Control File

Carolina Power & Light Company

January 5, 1980

USNRC REGION II ATLANTA, GEORGIA

81 JAN 7 A 9 : 5 9

1981 JAN 16 AM 10 34

NRC MAIL SERVICES BRANCH

RECEIVED DISTRIBUTION SERVICES UNIT

FILE: NG-3513 (R) SERIAL: NO-81-004

Mr. James P. O'Reilly, Director
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, GA 30303

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
RESPONSE TO IE BULLETIN 80-24

Dear Mr. O'Reilly:

Enclosed please find Carolina Power & Light Company's interim response to the subject Bulletin regarding Prevention of Damage Due to Water Leakage Inside Containment (Enclosure 1). Our response is numbered by item to correspond with your Bulletin.

Enclosure 2 is a plant drawing showing a portion of the Service Water System with the components in question outlined. It is included to simplify your review process. A similar drawing for the portion of the Fire Water System within the containment is not provided as it is adequately described in the text of Enclosure 1.

This interim response is being provided in lieu of the formal response requested due to the need for additional evaluation of some issues by the Robinson Plant staff. The issues requiring further evaluation are identified in the text of Enclosure 1. Per a telephone conversation with Mr. Paul Kellogg of your office on December 29, 1980, an agreement was reached to allow CP&L to delay the formal response for 15 days, to January 20, 1981, provided this interim report summarizing the information gathered to date was submitted by the original due date of January 5, 1981.

Should you have any additional questions regarding this response, please contact my staff.

Very truly yours,

B. J. Furr
Vice President
Nuclear Operations Department

JFB/CSB/kbb*

cc: Mr. Victor Stello, NRC

Enclosure 1 to the H. B. Robinson SEG Plant

Response to IE Bulletin 80-24

Item 1

Inside the Robinson Unit No. 2 Containment Vessel (CV) the two open Cooling Water Systems are: (1) service water to the containment air recirculation cooling units and (2) the Fire Protection System. A summary description of these systems is as follows:

Service Water

In order to adequately describe the Service Water System inside Containment, its function must be assessed in conjunction with the Containment Air Recirculation Cooling System.

The Containment Air Recirculation Cooling System consists of four air handling (Reactor Containment Fan Cooler) units located adjacent to the containment wall above the operating deck and an Air Distribution System.

The function of the Containment Air Recirculation Cooling System under normal power operating conditions is to remove heat from the containment atmosphere. This is accomplished by operating some combination of the four Reactor Containment Fan Cooler units as required to circulate containment air through their cooling coils. The cooling coils are each supplied with 800 gpm, or less, cooling water from the Service Water System. Cooling water is also supplied to the fan motor coolers.

The Containment Air Recirculation Cooling System remains operable under post-accident conditions to remove heat from the containment atmosphere thus minimizing the pressure transient within the C.V.

The principal function of the Service and Cooling Water System is to supply cooling water to plant equipment requiring cooling during operation. The cooling water for the reactor containment fan coolers is supplied from this system. This system also serves as a back-up water supply for the auxiliary feedwater pumps and the Isolation Valve Seal Water Injection Tank.

The Service and Cooling Water System uses four (4), 1/3 capacity pumps driven by electric motors located at the intake structure to supply all required service and cooling water for plant operation. Three of the pumps normally operate with the fourth pump in standby. They take suction from Lake Robinson and discharge into two (2) common 30 inch headers. Each header is adequate to handle full flow (one is redundant) and is provided with a motor driven automatic strainer. The headers can be isolated by motorized butterfly valves and manually operated butterfly valves located at the upstream and downstream ends of each loop. All water supply lines to heat exchanger components and water cooled equipment can be supplied from either header.

Two (2) full capacity Service Water Booster Pumps are furnished to supply cooling water to the four (4) containment fan coolers. One service water booster pump normally operats. Normally, Pump "A" supplies cooling water to fan coolers 1, 2, and 4, and Pump "B" supplies fan coolers, 3, 4, and 2 by direct piping. Pump discharge piping and valving are arranged such that either pump can supply water to all four containment fan coolers.

Service Water Pumps "A" and "B" and "A" Service Water Booster Pump are powered from safeguards bus E-1. Service Water Pumps "C" and "D" and "B" Service Water Booster Pump are powered from safeguards bus E-2. "D" Service Water Pump is capable of being powered from the dedicated shutdown bus. The system remains operable during a loss of coolant accident.

The source of water for the Service Water and Containment Fire Water systems is the Robinson impoundment. Chemical content, averaged over the first half of 1980, is shown below.

pH-5.4	O_2-9.85 ppm
Conductivity-19.9	Iron-.303 ppm
CL-2.5 ppm	Copper-.076 ppm
SIO_2-3.2 ppm	

The following are the specifications for the materials used in the Service Water System inside containment.

Pipe: Welded stainless steel A312 TP304

Fittings: A403 WP304 Stainless
A182 F304 Stainless

Each Containment Air Recirculation Cooling System HVH unit contains a bank of continuous water tube cooling coils for normal and post-accident cooling. Each bank of cooling coils consists of six Westinghouse Sturtevant WC-36108-6H coils. The coils are stacked six high to a bank. Each coil has a special removable steel water inlet header for tube cleaning. The removable header is seal welded with stainless steel seal strips to assure leak tightness.

Each cooling coil consists of the following:

(1) 5/8" OD copper tubes with 0.049-inch wall thickness, galvanized steel casings of 14-guage tops and 10-gauge end sheets.

(2) Plate copper fins, 8-1/2 fins per inch of coil length.

(3) A removable steel inlet water header designed for 100 psi and tested to 150 psi, all structural members are high-strength steel ASTM, SA 515, Grade 70. The header is coated inside with 30 mil thickness of Hypalon GA00-6 coating (Gates Engineering Division of the Glidden Company). The connection nozzle is Type 304L stainless steel pipe with a sealed welded drain attached to the nozzle. The cover is held in place structurally with steel bars and bolts tapped into the tube sheet.

(4) The return end of the coil has a 3-inch I.P.S. 90-10 cupro-nickel pipe header and a 3-inch I.P.S. 90-10 cupro-nickel nozzel connections. This header has a cupro-nickel drain brazed shut and a vent consisting of a coupling with threaded and brazed over plug.

The HVH fan motor heat exchanger cooling coil consists of the following:

(1) 5/8" OD copper tubes with 0.049-inch wall thickness.

(2) Plate copper fins, 0.008-inch thick, 8-1/2 fins per inch of coil length.

(3) 90-10 cupro-nickel headers with 0.25-inch diameter couplings plugged with a 0.25-inch square head bronze pipe soldered plug for vent and drain connections.

(4) Header nozzles are 90-10 cupro-nickel 1.5 inch, schedule 40 pipe.

A review of maintenance records since 1974 has revealed a history of leaks in the fan cooling coils and also the motor cooling coils attributed to normal tube wear. The repairs were made by soldering the leaking tubes and/or removing the leaking tubes and plugging the cut ends with brass plugs. The motor cooling coils were replaced in 1976 and fan cooling coils were replaced during the 1979 refueling outage. Leakage has not been a problem since these replacements. A more detailed description of the containment service water leaks will be provided in our January 20, 1981, formal response.

Should a service water leak develop inside containment, each individual fan cooler supply and discharge headers can be isolated by motor operated valves (located outside C.V.) actuated from the control room. The supply line to the motor coolers can be isolated via the same individual fan cooler motor operated valves. The motor cooler discharge line must be isolated by closing a normally locked open valve located outside C.V. The one-inch discharge header sample lines to Radiation Monitor R-16 can also be isolated via motor operated valves located outside C.V. and actuated from the control room. Failure of the motor operated isolation valve in the fan cooler supply header would require manual closing of the valve or the closing of an upstream manual valve. The fan cooler, motor cooler, and sample line discharge piping has only the single valves mentioned above for individual isolation. However, single failure of the system is considered to be an initial system leak inside containment. The service water isolation valves are not considered containment isolation valves in that the Air Recirculation System is operable during a design basis accident. Therefore, there are no provisions for their testing pursuant to 10CFR50 Appendix J.

The service water discharge flow and exit temperature of each of the fan coolers are alarmed in the control room if the flow is low or if the temperature is high. The transmitters are outside the reactor containment. In addition, the exit flow is monitored for radiation. Pressure indicators for each fan cooler discharge header are located in the Auxiliary Building. The motor cooler discharge lines are not instrumented.

There are six dew point sensors positioned at various locations inside containment. A strip chart recorder monitoring their readings is located in the Auxiliary Building.

The Condensate Measuring System is designed to detect Reactor Coolant System leakage by measuring the condensate collected from the HVH fan coolers. High condensate flow will cause an alarm in the control room. This system will also detect internal fan cooling coil leakage.

Radiation Monitoring System Channel R-16 monitors the containment fan cooler service water discharge for radiation indicative of a leak from the containment atmosphere into the cooling water. A small bypass flow from each of the cooling coil discharge lines is mixed in a common header and monitored by a single scintillation detector mounted in a holdup tank assembly. Upon indication of alarm level cooling water activity, each heat exchanger is individually sampled to determine which unit is leaking. This sampling sequence is achieved by isolating one unit at a time from the control room and allotting sufficient time for sample equilibrium to be established. (Approximately one minute). When the leaking unit is isolated, the radiation level will decrease. High radiation level alarms are annunciated on the main control room board and indicated on the Radiation Monitoring System cabinets.

<u>Fire Water System</u>

The Fire Water System inside containment consists of two supply headers during normal operation. One header supplies spray nozzles in the electrical penetration area of containment. This header has a deluge valve outside containment and all piping inside containment is dry and pressurized with air. The deluge valve is actuated by fire detection devices inside the containment. The second header supplies spray nozzle rings around the reactor coolant pumps and eight hose stations. The piping to the Reactor Coolant Pump spray nozzle headers is dry and pressurized with air and has an upstream deluge valve that is also actuated by fire detection devices in the Reactor Coolant Pump bays. The piping to the eight hose stations is charged with water.

In the event of a phase "A" isolation signal, the two motor operated valves (located outside containment) in each supply header will automatically close.

The following are typical material specifications used in the containment Fire Water System:

Pipe - A106 Grade B Carbon Steel

Fittings - A234 Grade WPBW Carbon Steel
A105 Grade 1 or 2 Forged Steel

Flanges - A105 Carbon Steel

Valves - (Body Material) A105 Carbon Steel
A216 WCB Carbon Steel Brass
A126 Gray Iron

Sprinkler Heads - B145 Alloy 5-A Bronze

The containment Fire Water System can be isolated by closing the two motor-operated valves on each supply header that are actuated from the control room. The isolation capability is not vulnerable to single failure due to the redundant motor-operated valves. These valves were tested during their 1980 refueling installation phase pursuant to Appendix J, 10CFR50.

The Robinson ISI Pump and valve program is currently being updated for the next 10-year interval. Provisions for leak testing these valves, as required by Appendix J, will be included.

Should a deluge valve leak by and pressurize a normally dry section of the Fire Water System above the existing air pressure, an alarm will be received in the control room. The header deluge valve for the electrical penetration area spray nozzles is outside containment. The deluge valve for the other header is located inside containment upstream of the Reactor Coolant Pump spray nozzle rings. The lines to the eight hose stations are upstream of the deluge valve and are not instrumented for leak detection. They are, however, located outside the polar crane wall and any leakage would be detected by the daily operator inspection.

Since the containment portion of the Fire Water System was installed during the 1980 refueling outage, no leaks have occurred.

Since the Fire Water System is normally pressurized above normal containment pressure (including the "dry" sections which are pressurized with air) and since the system is automatically isolated equipment is located in the C.V. sump below the reactor vessel or in the Reactor Coolant Pump bays. Both of these areas are high radiation areas when the reactor is operating. The calibration and/or test procedures for the equipment require extended access to these areas.

The equipment available to remove water from the containment sump consists of two sump pumps actuated by a level switch located in the C.V. sump. Remote, manual pump control capability is not provided, nor is it desirable since a sump pump could then very easily be run dry which would result in premature pump failure. C.V. sump pump status (on/off lights) is indicated on the waste disposal panel in the Auxiliary Building.

The sump level detection systems were previously described in paragraph 2a above.

Monthly surveillance on the detection and removal equipment is not necessary for the following reasons:

1. All service water and fire water piping in the C.V., except the Reactor Coolant Pump bay fire water spray headers, is located in lower radiation areas outside the missile barrier. These areas are inspected daily by an Auxiliary Operator. The operator performing the inspection documents on a check-off sheet that he has inspected all service water and fire water piping in the C.V. which is outside the RCP bays for evidence of leakage.

2. The RCP bay fire water spray headers are normally dry and pressurized with air. They only fill with water if actuated by fire detection devices in the pump bay. Water does not emit from a spray header until heat actuates each spray nozzle individually. If a deluge valve should leak by and pressurize the normally dry sections with fire water above the existing air pressure, an alarm is received in the control room. The air pressure is well below fire water header pressure. The fire water headers are continuously pressurized.

3. Service water leaks within HVH air coolers would be detected by frequent Condensate Measuring System alarms without an increase in RCS leakage. This type leakage can be easily verified when the Auxiliary Operator performs his daily C.V. inspection. The operability of the condensate measuring system is verified weekly.

4. Periodic Testing and/or calibration is performed on both Level Detection Systems on a refueling outage interval.

5. The C.V. sump pumps are functionally tested by manual actuation of the level switch prior to each start up from a cold shutdown condition.

Due to the redundancy of the Level Detection Systems and the daily C.V. inspection, an increased surveillance frequency on this equipment is not warranted.

Carolina Power & Light Company considers the suggested requirement to limit continued power operation to seven days should all the water level detection systems or all the removal systems become inoperable to be arbitrary and unjustified. Should portions of these systems within the containment fail, Unit 2 would eventually have to be shut down to affect repair for reasons of personal safety and "ALARA." More appropriate compensatory actions could be to increase the containment inspection frequency, carefully monitor containment sump pump operation, start trending waste holdup tank level for indication of abnormalities in the rate of water addition (increase or decreases), etc. Therefore, we do not intend to implement this recommendation at the H. B. Robinson Plant.

Item 2d

The Leakage Detection Systems and procedures were described above and are considered adequate to promptly detect water leakage in the C.V. Both the Fire Water and Service Water Systems within the C.V. can be completely isolated from outside the C.V.

Item 2e

A daily C.V. inspection has been performed at the H. B. Robinson Plant for several years. A specific sign-off on the Auxiliary Operators' daily logs (checklist) was added to document the inspection for leakage from the Fire Water or Service Water Systems within the containment but outside the missile barrier as previously described.

Item 2f

Carolina Power & Light Company currently disagrees with the requirement to notify the NRC of any service water leaks within the C.V. as a degradation of a containment boundary. The lowest pressure on the service water return lines from the containment fan coolers has been observed to be 42 psig. This corresponds to the maximum containment pressure expected during the design basis accident. Thus, no inleakage would be expected to occur in the containment portion of the service water system. An inability to maintain containment service water system pressure due to major leakage or loss of the S.W. booster pumps would be reportable under existing Technical Specification action statements (i.e., loss of one or more HVH units, and/or loss of one or both S.W. booster pumps). However, this situation is still under review by the Robinson Plant staff and additional information will be provided in our January 20, 1981, formal response.

In summary, the present flow instrumentation and level indication coupled with the expanded daily leak surveillance by Operations personnel is considered adequate to detect open cooling system leakage and the resultant water accumulation inside containment.

during a design basis accident, no leakage into the system from the containment atmosphere will occur. Thus, no radiation monitoring capability for this system is required.

Item 2a

A containment Water Level Measuring System has been installed as a result of the TMI follow-up program to satisfy requirements of NUREG 0578. The system is designed to detect and indicate the level of water present in the containment. Its range is 420 inches starting from the bottom of the key way sump beneath the reactor vessel. The 420-inch (35 foot) level is calculated to be equivalent to approximately 600,000 gallons of water in the containment. The water level is displayed in the control room on a dial type indicator on the modular receiver as well as a strip chart recorder. Redundant channels (including transmitters, receivers, and indicators) are provided for increased reliability. Both channels will record on the same strip chart recorder.

There are two other systems which provide containment water level information to the control room. The details regarding the operation of these systems will be included in our formal response to be submitted on January 20, 1981.

The indicators for both the existing and newly installed containment water level indicating systems are in full view of the control room operators. Experience with the service water leaks previously described for H. B. Robinson, Unit 2, has demonstrated that service water leaks are detected prior to receiving indications on the containment water level instrumentation. The leaks are detected by our daily containment inspection, the Condensate Measuring System, or abnormal amounts of waste water requiring processing. Thus, the H. B. Robinson, Unit 2, containment water level indicating systems are considered adequate.

Item 2b

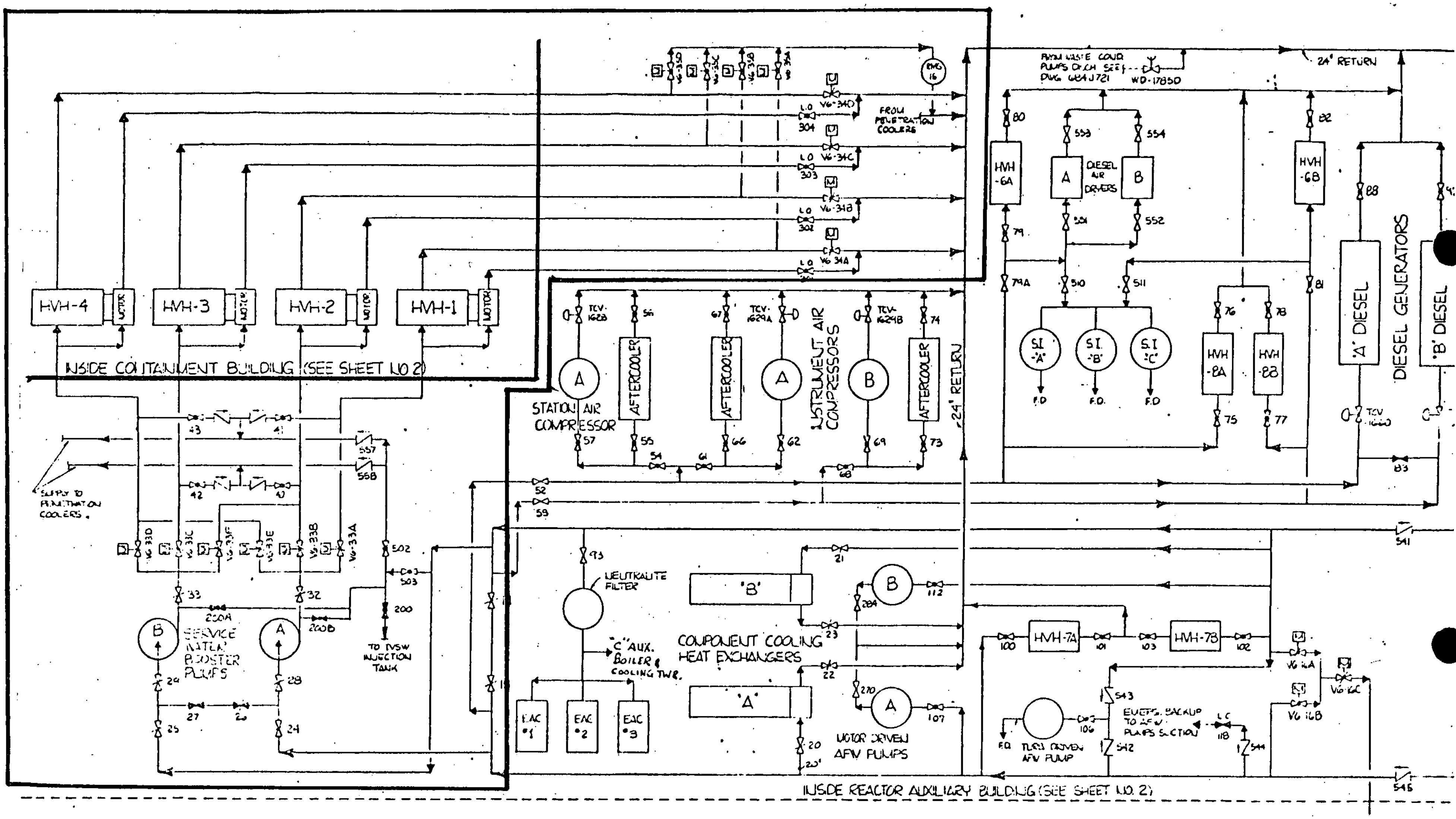
There is no flow indication in the containment sump pump discharge line to the waste holdup tank. Run lights are displayed on the Waste Disposal Panel located in the Auxiliary Building near a frequently manned station. Continued flow from the sump would result in a waste holdup tank high level which initiates an alarm in the control room. Since Robinson is a single unit plant, fluctuations in the rate at which the waste holdup tank fills are readily apparent. Since operational problems on H. B. Robinson, Unit 2, cannot be masked by the normal operation of another unit, no modifications to this indication system are necessary.

Item 2c

Monthly surveillance on equipment used to detect and remove water from the containment sump is not possible because all the affected

Item 3

The Component Cooling Water System (CCW), which is a closed system, provides cooling to some components within the containment vessel. The CCW pumps, heat exchangers, and expansion tank are located outside the containment vessel in the Auxiliary Building. Additional information on this system will be included in our January 20, 1981, formal response.


HVH-4
HVH-3
HVH-2
HVH-1
MOTOR
INSIDE CONTAINMENT BUILDING (SEE SHEET NO 2)
FROM PENETRATION COOLERS
SUPPLY TO PENETRATION COOLERS
SERVICE WATER BOOSTER PUMPS
TO IVSW INJECTION TANK
STATION AIR COMPRESSOR
AFTERCOOLER
INSTRUMENT AIR COMPRESSORS
24" RETURN
DIESEL AIR DRYERS
HVH-6A
HVH-6B
S.I. "A"
S.I. "B"
S.I. "C"
F.D
HVH-8A
HVH-8B
'A' DIESEL
DIESEL GENERATORS
'B' DIESEL
NEUTRALITE FILTER
"C" AUX. BOILER & COOLING TWR.
EAC #1
EAC #2
EAC #3
COMPONENT COOLING HEAT EXCHANGERS
MOTOR DRIVEN AFW PUMPS
TURB DRIVEN AFW PUMP
HVH-7A
HVH-7B
INSIDE REACTOR AUXILIARY BUILDING (SEE SHEET NO. 2)