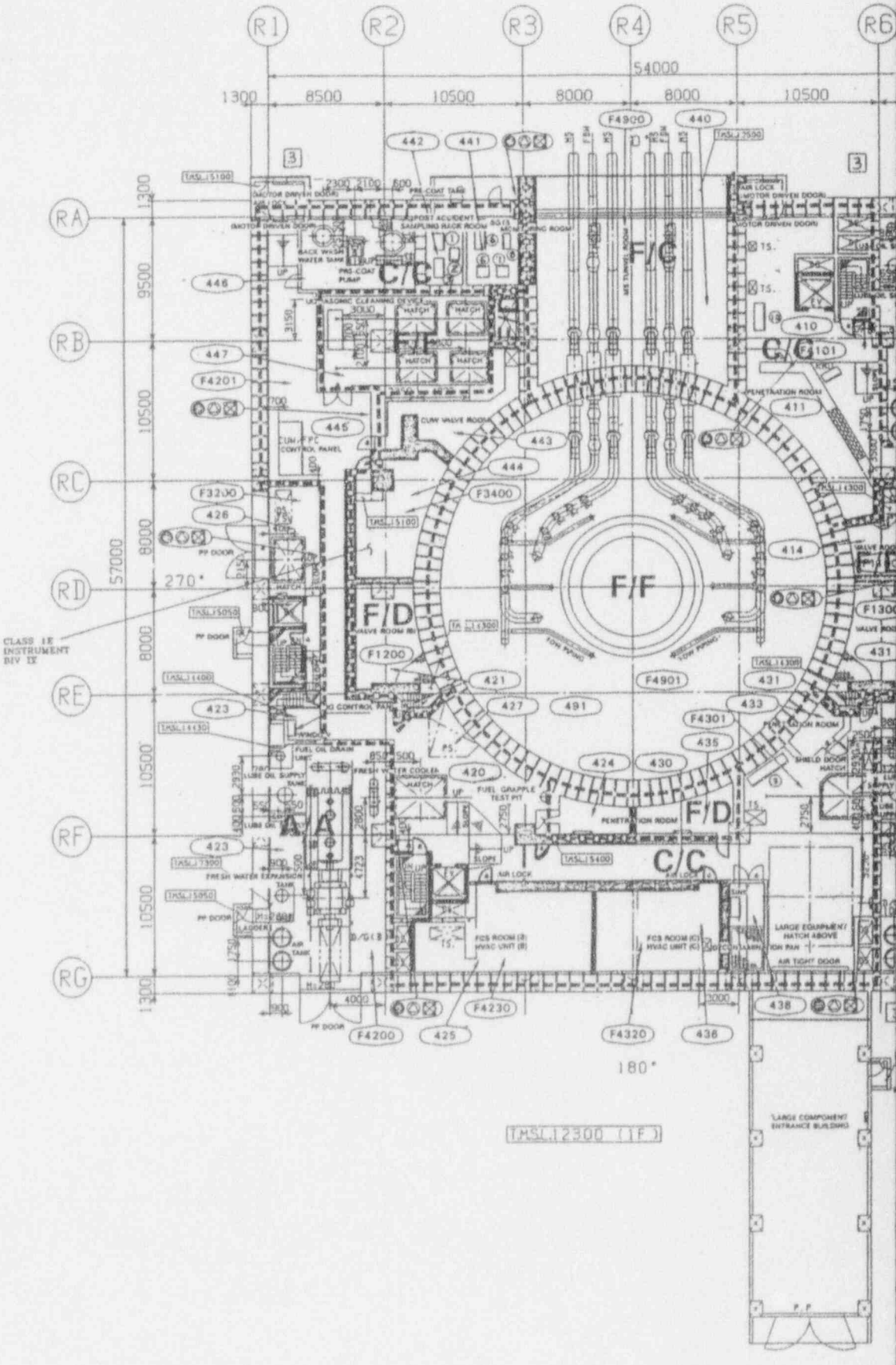
OOL
NSTALLED RAIL

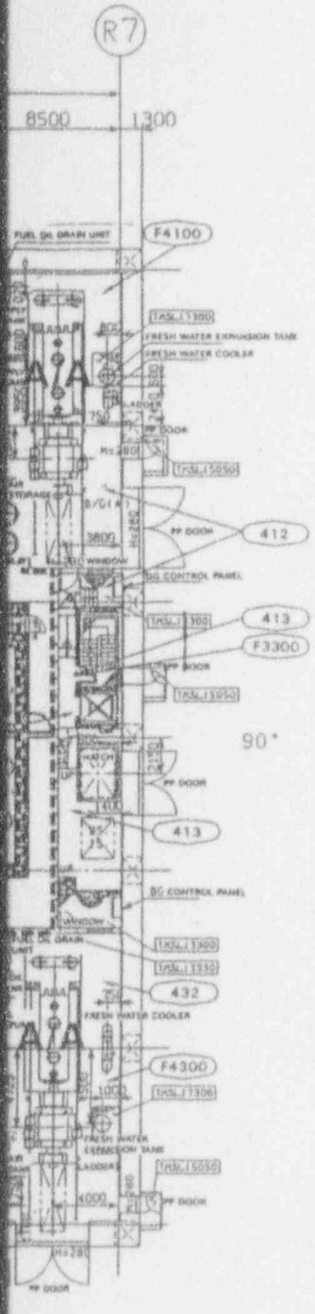
STALLED RAIL STORAGE AREA
T GRAPPLE STORAGE AREA
R RING GRAPPLE STORAGE AREA
TCH TUBE GRAPPLE STORAGE AREA
TORAGE AREA
TION HANDLING CONNECTOR ROD STORAGE AREA

(REMARKS)
EQUIPMENT
D/S POOL
SPENT FUEL STORAGE POOL

9404180300-07

Figure 9A.4-8 REACTOR BUILDING FIRE PROTECTION AT ELEVATION 31700/38200mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
57000
9500
10500
8000
8000
10500
1300
C/C
F/C
F/F
F/D
A/A
270°
180°
CLASS 1E INSTRUMENT DIV IX
TMSL 12300 (1F)
LARGE COMPONENT ENTRANCE BUILDING
LARGE EQUIPMENT HATCH ABOVE
AIR TIGHT DOOR
FUEL GRAPPLE TEST PIT
PENETRATION ROOM
SHIELD DOOR HATCH
AIR LOCK
F4900
440
442
441
446
447
F4201
445
443
444
F3200
426
F3400
414
411
410
F4101
F1200
421
427
491
F4901
431
433
F4301
435
424
430
420
423
425
F4200
F4230
F4320
436
438



(REMARKS)
EQUIPMENT
PRE COAT PUMP
FUEL HANDLING MACHINE TEST PIT
DIESEL GENERATOR ROOMS 412, 423, AND 432 HAVE A
SUNKEN FLOOR AT 12,000mm WITH A GRATING FLOOR AT 12,300mm.

INSTRUMENT RACK LIST

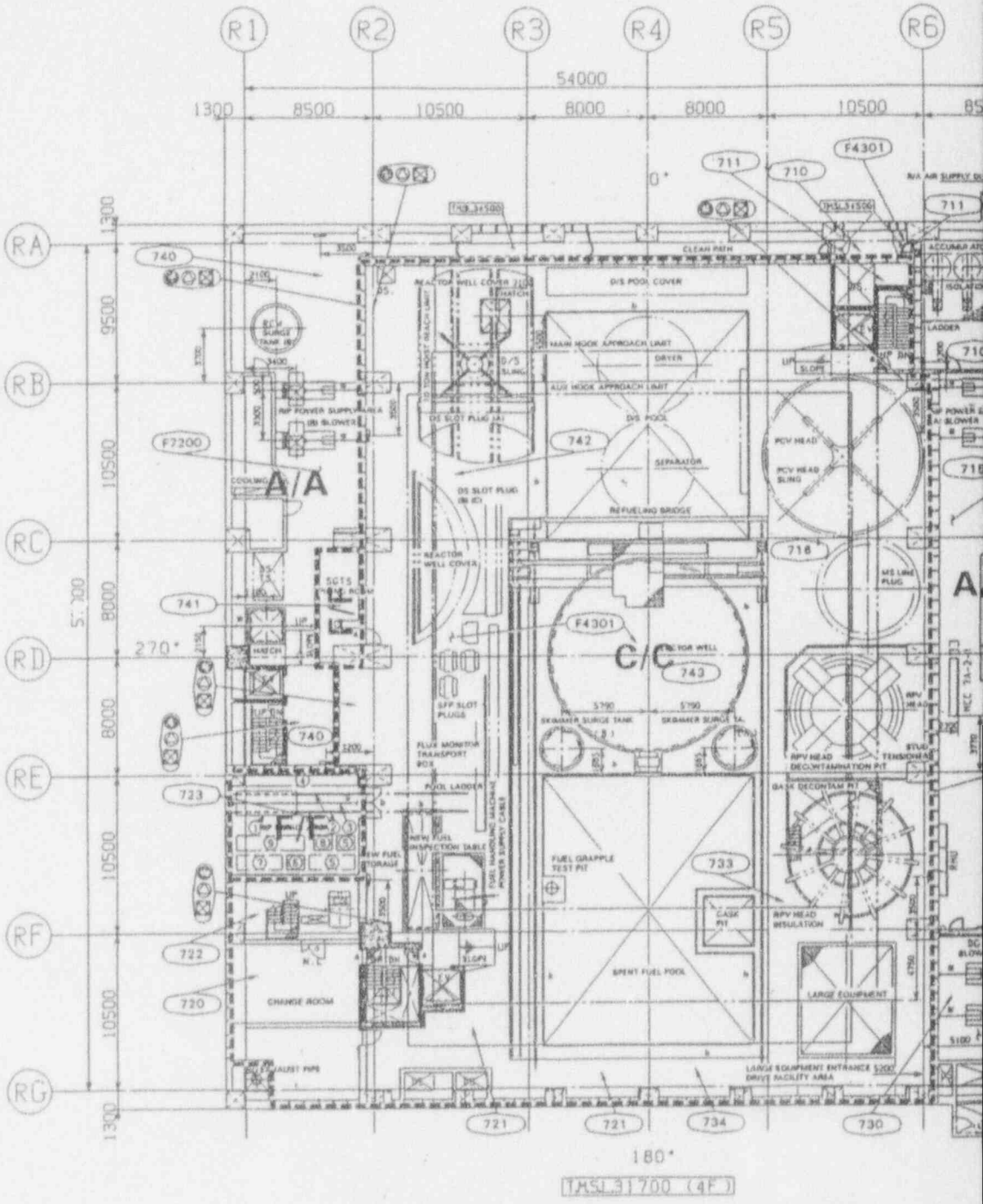
	(NO.) NAME
H22-P031	1. POST ACCIDENT SAMPLE TRANSFER RACK
H22-P032	2. POST ACCIDENT SAMPLE RECOVERY RACK
H22-P033	3. POST ACCIDENT SAMPLING LOCAL OPERATING PANEL
H22-P035	5. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (A)
H22-P036	6. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (B)
H22-P037	7. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P038	8. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P039	9. CONTAINMENT VESSEL PRESSURE, LEAK TEST RACK
H22-P040	10. REACTOR CONTAINMENT VESSEL DEW POINT RECORDER RACK

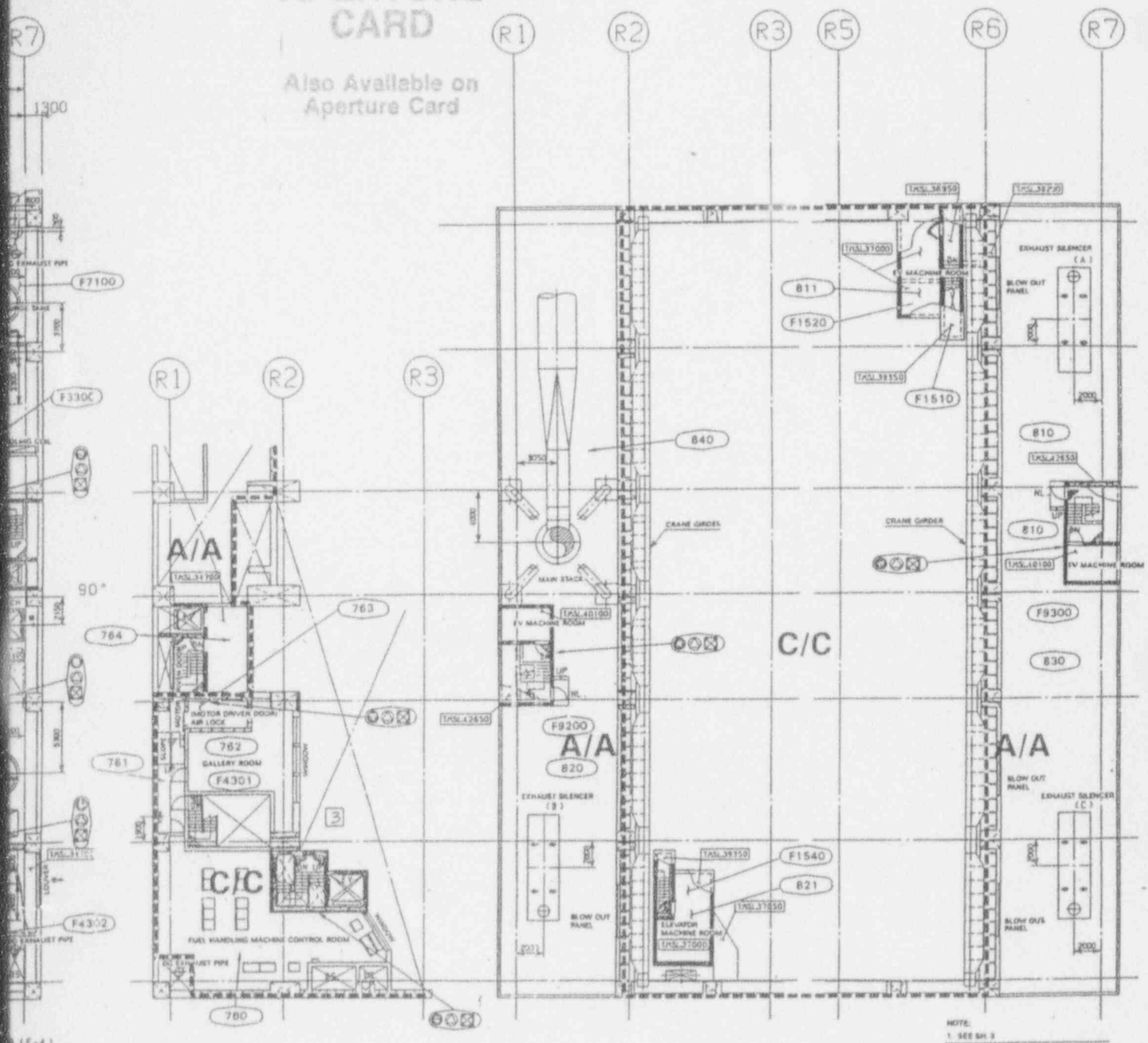
[3] ZONE DOSE RATE (μSv/h)

A $\leq$ 6
B < 10
C < 50
D < 250
E < 1000
F $\geq$ 1000

9404180300-08

Figure 12.3-5 REACTOR BUILDING RADIATION ZONE MAP FOR FULL POWER AND SHUTDOWN OPERATION AT ELEVATION 12300 mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
51300
9500
10500
8000
8000
10500
1300
A/A
F/F
C/C
270°
180°
TMSL 31700 (4F)
740
741
742
743
F4301
F7200
711
710
718
723
722
720
721
734
730
733
DS POOL COVER
REACTOR WELL COVER
SEPARATOR
REFUELING BRIDGE
SKIMMER SURGE TANK
FUEL GRAPPLE TEST PIT
SPENT FUEL POOL
CHANGE ROOM
LARGE EQUIPMENT
CASK PIT
RPV HEAD INSULATION
RPV HEAD DECONTAMINATION PIT
POOL LADDER
NEW FUEL INSPECTION TABLE
NEW FUEL STORAGE
MAIN HOOK APPROACH LIMIT
AUX HOOK APPROACH LIMIT
DS POOL
PCV HEAD
PCV HEAD SLING
MS LINE PLUG
DS SLOT PLUG
SFP SLOT PLUGS
REACTOR WELL COVER
LADDER
TMSL 38200
TMSL 34500
TMSL 31700
a - a



3 ZONE DOSE RATE (μSv/h)

A ≤ 6
B < 10
C < 50
D < 250
E < 1000
F ≥ 1000

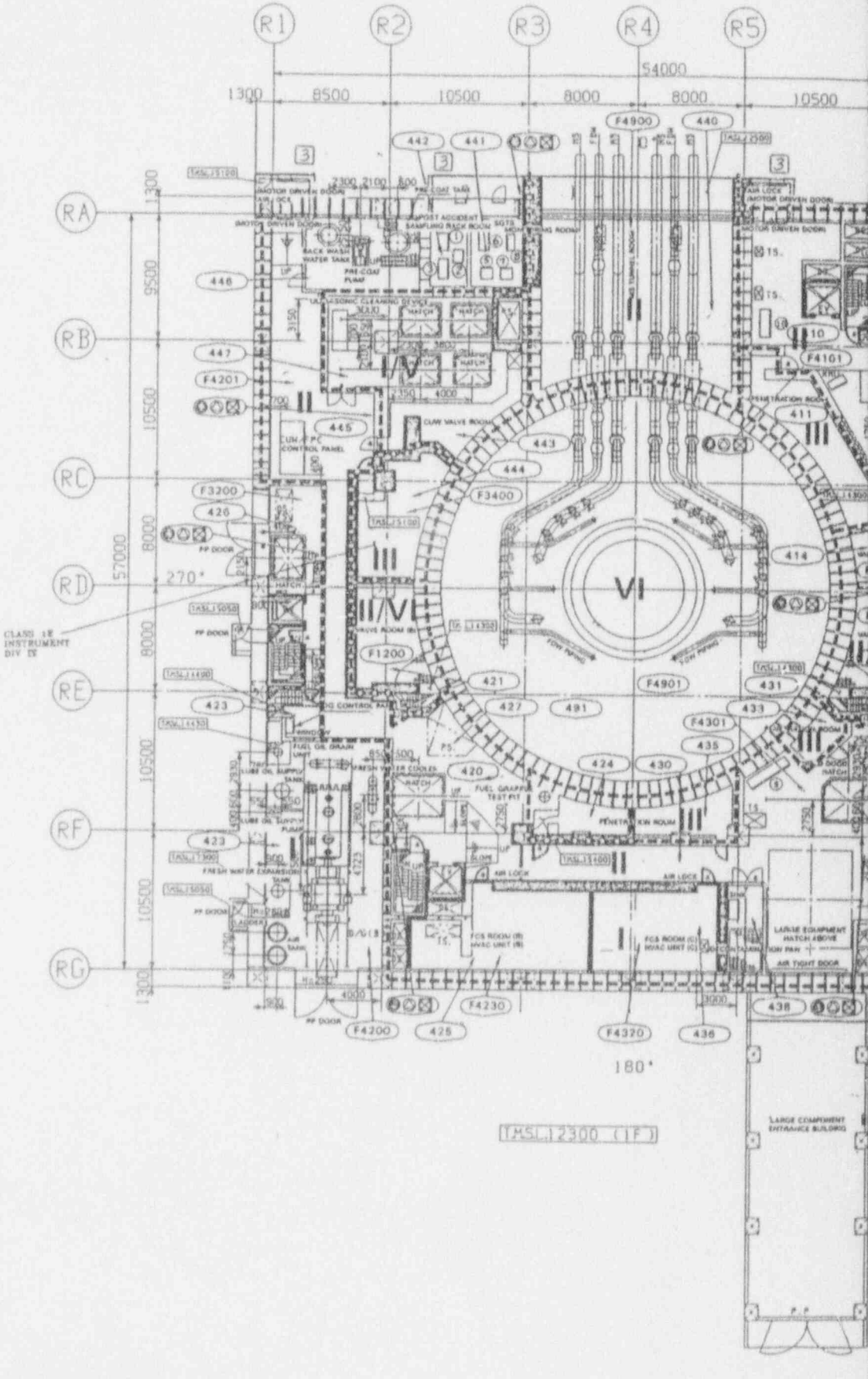
RACK NAME

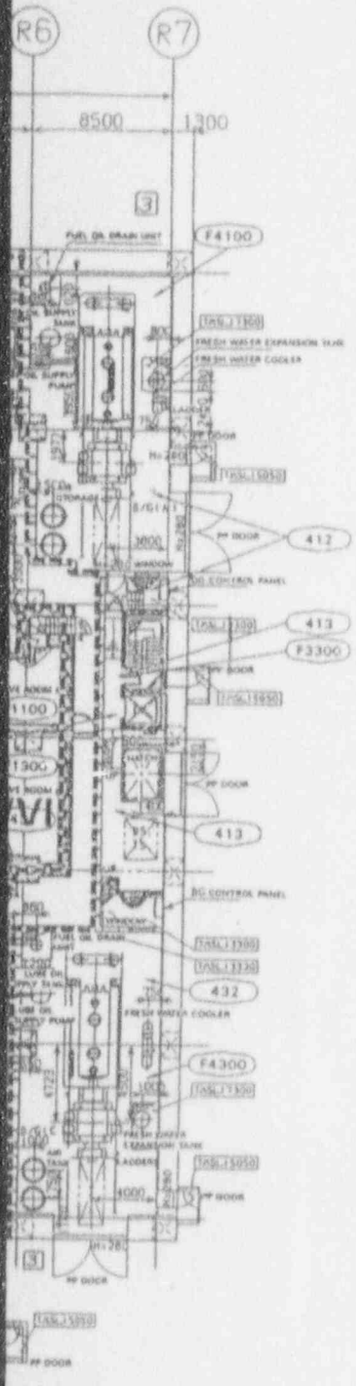
ON POOL
ARY INSTALLED RAIL
IL
RY INSTALLED RAIL STORAGE AREA
SHAFT GRAPPLE STORAGE AREA
WEAR RING GRAPPLE STORAGE AREA
STRETCH TUBE GRAPPLE STORAGE AREA
UG STORAGE AREA
R PORTION HANDLING CONNECTOR ROD STORAGE AREA

(REMARKS)
EQUIPMENT
D/S POOL
SPENT FUEL STORAGE POOL

9404180300-09

Figure 12.3-9 REACTOR BUILDING RADIATION ZONE MAP FOR FULL POWER AND SHUTDOWN OPERATION AT ELEVATION 31700/38200 mm


R1
R2
R3
R4
R5
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
9500
10500
8000
8000
10500
1300
57000
270°
180°
VI
II/VI
III/VI
III
II
IV
F4900
440
442
441
446
447
F4201
445
F3200
426
F3400
444
443
411
F4101
414
F1200
421
F4901
431
423
427
491
433
F4301
438
420
424
430
423
425
F4200
F4230
F4320
436
438
CLASS 1E INSTRUMENT DIV IV
LARGE EQUIPMENT HATCH ABOVE
AIR TIGHT DOOR
LARGE COMPONENT ENTRANCE BUILDING
TMSL 12300 (1F)



(REMARKS)
EQUIPMENT
PRE COAT PUMP
FUEL HANDLING MACHINE TEST PIT
DIESEL GENERATOR ROOMS 412, 423, AND 432 HAVE A
SUNKEN FLOOR AT 12,000mm WITH A GRATING FLOOR AT 12,300mm.

INSTRUMENT RACK LIST

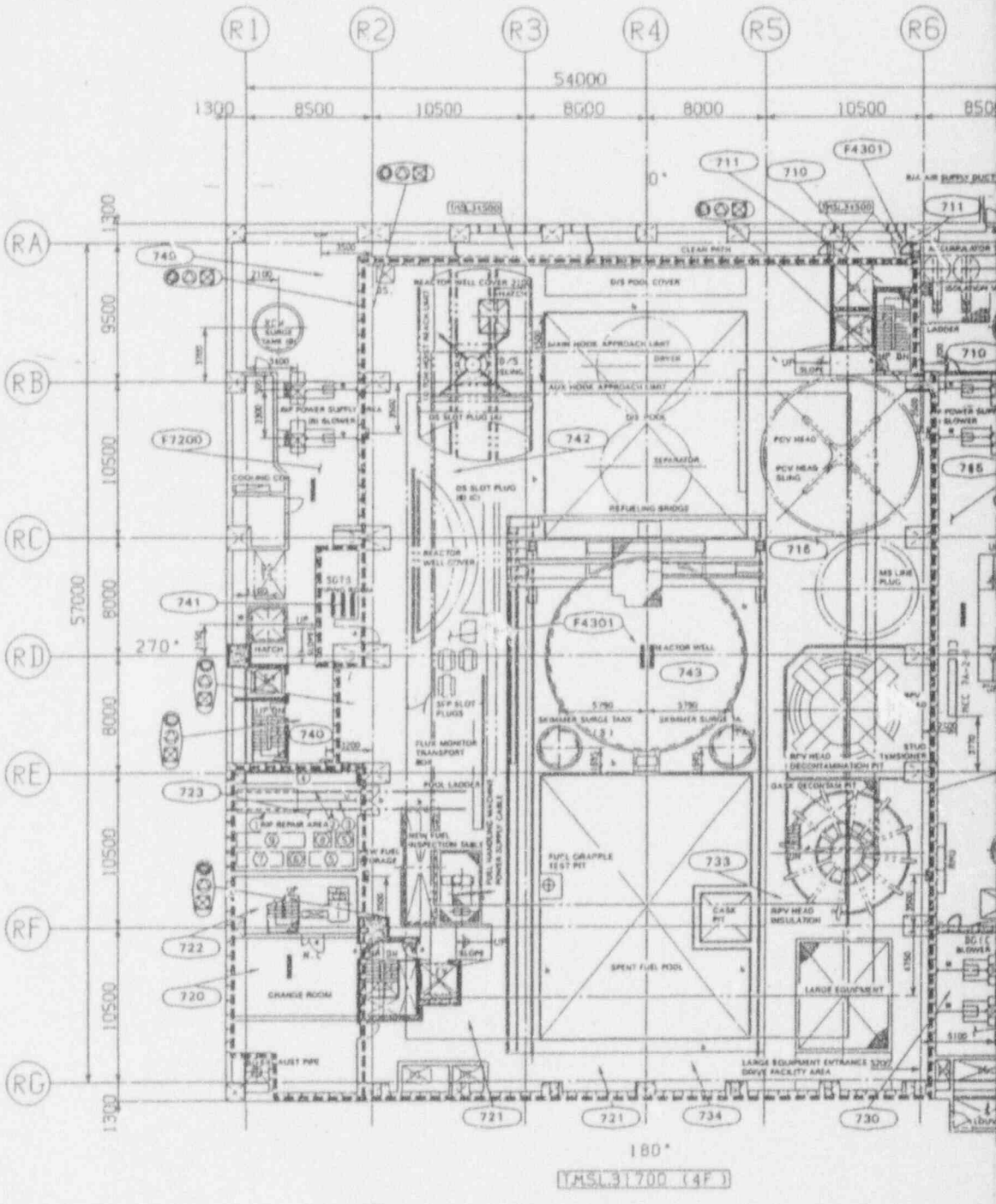
NO	NAME
H22-P031	1. POST ACCIDENT SAMPLE TRANSFER RACK
H22-P032	2. POST ACCIDENT SAMPLE RECOVERY RACK
H22-P033	3. POST ACCIDENT SAMPLING LOCAL OPERATING PANEL
H22-P035	5. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (A)
H22-P036	6. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (B)
H22-P037	7. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P038	8. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P039	9. CONTAINMENT VESSEL PRESSURE, LEAK TEST RACK
H22-P040	10. REACTOR CONTAINMENT VESSEL DEW POINT RECORDER RACK

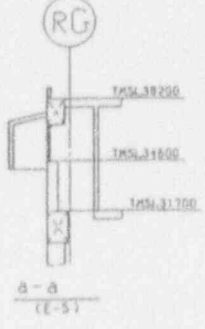
[3] ZONE DOSE RATE (Gy/h)

A ≤ 0.005
B ≤ 0.05
C ≤ 0.5
D ≤ 5
E ≤ 50
F ≥ 50

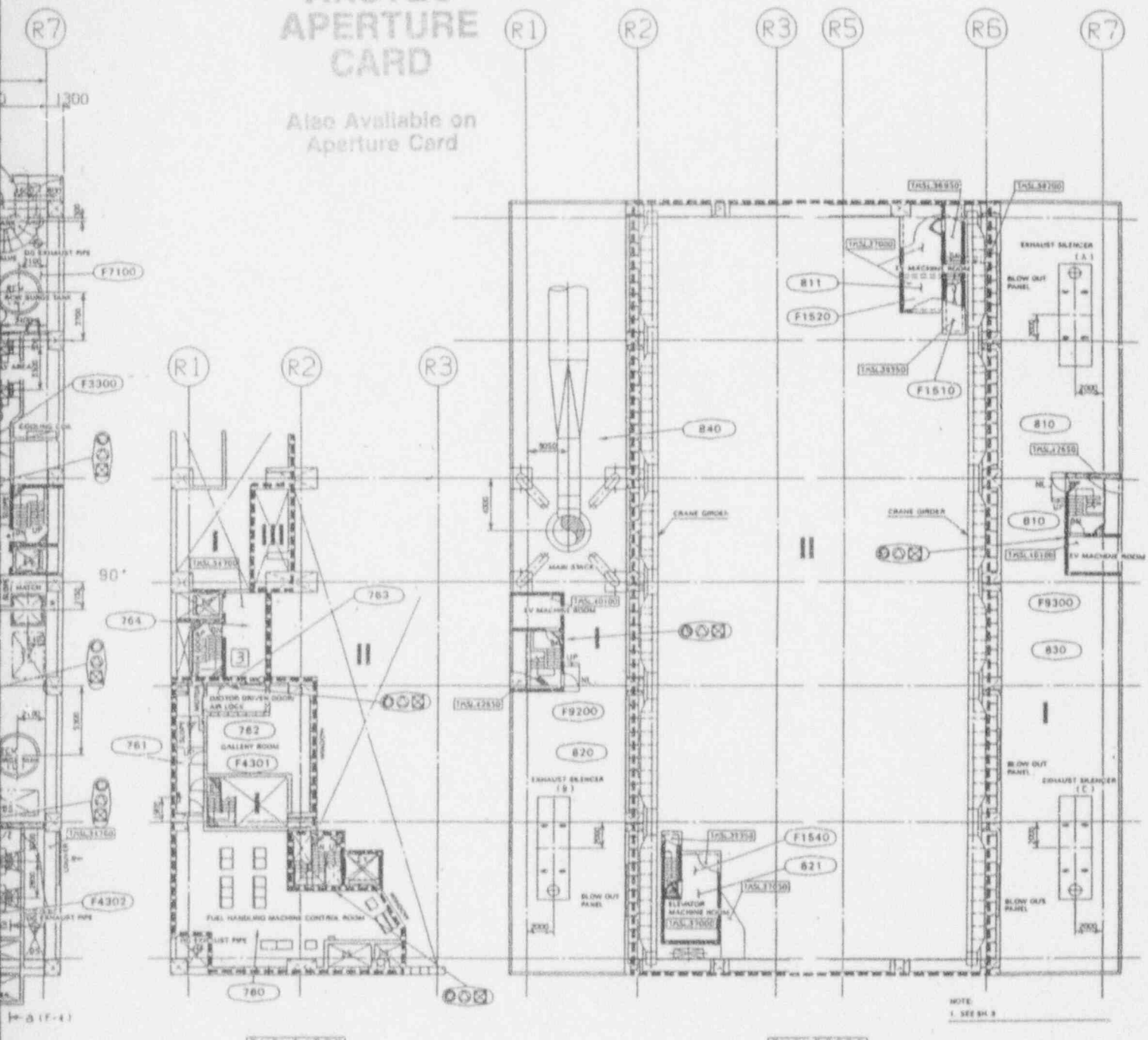
9404180300-10

Figure 12.3-16 REACTOR BUILDING RADIATION ZONE MAP POST LOCA AT ELEVATION −12300 mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
57000
9500
10500
8000
8000
10500
1300
270°
180°
TMSL 31700 (4F)
D/S POOL COVER
REACTOR WELL COVER
SEPARATOR
REFUELING BRIDGE
SPENT FUEL POOL
CASK PIT
CHANGE ROOM
LARGE EQUIPMENT
POOL LADDER
FUEL GRAPPLE TEST PIT
RPV HEAD INSULATION
710
711
715
716
720
722
723
730
733
734
740
741
742
743
F4301
F7200


RG
TMSL 38200
TMSL 34600
TMSL 31700

A - A
(E-S)



[3] ZONE DOSE RATE (Gy/h)

A ≤ 0.005
B < 0.05
C < 0.5
D < 5
E < 50
F ≥ 50

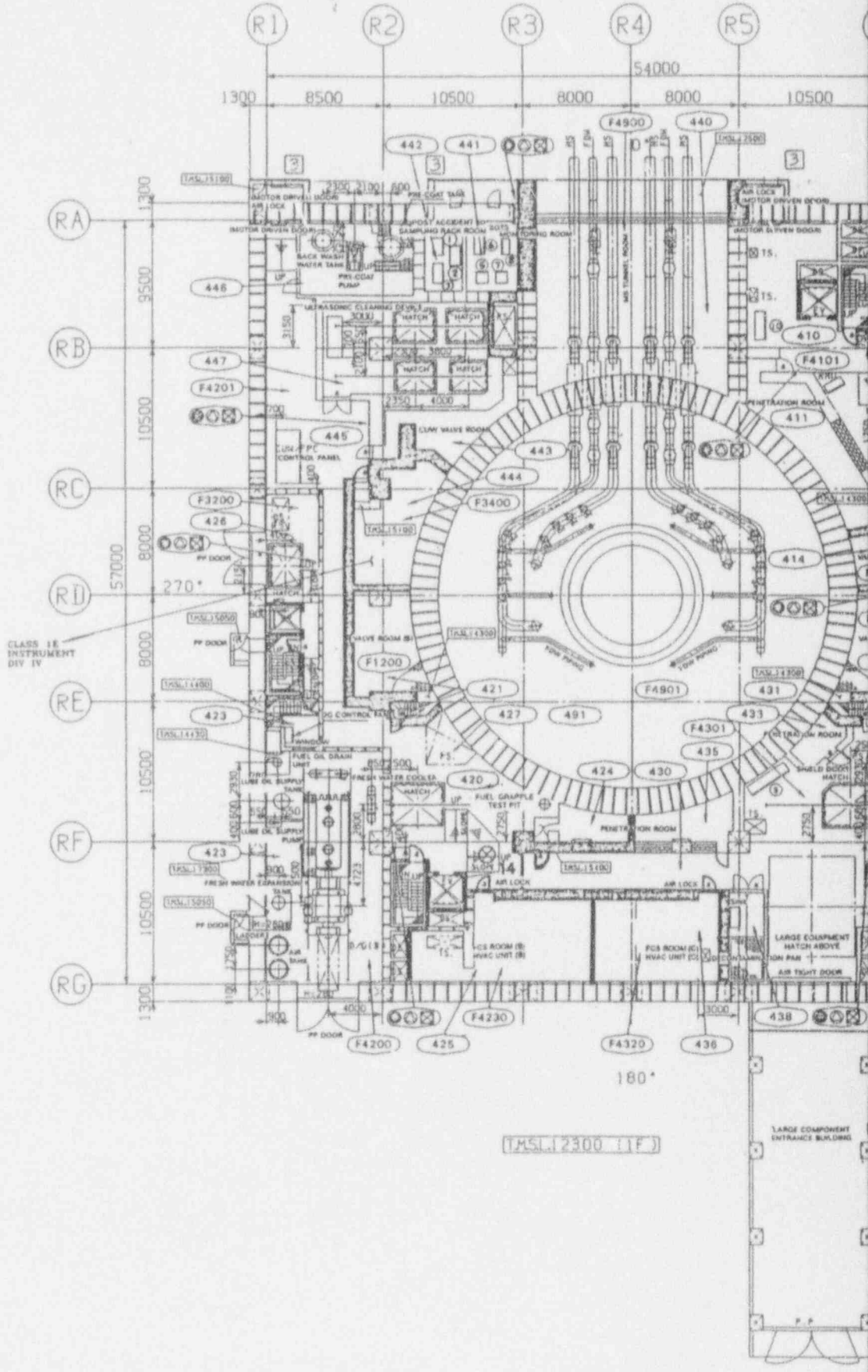
RACK NAME

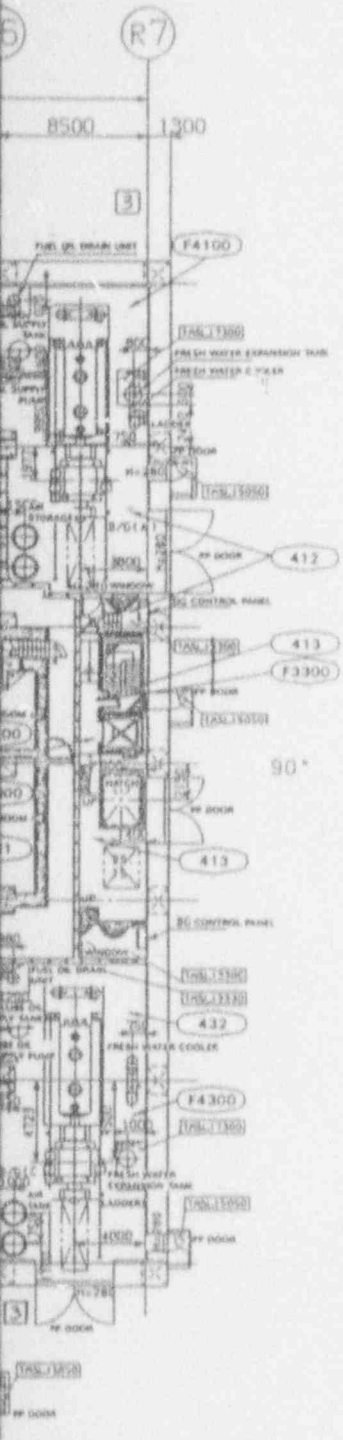
PECTION POOL
PORARY INSTALLED RAIL
IO-RAIL
PORARY INSTALLED RAIL STORAGE AREA
ELLER SHAFT GRAPPLE STORAGE AREA
PUSER WEAR RING GRAPPLE STORAGE AREA
PUSER STRETCH TUBE GRAPPLE STORAGE AREA
ER PLUG STORAGE AREA
UPPER PORTION HANDLING CONNECTOR ROD STORAGE AREA

(REMARKS)
EQUIPMENT
D/S POOL
SPENT FUEL STORAGE POOL

9404180300-11

Figure 12.3-20 REACTOR BUILDING RADIATION ZONE MAP POST LOCA AT ELEVATION -31700/38200 mm


R1
R2
R3
R4
R5
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
57000
9500
10500
8000
8000
10500
1300
270°
180°
CLASS 1E INSTRUMENT DIV IV
TMSL 15190
TMSL 14300
TMSL 14430
TMSL 15050
TMSL 13900
TMSL 15100
TMSL 12300 (1F)
F4900
F4101
F4201
F3200
F3400
F1200
F4901
F4301
F4230
F4200
F4320
440
442
441
446
447
445
410
411
443
444
426
414
421
427
491
431
433
435
423
420
424
430
425
436
438
AIR LOCK
MOTOR DRIVEN DOOR
PENETRATION ROOM
LARGE COMPONENT HATCH ABOVE
AIR TIGHT DOOR
LARGE COMPONENT ENTRANCE BUILDING



AREA RADIATION MONITOR SYMBOL

⊗ n n = MONITOR ASSIGNED NUMBER

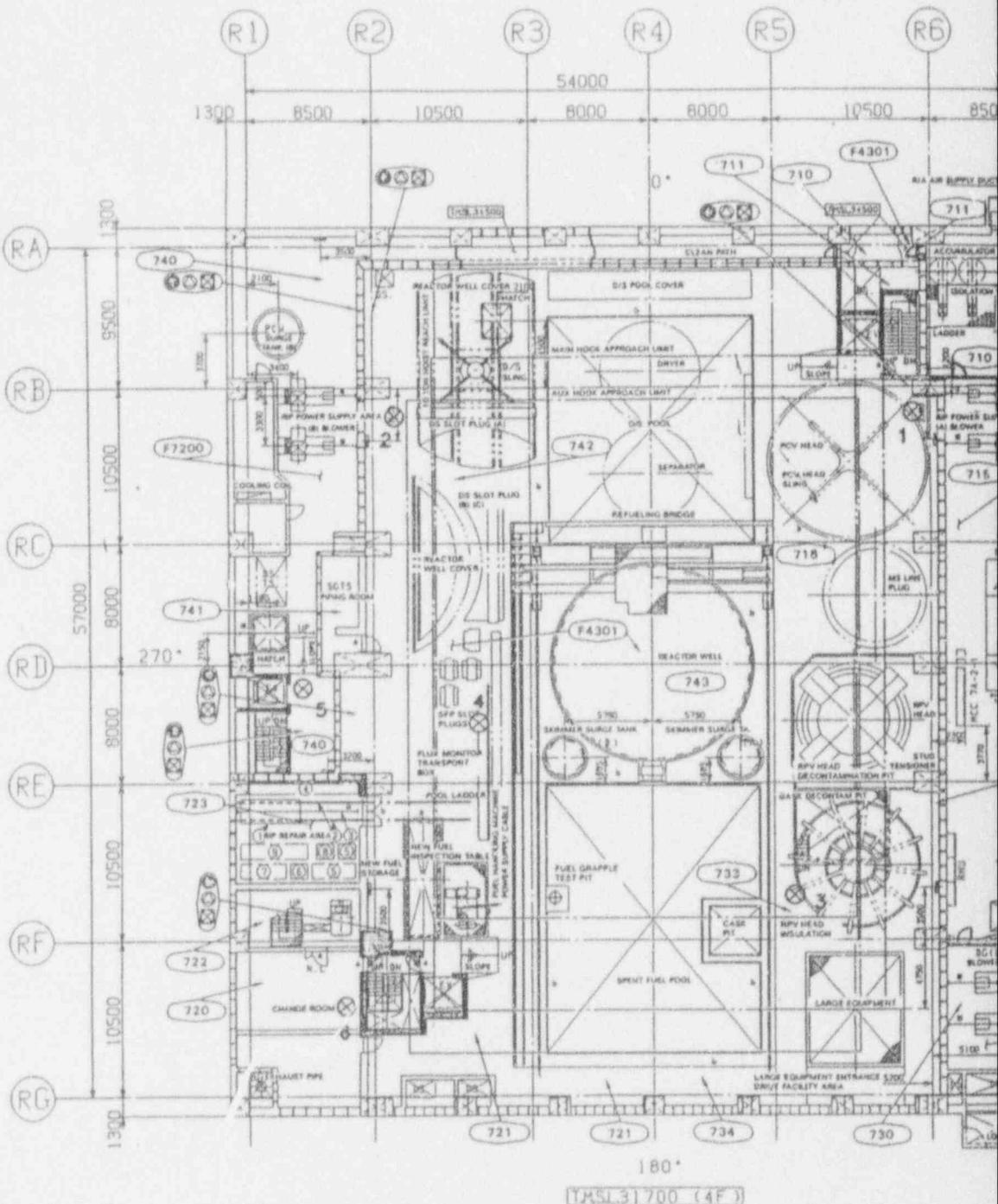
(REMARKS)
EQUIPMENT
PRE COAT PUMP
FUEL HANDLING MACHINE TEST PIT
DIESEL GENERATOR ROOMS 412, 423, AND 432 HAVE A SUNKEN FLOOR AT 12,000mm WITH A GRATING FLOOR AT 12,300mm.

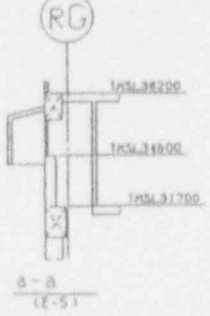
INSTRUMENT RACK LIST

	(NO.) NAME
H22-P031	1. POST ACCIDENT SAMPLE TRANSFER RACK
H22-P032	2. POST ACCIDENT SAMPLE RECOVERY RACK
H22-P033	3. POST ACCIDENT SAMPLING LOCAL OPERATING PANEL
H22-P035	5. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (A)
H22-P036	6. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR GAS SAMPLER RACK (B)
H22-P037	7. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P038	8. STANDBY GAS TREATMENT SYSTEM RADIATION MONITOR PARTICULATE IODINE SAMPLE RACK
H22-P039	9. CONTAINMENT VESSEL PRESSURE, LEAK TEST RACK
H22-P040	10. REACTOR CONTAINMENT VESSEL DEW POINT RECORDER RACK

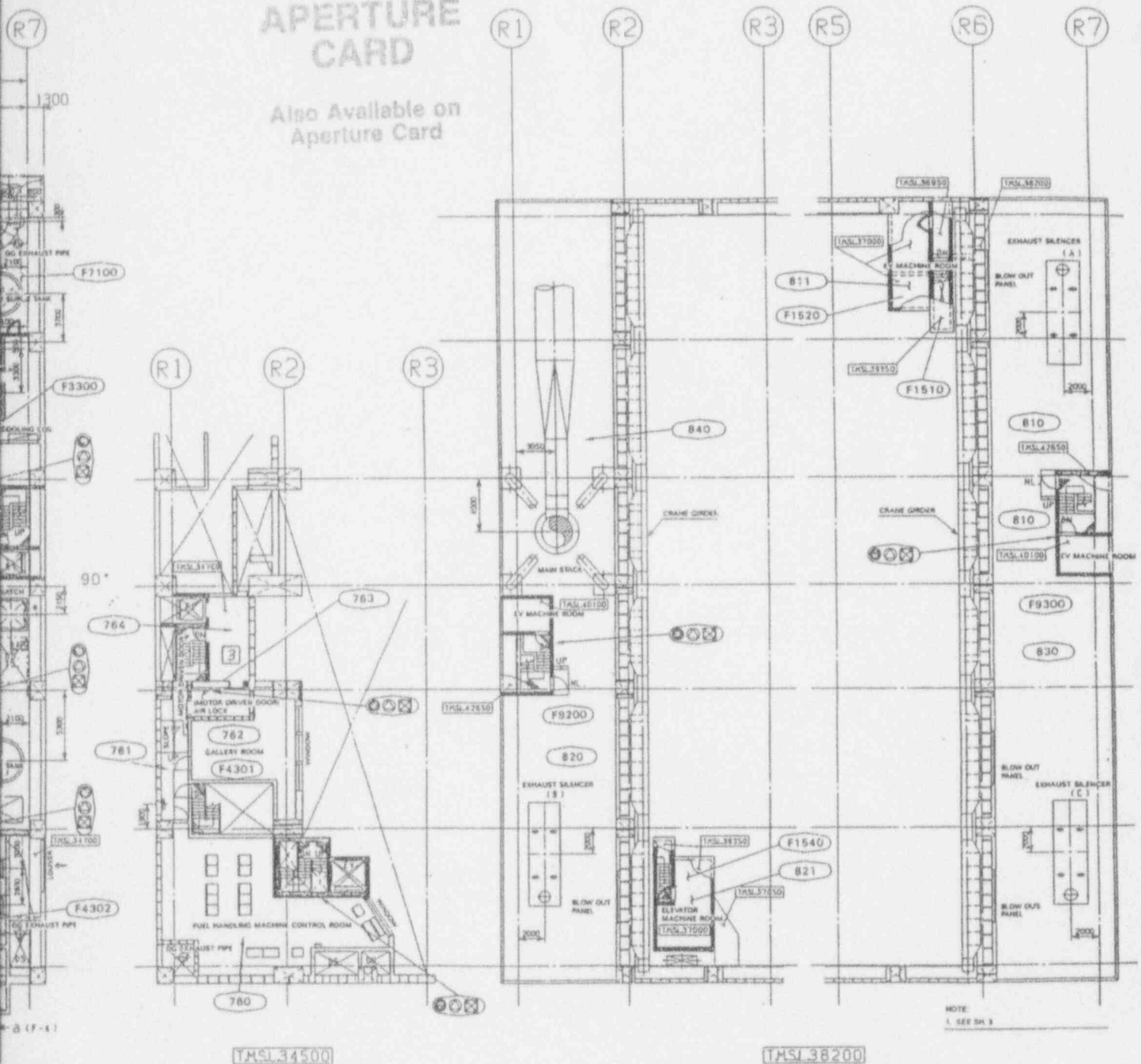
9404180300-12

Figure 12.3-59 REACTOR BUILDING AREA RADIATION MONITORS AT ELEVATION 12300 mm


R1
R2
R3
R4
R5
R6
54000
1300
8500
10500
8000
8000
10500
RA
RB
RC
RD
RE
RF
RG
57000
9500
10500
8000
8000
10500
1300
0°
90°
180°
270°
F4301
711
710
740
F7200
742
741
743
723
733
722
720
721
734
730
718
716
REACTOR WELL COVER
D/S POOL COVER
REFUELING BRIDGE
SEPARATOR
SPENT FUEL POOL
REACTOR WELL
FUEL GRAPPLE TEST PIT
CASK PIT
LARGE EQUIPMENT
CHANGE ROOM
POOL LADDER
RPV HEAD INSULATION
TMSL 31700 (4F)


RG
TMSL 38200
TMSL 34600
TMSL 31700

A - A
(E-51)



RACK NAME

CTION POOL
DRARY INSTALLED RAIL
RAIL
DRARY INSTALLED RAIL STORAGE AREA
LER SHAFT GRAPPLE STORAGE AREA
SER WEAR RING GRAPPLE STORAGE AREA
BER STRETCH TUBE GRAPPLE STORAGE AREA
PLUG STORAGE AREA
PER PORTION HANDLING CONNECTOR ROD STORAGE AREA

(REMARKS)
EQUIPMENT
D/S POOL
SPENT FUEL STORAGE POOL

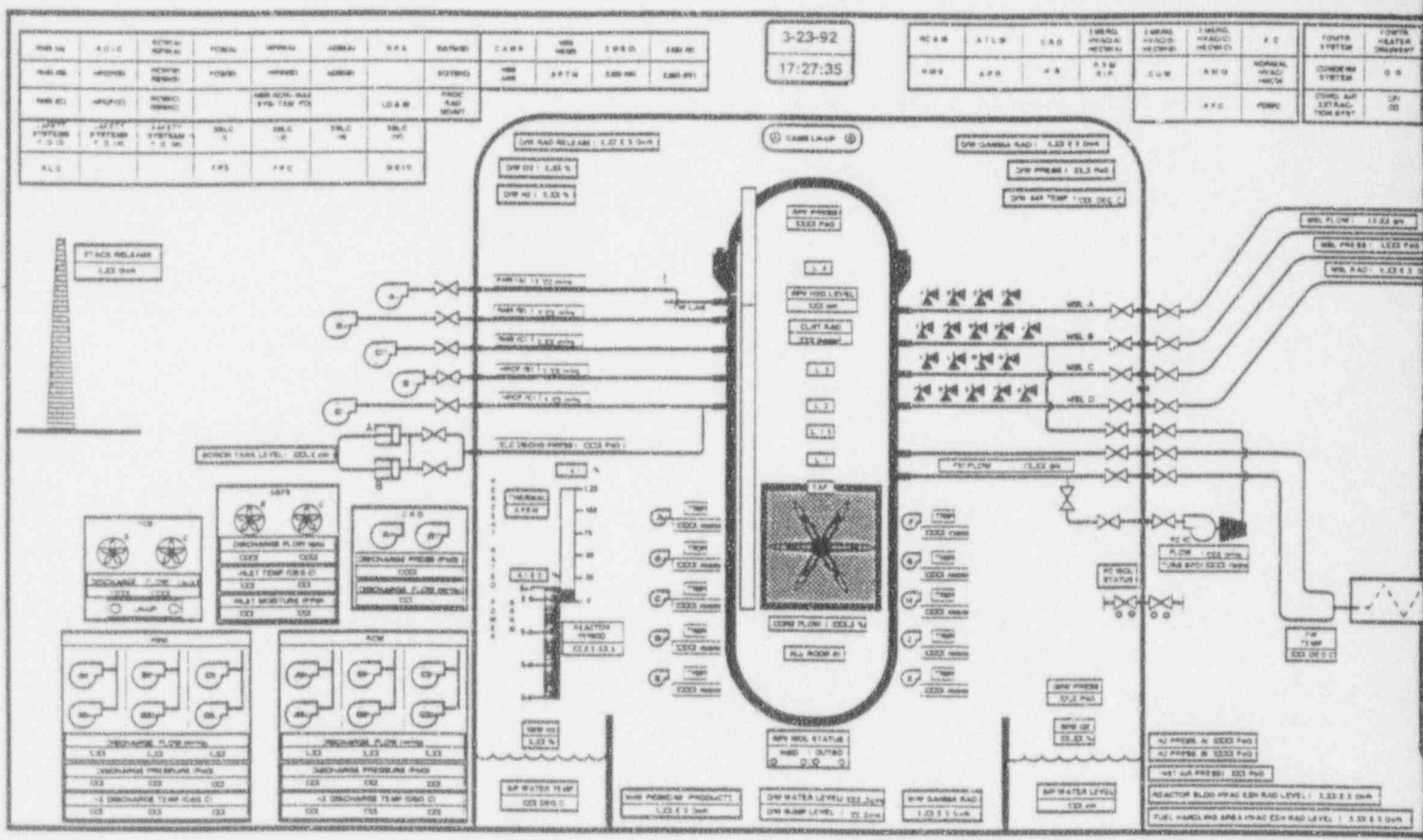
AREA RADIATION MONITOR SYMBOL

⊗ n n = MONITOR ASSIGNED NUMBER

9404180300-13

Figure 12.3-62 REACTOR BUILDING AREA RADIATION MONITORS AT ELEVATION 31700 mm

FIXED-POS



SITION DISPLAY

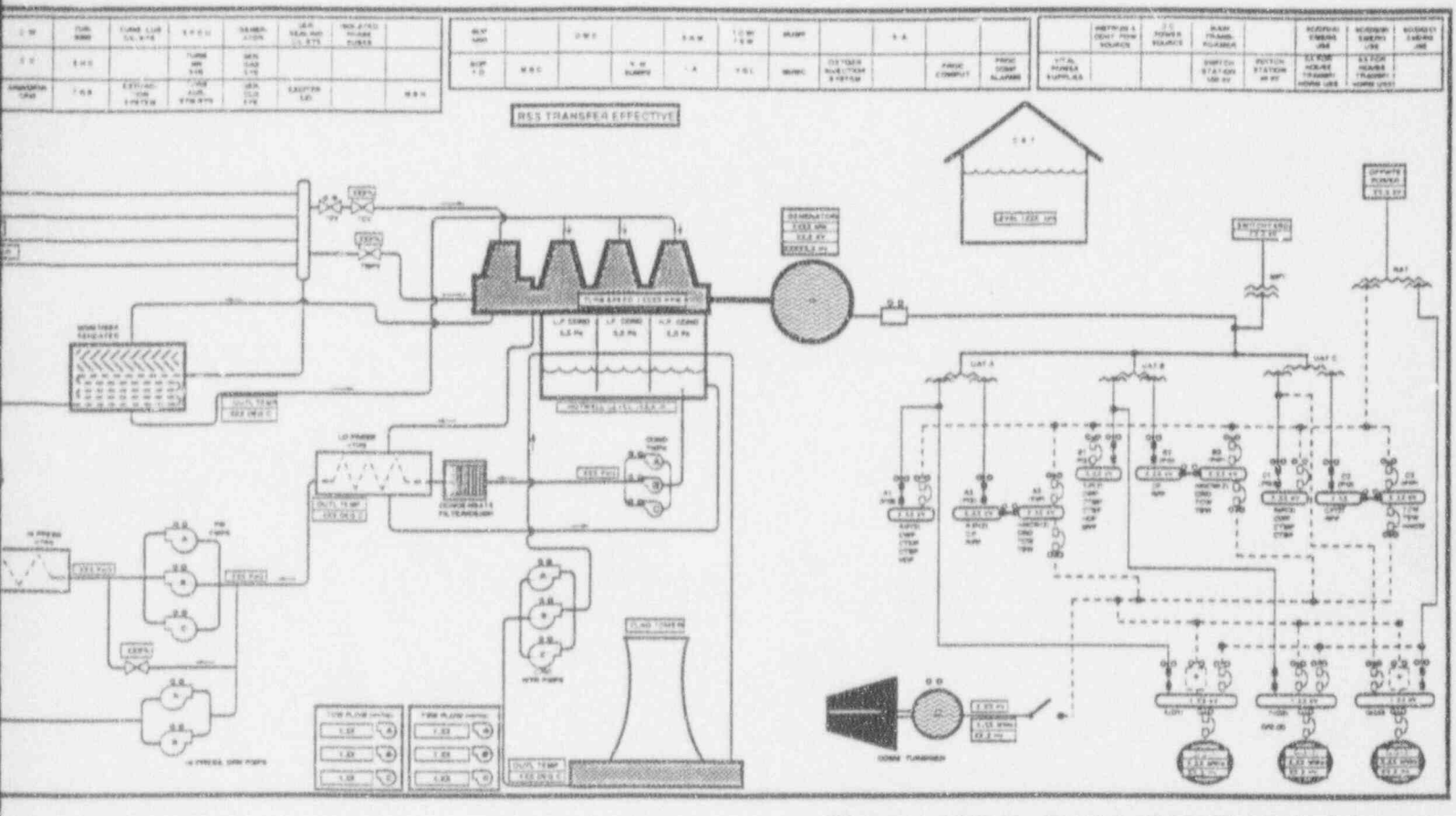


Figure 18C-7 FIXED-POSITION DISPLAY

REVISED CHANGE PAGE INSTRUCTION
(SSAR)

REVISED

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 2	
TAB 2.0	
2.0-1 thru 3/4	2.0-**1 thru 3/4**
2.0-3/4	2.0-**3/4**
TAB 2.2	
2.2-3/4	2.2-**3/4**
TAB 2.3	
2.3-1, 2	2.3-**1**, 2
2.3-5, 6	2.3-**5**, **6**
CHAPTER 3	
TAB 3.0	
3.0-i thru vi	3.0-**i thru vi**
3.0-ix thru xii	3.0-**ix thru xii**
3.0-xv thru xviii	3.0-**xv thru xviii**
3.0-xxi thru xxiv	3.0-**xxi thru xxiv**
3.0-xxvii, xxviii	3.0-xxvii,**xxviii**
3.0-xxix, xxx	3.0-xxix, xxx *
TAB 3.1	
3.1-1, 2	3.1-**1**, 2
3.1-9, 10	3.1-**9**, 10
3.1-13, 14	3.1-**13**, 14
3.1-19, 20	3.1-19, **20**
3.1-35 thru 62	3.1-35 **thru 62**
TAB 3.2	
3.2-5 thru 10	3.2-**5 thru 10**
3.2-17 thru 62	3.2-**17 thru 62**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 3 (Cont'd)	
TAB 3.3	
3.3-1 thru 4	3.3-**1 thru 4**
TAB 3.4	
3.4-1 thru 16	3.4-**1 thru 18**
TAB 3.5	
3.5-5 thru 12	3.5-**5 thru 12**
3.5-5 thru 17/18	3.5-5 **thru 17/18**
15	15
TAB 3.6	
3.6-1, 2	3.6-1, **2**
3.6-7 thru 12	3.6-**7 thru 12**
3.6-31, 32	3.6-31, **32**
3.6-37, 38	3.6-37, 38
3.6-41, 42	3.6-41, **42**
TAB 3.7	
3.7-3, 4	3.7-3, **4**
3.7-15 thru 26	3.7-**15 thru 26**
3.7-45 thru 48	3.7-**45 thru 48**
3.7-55 thru 78	3.7-**55 thru 78**
TAB 3.8	
3.8-1 thru 26	3.8-**1 thru 26**
3.8-29, 30	3.8-**29**, **30**
3.8-37, 38	3.8-**37**, **38**
3.8-41 thru 48	3.8-**41 thru 48**
3.8-51, 52	3.8-**51**, 52
3.8-59, 60	3.8-**59**, 60

* Page 3.0-xxix should be Amendment 32 not 31 as provided in this modification package.

ABWP SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 3 (Cont'd)	
TAB 3.9	
3.9-1 thru 156	3.9-**1 thru 155/156**
TAB 3.10	
3.10-1, 2	3.10-1, **2**
TAB 3.11	
3.11-3, 4	3.11-3, **4**
TAB 3.12	
3.12-1 thru 3/4	3.12-**1 thru 4**
TAB 3.13	
3.13-1, 2	3.13-**1**, 2
3.13-7 thru 10	3.13-**7 thru 10**
3.13-13 thru 16	3.13-**13 thru 21**
TAB App. 3A	
3A-3 thru 8	3A-**3 thru 8**
3A-11, 12	3A-**11, 12**
3A-27, 28	3A-**27, 28**
3A-31 thru 50	3A-**31 thru 50**
3A-59 thru 62	3A-**59 thru 62**
3A-71, 72	3A-**71**, 72
3A-75 thru 94	3A-**75 thru 94**
3A-97 thru 296	3A-**97 thru 296**

REMOVE PAGE No.	ADD PAGE No.
TAB App. 3B	
3B-5 thru 70	3B-**5 thru 73/74**
TAB App. 3E	
3E-7, 8	3E-**7, 8**
3E-9 thru 12	3E-**9 thru 12**
3E-15 thru 26	3E-**15 thru 26**
3E-33 thru ~~59/60~~ 50	3E-**33 thru ~~59/60~~ 50**
3E-55 thru 59/60	3E-55 thru 59/60 *
TAB App. 3G	
3G-5, 6	3G-**5, 6**
3G-9 thru 115/116	3G-**9 thru 115/116**
TAB App. 3H	
3H.0-iii thru viii	3H.0-**iii thru viii**
3H.1-3 thru 10	3H.1-**3 thru 10**
3H.1-13 thru 86	3H.1-**13 thru 86**
3H.1-89 thru 92	3H.1-**89 thru 92**
3H.1-97 thru 102	3H.1-**97 thru 102**
3H.1-105 thru 113/114	3H.1-**105 thru 113/114**
3H.2-1 thru 10	3H.2-**1 thru 10**
3H.2-13 thru 30	3H.2-**13 thru 30**
3H.3-1 thru 8	3H.3-**1 thru 8**
3H.3-11 thru 38	3H.3-**11 thru 39**
3H.4-1 thru 6	3H.4-**1 thru 6**
3H.5-1, 2	3H.5-1, **2**
TAB App. 3I	
3I-1 thru 18	3I-**1 thru 18**

* Pages 3E-51, 52 and 53, 54 provided in this modification package in the event they were discarded earlier.

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 5 (Cont'd)	
TAB 5.2	
5.2-1 thru 20	5.2-**1 thru 20**
5.2-25 thru 36	5.2-**25 thru 36**
5.2-39, 40	5.2-39, **40**
5.2-45 thru 50	5.2-**45 thru 50**
5.2-53 thru 56	5.2-**53 thru 56**
5.2-71, 72	5.2-71, **72**
5.2-75, 76	5.2-**75, 76**
5.2-81, 82	5.2-81, **82**
TAB 5.3	
5.3-5 thru 8	5.3-**5 thru 8**
5.3-11 thru 18	5.3-**11 thru 18**
5.3-21, 22	5.3-**21, 22**
5.3-25/26	5.3-**25/26**
TAB 5.4	
5.4-3, 4	5.4-**3, 4**
5.4-7 thru 73	5.4-**7 thru 75**
TAB App. 5A	
5A-1, 2	5A-**1**, 2
5A-7, 8	5A-**7**, 8
TAB App. 5B	
5B-1 thru 5	5B-**1 thru 5**
CHAPTER 6	
TAB 6.0	
6.0-i thru xii	6.0-**i thru xii**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 6 (Cont'd)	
TAB 6.1	
6.1-1 thru 4	6.1-**1 thru 4**
6.1-7, 8	6.1-**7**, 8
TAB 6.2	
6.2-1 thru 228	6.2-**1 thru 241/242**
TAB 6.3	
6.3-1 thru 8	6.3-**1 thru 8**
6.3-11 thru 14	6.3-**11 thru 14**
6.3-17 thru 86	6.3-**17 thru 87/88**
TAB 6.4	
6.4-1 thru 10	6.4-**1 thru 10**
TAB 6.5	
6.5-1 thru 17/18	6.5-**1 thru 18**
TAB 6.6	
6.6-5, 6	6.6-5, 6
6.6-1, 2	6.6-**1**, 2
6.6-11, 12	6.6-**11, 12**
6.6-29/30	6.6-**29/30**
6.6-39 thru 42	6.6-**39 thru 42**
TAB 6.7	
6.7-1 thru 6	6.7-**1 thru 6**

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPER 6 (Cont'd)	
TAB App. 6A	
6A-3, 4	6A-3, 4
6A-9 thru 12	6A-**9 thru 12**
TAB App. 6B	
6B-1, 2	6B-**1**, 2
6B-5, 6	6B-5, **6**
TAB App. 6C	
6C-1 thru 3/4	6C-**1 thru 3/4**
TAB App. 6D	
6D-1, (2) 3/4	6D-1 (2) 3/4 *
TAB App. 6E	
Add	6E-**1 thru 3**
CHAPTER 7	
TAB 7.0	
7.0-i thru vii/viii	7.0-**1 thru vii/viii**
TAB 7.1	
7.1-1 thru 4	7.1-**1 thru 4**
7.1-15 thru 24	7.1-**15 thru 24**
7.1-27, 28	7.1-**27**, 28
7.1-33, 34	7.1-33, **34**
7.1-37, 38	7.1-**37**, 38

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 7 (Cont'd)	
TAB 7.2	
7.2-5 thru 24	7.2-**5 thru 24**
7.2-47, 48 (7.2-47, 48) →	
TAB 7.2 (cont'd)	
7.2-53, 54	7.2-53, **54**
7.2-57, 58	7.2-57, **58**
TAB 7.3	
7.3-1 thru 4	7.3-**1 thru 4**
7.3-7 thru 16	7.3-**7 thru 16**
7.3-19 thru 22	7.3-**19 thru 22**
7.3-33, 34	7.3-33, **34**
7.3-49, 50	7.3-**49**, 50
7.3-53 thru 68	7.3-**53 thru 68**
7.3-71, 72	7.3-71, **72**
7.3-81, 82	7.3-81, **82**
7.3-87 thru 96	7.3-**87 thru 97/98**
TAB 7.4	
7.4-1 thru 4	7.4-**1 thru 4**
7.4-7, 8	7.4-7, 8
7.4-17, 18	7.4-**17**, **18**
7.4-27 thru 30	7.4-**27 thru** 30
TAB 7.5	
7.5-1, 2	7.5-**1**, 2
7.5-7 thru 14	7.5-**7 thru 14**
7.5-21 thru 24	7.5-**21 thru 24**
7.5-27 thru 29	7.5-**27 thru 29**

* Page 6D-3/4 provided in this modification package

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 9 (Cont'd)	
TAB 9.1	
9.1-3, 4	9.1-3, **4**
9.1-9 thru 18	9.1-**9 thru 18**
9.1-23 thru 32	9.1-**23 thru 32**
9.1-35 thru 50	9.1-**35 thru 50**
9.1-55 thru 60	9.1-**55 thru 60**
9.1-65, 66	9.1-65, **66**
9.1-69, 70	9.1-69, **70**
TAB 9.2	
9.2-1 thru 4	9.2-**1 thru 4**
9.2-11 thru 70	9.2-**11 thru 70**
9.2-73 thru 76	9.2-**73 thru 76**
TAB 9.3	
9.3-3 thru 6	9.3-**3 thru 6**
9.3-11 thru 14	9.3-**11 thru 14**
9.3-17 thru 36	9.3-**17 thru 36**
9.3-39 thru 42	9.3-**39 thru 42**
9.3-45 thru 48	9.3-**45 thru 48**
TAB 9.4	
9.4-1 thru 57	9.4-**1 thru 57**
TAB 9.5	
9.5-1 thru 90	9.5-**1 thru 90**
TAB App. 9A	
9A.2-3 thru 9/10	9A.2-**3 thru 9/10**
9A.3-3	9A.3-**3**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 9 (Cont'd)	
TAB App. 9A (cont'd)	
9A.4-1 thru 507	9A.4-**1 thru 502**
9A.5-9 thru 14	9A.5-**9 thru 14**
9A.5-25, 26	9A.5-25, **26**
9A.6-99, 100	9A.6-**99**, 100
TAB App. 9B	
9B-3 thru 14	9B-**3 thru 14**
TAB App. 9C	
9C-1 thru 12	9C-**1 thru 12**
TAB App. 9D	
9D-1, 2	9D-1, **2**
9D-5, 6	9D-**5**, 6
CHAPTER 10	
TAB 10.0	
10.0-i/ii thru v/vi	10.0-**i/ii/ thru v/vi**
TAB 10.1	
10.1-1 thru 10	10.1-**1 thru 10**
TAB 10.2	
10.2-1 thru 21/22	10.2-**1 thru 21/22**

Amendment 34 - Page change instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 14	
TAB 14.0	
14.0-i thru v/vi	14.0-**i** thru v/**vi**
TAB 14.2	
14.2-11 thru 18	14.2-11 thru **18**
14.2-21,22	14.2-2**1**,**22**
14.2-25 thru 30	14.2-**25** thru**30**
14.2-33, ~~thru~~ 34	14.2-**33**, ~~thru~~ **34**
14.2-39 thru 42	14.2-**39** thru **42**
14.2-47 thru 50	14.2-**47** thru **50**
14.2-53,54	14.2-53,**54**
14.2-61,62	14.2-**61**,62
14.2-71,72	14.2-**71**,72
14.2-75 thru 170	14.2-75 thru **170**
14.2-179 thru 182	14.2-**179** thru **182**
14.2-185,186	14.2-185,**186**
14.2-193 thru 200	14.2-**193** thru **200**
TAB 14.3	
14.3-5 thru 59	14.4-5 thru **60**

Amendment 34 - Page change instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 15	
TAB 15.0	
15.0-i thru xviii	15.0-**i** thru **xvi**
15.0-5 thru 19	15.0-5 thru **19** *
TAB 15.1	
15.1-3 thru ~~18~~ 10	15.1-3 thru ~~18~~ 10
15.1-15 thru 18	15.1-**15** thru **18**
15.1-21 thru 24	15.1-**21** thru **24**
TAB 15.2	
15.2-1 thru 12	15.2-1 thru **12**
15.2-15 thru 24	15.2-15 thru 24
15.2-27 thru 55/56	15.2-**27** thru **55/56** **
TAB 15.3	
~~15.3-1 thru 19/20~~	15.3-1 thru 18 ***
~~15.4-3 thru 10~~	~~15.4-3 thru 10~~ .
TAB 15.4	
15.4-3 thru 10	15.4-3 thru **10**
15.4-19 thru 23/24	15.4-**19** thru **23/24**
TAB 15.5	
15.5-1 thru 4	15.5-**1** thru **4**
TAB 15.6	
15.6-3 thru 8	15.6-3 thru 8
15.6-11,12	15.6-11,**12**
15.6-17 thru 42	15.6-**17** thru **42**
15.6-45 thru 47/48	15.6-**45** thru **47/48**
TAB 15.7	
15.7-1,2	15.7-**1**,2
15.7-5 thru 20	15.7-5 thru **20**
TAB 15.8	
15.8-1,2	15.8-**1**,2
TAB 15A	
15A-i/ii	15A-**i**/**ii**
15A-v thru viii	15A-v thru **viii**
15A-7 thru 10	15A-7 thru 10
15A-23/24	15A-**23/24**
15A-35/36	15A-35/**36**
15A-41 thru 48	15A-41 thru **48**
15A-57 thru 88	15A-57 thru 88
15A-91 thru 110	15A-**91** thru **110**
15A-113 thru 118	15A-**113** thru **118**
15A-121 thru 127/128	15A-121 thru **127/128**
TAB 15B	
15B-11 thru 16	15B-**11** thru 16
15B-35/36	15B-35/**36**
TAB 15D	
15D-1,2	15D-1,2

* Pages 15.0-5, 6 provided in this modification package

** Page 15.2-25,26 provided in this modification package

*** Page 15.3-1,2 provided in this modification package

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPER 16 Pages printed on one side.	
TAB 16.0	
iii	**iii**
vii	**vii**
16.0-2	**16.0-2**
TAB 16.2	
2.0-1	**2.0-1**
TAB 16.3	
3.0-2	**3.0-2**
TAB 16.3.1	
3.1-6	**3.1-6**
3.1-12 thru 14	**3.1-12 thru 14**
3.1-16	**3.1-16**
3.1-21	**3.1-21**
TAB 16.3.3	
3.3-6	**3.3-6**
3.3-1 thru 3	**3.3-1 thru 3**
3.3-5 (6)	**3.3-5 (6)**
3.3-8	**3.3-8**
3.3-10 thru 16	**3.3-10 thru 16**
3.3-21	**3.3-21**
3.3-24	**3.3-24**
3.3-28 thru 32	**3.3-28 thru 32**
3.3-34 thru 38	**3.3-34 thru 38**
3-42	**3.3-42**
3.3-52	**3.3-52**
3.3-68 thru 71	**3.3-68 thru 71**
3.3-74	**3.3-74**

REMOVE PAGE No.	ADD PAGE No.
CHAPER 16 (Cont'd)	
TAB 16.3.4	
3.4-3	**3.4-3**
3.4-4	**3.4-4**
3.4-6	**3.4-6**
3.4-8	**3.4-8**
3.4-12 thru 17	**3.4-12 thru 17**
3.4-23	**3.4-23**
TAB 16.3.5	
3.5-1 thru 6	**3.5-1 thru 6**
3.5-10	**3.5-10**
TAB 16.3.6	
3.6-2	**3.6-2**
3.6-7	**3.6-7**
3.6-12	**3.6-12**
3.6-15 thru 18	**3.6-15 thru 18**
3.6-21 thru 23	**3.6-21 thru 23**
3.6-28	**3.6-28**
3.6-29	**3.6-29**
3.6-34	**3.6-34**
TAB 16.3.7	
3.7-16	**3.7-16**
3.7-17	**3.7-17**
TAB 16.3.8	
3.8-1	**3.8-1**
3.8-3	**3.8-3**
3.8-5 thru 8	**3.8-5 thru 8**
3.8-10 thru 13	**3.8-10 thru 13**

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 16 (Cont'd)	
TAB 16.3.8 (cont'd)	
3.8-15	**3.8-15**
3.8-17	**3.8-17**
3.8-18	**3.8-18**
3.8-25 thru 27	**3.8-25 thru 27**
3.8-42 thru 44	**3.8-42 thru 44**
3.8-50	**3.8-50**
TAB 16.3.9	
3.9-2	**3.9-2**
3.9-3	**3.9-3**
3.9-7	**3.9-7**
3.9-9	**3.9-9**
3.9-11	**3.9-11**
TAB 16.5	
5.0-14	**5.0-14**
5.0-18	**5.0-18**
TAB 16B.3.1	
B 3.1-11	**B 3.1-11**
B 3.1-14	**B 3.1-14**
B 3.1-23 thru 25	**B 3.1-23 thru 25**
B 3.1-27	**B 3.1-27**
B 3.1-31 thru 33	**B 3.1-31 thru 33**
B 3.1-41	**B 3.1-41**
TAB 16B.2	
B 2.0-2	**B 2.0-2**
B 2.0-3	**B 2.0-3**
B 2.0-8	**B 2.0-8**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 16 (Cont'd)	
TAB 16B.3	
B 3.0-5	**B 3.0-5**
B 3.0-11	**B 3.0-11**
TAB 16B.3.3	
B 3.3-39	**B 3.3-39**
B 3.3-40	**B 3.3-40**
B 3.3-10	**B 3.3-10**
B 3.3-12	**B 3.3-12**
B 3.3-13	**B 3.3-13**
B 3.3-17	**B 3.3-17**
B 3.3-18	**B 3.3-18**
B 3.3-34	**B 3.3-34**
B 3.3-35	**B 3.3-35**
B 3.3-54	**B 3.3-54**
B 3.3-57	**B 3.3-57**
B 3.3-60 thru 84	**B 3.3-60 thru 84**
B 3.3-100	**B 3.3-100**
B 3.3-102 thru 104	**B 3.3-102 thru 104**
B 3.3-107	**B 3.3-107**
B 3.3-110	**B 3.3-110**
B 3.3-120 thru 124	**B 3.3-120 thru 124**
B 3.3-126	**B 3.3-126**
B 3.3-129	**B 3.3-129**
B 3.3-130	**B 3.3-130**
B 3.3-134	**B 3.3-134**
B 3.3-136	**B 3.3-136**
B 3.3-139	**B 3.3-139**
B 3.3-161 thru 163	**B 3.3-161 thru 163**
B 3.3-165 thru 167	**B 3.3-165 thru 167**
B 3.3-182	**B 3.3-182**
B 3.3-183	**B 3.3-183**
B 3.3-211	**B 3.3-211**
B 3.3-215	**B 3.3-215**
B 3.3-217	**B 3.3-217**
B 3.3-238	**B 3.3-238**
B 3.3-240	**B 3.3-240**

CHAPTER 17

TAB 17.3

17.3-5 thru 10 17.3-5 thru 10*

* All pages provided in this modification package

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 18	
TAB 18.0	
18.0-i, ii	18.0-i, **ii**
18.0-iii/iv	18.0-**iii**/iv
18.0-v/vi	18.0-**v**/vi
TAB 18.1	
18.1-1/2	18.1-**1**/2
TAB 18.3	
18.3-1, 2	18.3-**1**, 2
TAB 18.4	
18.4-3 thru 10	18.4-**3 thru 10**
TAB 18.5	
18.5-1/2	18.5-**1**/2 *
TAB 18.6	
18.6-1, 2	18.6-**1**, 2
TAB 18.8	
18.8-1, 2	18.8-**1**, 2
TAB App. 18A	
~~18A-1 thru 3~~ All	~~18A-1 thru 3~~ All

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 18 (Cont'd)	
TAB App. 18B	
18B-1 thru 50	18B-**1 thru 48**
TAB App. 18C	
18C-1, 2	18C-**1**, 2
18C-7, 8	18C-7, **8**
18C-9, 10	18C-9, **10**
TAB App. 18D	
18D-1 thru 16	18D-**1 thru 16**
TAB App. 18E	
18E-1, 2	18E-**1**, 2
18E-5 thru 32	18E-**5 thru 32**
18E-39 thru 44	18E-**39 thru 44**
TAB App. 18F	
18F-1 thru 14	18F-**1 thru 14**
TAB App. 18G	
18G-1 thru 10	18G-**1 thru 10**
TAB App. 18H	
Add	18H-**1 thru 4.3**

* Page 18.5-1/2 provided in this information. It should be Amendment 33.

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back). Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19	
TAB 19.0	
19-i thru lv/lvi	19-**i thru xxxiv**
TAB 19.1	
19.1, 2	19.1, **2**
TAB 19.2	
19.2-1 thru 10	19.2-**1 thru 10**
TAB 19.3	
19.3-1 thru 24	19.3-**1 thru 24**
TAB 19.5	
19.5-1 thru 3/4	19.5-**1 thru 3/4**
TAB 19.6	
19.6-1 thru 6	19.6-**1 thru 7/8**
TAB 19.7	
19.7-5 thru 10	19.7-**5 thru 10**
TAB 19.8	
19.8-3 thru 6	19.8-**3 thru 6**
19.8-9, 10	19.8-9, **10**
19.8-23 thru 28	19.8-**23 thru 28**
19.8-33 thru 41/42	19.8-**33 thru 41/42**
TAB 19.9	
19.9-1 thru 11/12	19.9-**1 thru 13/14**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB. 19.10	
19.10-1 thru 4	19.10-**1 thru 4**
TAB 19.11	
19.11-1/2	19.11-**1/2**
TAB App. 19A	
19A-7, 8	19A-7, **8**
19A-17, 18	19A-17, **18**
19A-19, 20	19A-19, **20**
TAB App. 19B	
19B-1 thru 6	19B-**1 thru 6**
19B-11, 12	19B-11, **12**
19B-17 thru 62	19B-**17 thru 62**
19B-65 thru 124	19B-**65 thru 124**
TAB App. 19D	
19D-i thru xvi	19D-**i thru xvii/xviii**
19D.3-13 thru 16	19D.3-**13 thru 16**
19D.4-7 thru 13	19D.4-**7 thru 13**
19D.4-17 thru 24	19D.4-**17 thru 24**
19D.5-7 thru 16	19D.5-**7 thru 16**
19D.5-27 thru 30	19D.5-**27 thru 30**
19D.5-41, 42	19D.5-41, **42**
19D.5-49, 50	19D.5-**49**, 50
19D.5-65, 66	19D.5-65, **66**
19D.6-7, 8	19D.6-7, **8**
19D.6-11 thru 20	19D.6-**11 thru 19**
19D.6-23 thru 76	19D.6-**23 thru 76.1**

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 19D (cont'd)	
19D.7-1, 2	19D.7-**1, 2**
19D.7-7 thru 18	19D.7-**7 thru 18**
19D.7-20, 21 – 21, 22	19D.7-20, 21 – 21, 22
19D.7-27 thru 30	19D.7-**27 thru 30**
19D.9-1, 2	19D.9-**1, 2**
19D.10-1, 2	19D.10-**1, 2**
19D.12-1 thru 3/4	19D.12-**1 thru 3/4**
19D.13-1, 2	19D.13-**1, 2**
TAB 19E	
19E.2-5 thru 250	19E.2-**5 thru 300**
19E.3-3 thru 12	19E.3-**3 thru 12**
TAB 19EA	
19EA-3 thru 6	19EA-**3 thru 6**
19EA-15, 16	19EA-**15, 16**
19EA-21 thru 44	19EA-**21 thru 47**
TAB 19EB	
19EB-9 thru 22	19EB-**9 thru 22**
TAB 19EC	
19EC-3, 4	19EC-**3, 4**
19EC-25, 26	19EC-**25, 26**
19EC-29 thru 32	19ED-**29 thru 32**
19EC-37 thru 39/40	19EC-**37 thru 39/40**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 19ED	
19ED-1 thru 28	19ED-**1 thru 35/36***
TAB 19EE	
19EE-1, 2	19EE-**1, 2**
19EE-7 thru 18	19EE-**7 thru 18**
TAB 19F	
19F-1 thru 19	19F-**1 thru 19**
TAB 19FA	
19FA-1 thru 5/6	19FA-**1 thru 5/6**
TAB 19H	
19H-5 thru 8	19H-**5 thru 8**
19H-11 thru 16	19H-**11 thru 16**
19H-19, 20	19H-19, **20**
19H-23 thru 32	19H-23 thru **32**
TAB 19I	
19I-3 thru 12	19I-**3 thru 12**
19I-19, 20	19I-**19**, 20
TAB 19J	
19K-5 thru 18	19K-**5 thru 18**
19K-21 thru 31/32	19K-**21 thru 31/32**

* Page 19ED-33, 34 provided in this modification package

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 19L	
19L-7 thru 12	19L-7 thu **12** 28*
19L-21 thru 27	19L-**21 thru** 27
19L-47, 48	19L-**47, 48**
TAB 19M	
19M-1, 2	19M-1, **2**
19M-7, 8	19M-7, **8**
19M-11 thru 22	19M-**11 thru 22**
19M-31, 32	19M-31, **32**
19M-43 thru 48	19M-**43 thru 48**
TAB 19N	
19N-3 thru 20	19N-**3 thru 20**
TAB 19P	
19P-1 thru 24	19P-**1 thru 24**
19P-29 thru 31/32	19P-**29 thru 31/32**
TAB 19Q	
19Q-7 thru 45 46	19Q-7 thru 45 46**
19Q-57, 58	19Q-**57, 58**
19Q-63 thru 68	19Q-**63 thru 68**
19Q-73, 74	19Q-**73, 74**
TAB 19QB	
19QB-1 thru 6	19QB-**1 thru 6**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 19QC	
19QC-3 thru 18	19QC-**3 thru 18**
19QC-35, 36	19QC-**35, 36**
19QC-39, 40	19QC-**39, 40**
19QC-43, 44	19QC-**43, 44**
19QC-47, 48	19QC-**47, 48**
19QC-51 thru 56	19QC-**51 thru 56**
TAB 19R	
19R-1 thru 53/54	19R-**1 thru 53/54**
CHAPTER 20	
TAB 20.0	
20.0-v, vi	20.0-v, vi
TAB 20.1	
20.1-1 thru 12	20.1-**1 thru 12**
20.1-19, 20	20.1-**19**, 20 37/38
20.1-23 thru 28 37/38	20.1 **23 thru** 28
~~20.1-29, 30~~	~~20.1-29, 30~~
~~20.1-31 thru 37/38~~	~~20.1-31 thru 37/38~~
TAB 20.2.8	
20.2.8-11, 12	20.2.8-**11**, 12

* Page 19L-27,28 provided in this modification package

** Page 19Q-45,46 provided in this modification package

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 20.2.10	
20.2.10-1/2	20.2.10-**1 thru 7/8**
TAB 20.2.14	
20.2.14-1/2	20.2.14-**1/2**
TAB 20.2.16	
20.2.16-1/2	20.2.16-**1/2**
TAB 20.2.19	
20.2.19-27, 28	20.2.19-**27**, 28
TAB 20.3.1	
20.3.1-3 thru 6	20.3.1-**3 thru 6**
20.3.1-15 thru 22	20.3.1-**15 thru 22**
TAB 20.3.2	
20.3.2-9, 10	20.3.2-**9**, 10
20.3.2-17, 18 thru 26	20.3.2-17, **18** thru 26
~~20.3.2-23 thru 26~~	~~20.3.2-23 thru 26~~
20.3.2-37, 38	20.3.2-**37**, 38
20.3.2-41, 42	20.3.2-**41**, 42
20.3.2-47, 48	20.3.2-47, **48**
20.3.2-59, 60	20.3.2-**59**, **60**
20.3.2-71 thru 77/78	20.3.2-**71 thru 77/78**

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	
TAB 20.3.3	
20.3.3-9, 10	20.3.3-9, **10**
20.3.3-25, 26	20.3.3-**25**, **26**
TAB 20.3.4	
20.3.4-1 thru 4	20.3.4-**1 thru 4**
20.3.4-9, 10	20.3.4-**9**, 10
20.3.4-13, 14	20.3.4-13, **14**
20.3.4-19, 20	20.3.4-19, **20**
20.3.4-25 thru 28	20.3.4-**25 thru 28**
20.3.4-31 thru 39/40	20.3.4-**31 thru 39/40**
TAB 20.3.6	
20.3.6-5 thru 16	20.3.6-**5 thru 16**
20.3.6-21, 22	20.3.6-**21**, 22
TAB 20.3.7	
20.3.7-5, 6	20.3.7-5, **6**
20.3.7-9, 10	20.3.7-9, **10**
20.3.7-19, 20	20.3.7-**19**, **20**
20.3.7-29 thru 36	20.3.7-**29 thru 36**
TAB 20.3.8	
20.3.8-9 thru 14	20.3.8-**9 thru 14**
20.3.8-21, 22	20.3.8-21, **22**
20.3.8-45, 46	20.3.8-**45**, 46
20.3.8-65 thru 68	20.3.8-**65 thru 68**
20.3.8-83, 84	20.3.8-83, **84**
20.3.8-89, 90	20.3.8-89, **90**

ABWR SSAR

Amendment 34 - Page Change Instruction (continued)

The following pages have been changed, please make the specified changes in your SSAR. Pages are listed as page pairs (front & back), *exception* Chapter 16. Bold page numbers represent a page that has been changed by Amendment 34.

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	CHAPTER 20 (Cont'd)
TAB 20.3.9	
20.3.9-3 thru 6	20.3.9-**3 thru 6**
20.3.9-27, 28	20.3.9-**27, 28**
20.3.9-35 thru 44	20.3.9-**35 thru 44**
TAB 20.3.10	
20.3.10-1 thru 24	20.3.10-**1 thru 24**
TAB 20.3.11	
20.3.11-1, 2	20.3.11-**1, 2**
20.3.11-11, 12	20.3.**11**, 12
TAB 20.3.12	
20.3.12-1 thru 4	20.3.12-**1 thru 4**
20.3.12-7, 8	20.3.12-**7, 8**
20.3.12-23, 24	20.3.12-**23**, 24
TAB 20.3.13	
20.3.13-5 thru 22	20.3.13-**5 thru 22**
TAB 20.3.14	
20.3.14-1, 2	20.3.14-**1**, 2
20.3.14-39, 40	20.3.14-**39**, 40
TAB 20.3.15	
20.3.15-9, 10	20.3.15-9, **10**
20.3.15-13, 14	20.3.15-**13**, 14
20.3.15-17 thru 20	20.3.15-**17 thru 20**
20.3.15-23, 24	20.3.15-**23**, 24

REMOVE PAGE No.	ADD PAGE No.
CHAPTER 19 (Cont'd)	CHAPTER 20 (Cont'd)
TAB 20.3.15 (cont'd)	
20.3.15-39, 40	20.3.15-**39**, 40
TAB 20.3.16	
20.3.16-5, 6	20.3.16-5, **6**
20.3.16-13 thru 16	20.3.16-**13 thru 16**
TAB 20.3.17	
20.3.17-3, 4	20.3.17-3, **4**
20.3.17-7, 8	20.3.17-7, 8
20.3.17-21, 22	20.3.17-**21, 22**
CHAPTER 21	
*	All new figures

* Replace old figures with new figures (figure-by-figure and sheet-by-sheet) except remove and do not replace Figure 12.3-6.