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WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

February 24, 1989
G02-89-025

Docket No. 50-397

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Gentlemen:

Subject: GENERIC LETTER 88-14, "INSTRUMENT AIR SUPPLY SYSTEM PROBLEMS AFFECTING SAFETY-RELATED EQUIPMENT;" STATUS REPORT

Reference: Generic Letter 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment;" dated 1/30/89

The subject Generic Letter requested that each licensee perform a design and operations verification of their instrument air system. A reply within 180 days was requested which for WNP-2 would be February 23, 1989 based upon an August 23, 1988 receipt date. In the reference we indicated that the February 23 date could not be met but that by this date a status report would be provided.

This report is attached. Because this report provides information on a currently ongoing effort, the contents of the report are subject to change. Significant changes that would relate to the information requested by the Generic Letter will be reflected in our final submittal.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

lw

Attachment

cc: JB Martin - NRC RV
NS Reynolds - BCP&R
RB Samworth - NRC
DL Williams - BPA/399
NRC Site Inspector - 901A

A048
1/1

STATE OF WASHINGTON)
)
COUNTY OF BENTON)

Subject: Generic Letter 88-14

I, G.C. Sorensen, being duly sworn, subscribe to and say that I am the Manager, Regulatory Programs for the WASHINGTON PUBLIC POWER SUPPLY SYSTEM, the applicant herein; that I have full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information and belief the statements made relative to the status of this effort are true.

DATE 24 FEB, 1989

G.C. Sorensen

G.C. Sorensen, Manager
Regulatory Programs

On this day personally appeared before me G.C. Sorensen to me known to be the individual who executed the foregoing instrument and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 24th day of February 1989.

Bonnie Kosko

Notary Public in and for the
State of Washington

Residing at Kennewick, Wa

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

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GC Sorensen

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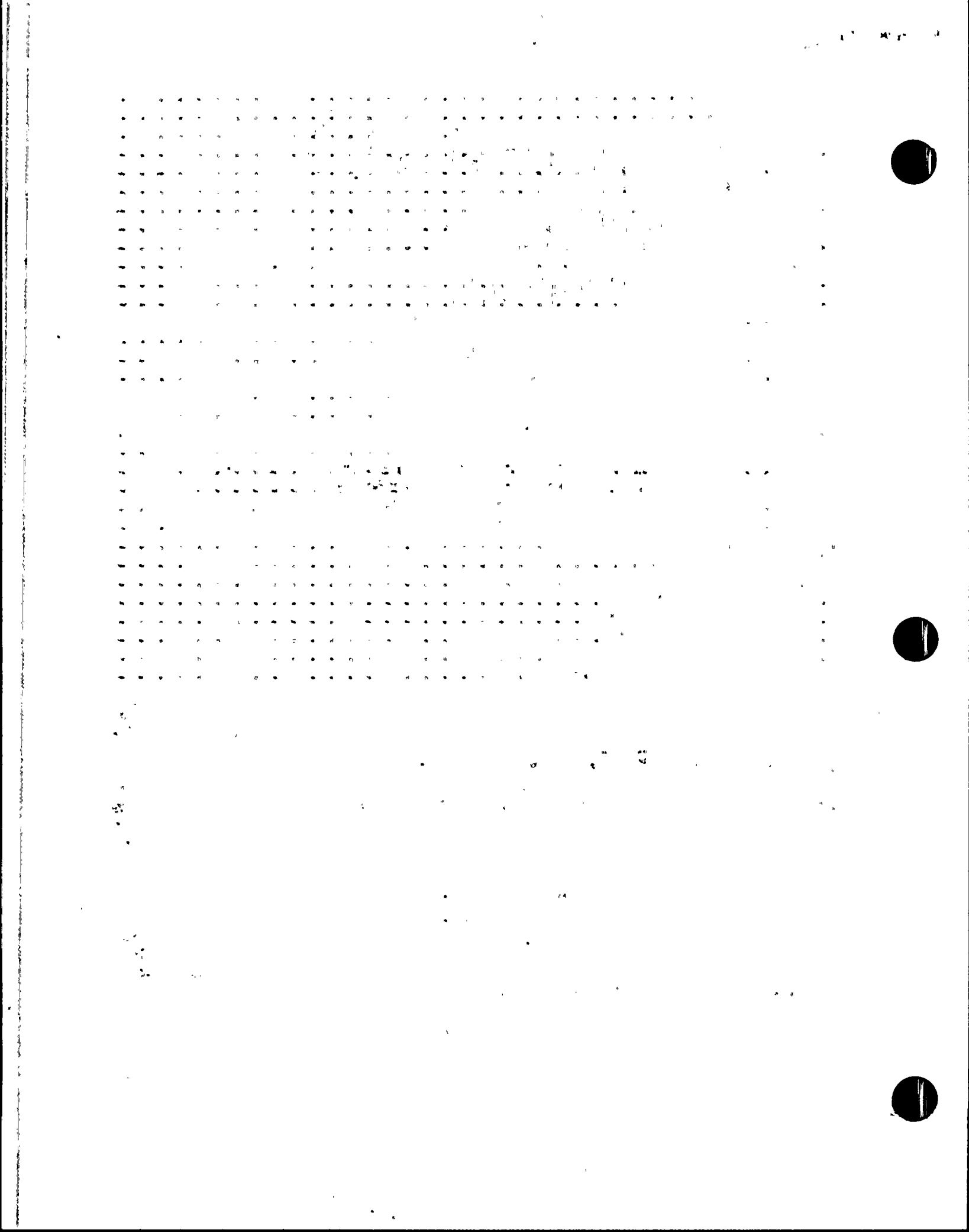


1 REPORT SUMMARY

The Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment" on August 8, 1988. The generic letter was issued to address the NRC's concerns with the possible adverse impact of failures of plant instrument air systems on safety-related equipment. In accordance with the requirements of this generic letter, and the commitments made in the Supply System's letter to the NRC dated January 30, 1989, the following is a preliminary response to GL 88-14. As stated in the January letter, the submittal containing the final results of the air systems review will be made on April 14. The results of any air system tests which must wait until the spring outage, will be submitted on July 7.

This summary briefly describes the scope of work as required by GL 88-14, and the progress made to date. A detailed description is provided in the following sections.

The plant instrument air systems have been evaluated to determine their criteria. Included in this evaluation were the Control Air System, Containment Instrument Air System, and each of the Emergency Diesel Generator Starting Air Systems. A description of each of these systems and their performance criteria are presented herein.

All safety-related air actuators in the plant have been identified. The manufactures of these actuators were consulted in order to determine the components minimum air quality requirements. From these minimum air quality requirements, instrument air quality test criteria were developed. Air quality tests are currently being performed and the results of these tests and recommendations for additional tests will be presented in the final submittal.

The normal operating position, fail-safe position and fail-safe function of the safety-related actuators identified above have been determined. This information is presented herein. The fail-safe position of each of these valves is currently being evaluated to assure that the as-built fail-safe position reflects the design intent. The results of this evaluation will be presented in the final submittal.

The air supply to safety-related actuators has been reviewed (by drawing review or walkdown) to determine which have in-line filters. Manufacturers have been contacted to determine the performance of these filters. This information is presented herein.

All of the safety-related instrument air accumulators have been identified. The majority of these accumulators have been evaluated to determine their safety function, verified that they were sized for the worst case event, and reviewed to determine the type of check valve included in the design. The evaluation of these accumulators is included herein. The evaluations for the remaining accumulators will be included in a later submittal.

Last, a criteria for evaluating the plant operating, maintenance and testing procedures has been developed and is included herein. All of the plant operating, maintenance and testing procedures have been identified. A database of these procedures is included herein. These procedures are currently being evaluated. The results of this evaluation will be included in a later submittal.

2 BACKGROUND INFORMATION

The following is a historical description of the NRC's air systems concerns. This description does not include all NRC published documents on the subject, however it does cover the more important ones. Following this historical description is a detailed summary of Generic Letter 88-14 emphasizing the recommendations described therein.

2.1 History of NRC Air Systems Concerns

The Nuclear Regulatory Commission (NRC) issued Information Notice (IN) 87-28, "Air Systems Problems at U.S. Light Water Reactors," on June 22, 1987. The notice was issued to alert licensees to potentially significant problems associated with air system failures. The notice referenced a study, AEOD/C701 "Case Study Report, Air System Problems at U.S. Light Water Reactors", that was issued by the NRC Office for Analysis and Evaluation of Operational Data. The study provided a comprehensive review and evaluation of the potential safety implication associated with air system problems. Information Notice 87-28 indicated that the majority of the problems discussed in AEOD/C701 were traceable to air system design and/or maintenance deficiencies.

Supplement 1 to NRC IN 87-28 was issued to transmit a copy of NUREG-1275, Volume II "Operating Experience Feedback Report - Air System Problems." In addition, the Supplement requested recipients to review NUREG-1275, Volume 2 for applicability and consider actions as appropriate.

NUREG 1275, Volume 2, published in December 1987, essentially reiterated the findings of the AEOD/C701 Study, with the addition of three safety significant events which had occurred in the interim. The NUREG analyzed operating data from a number of safety significant events, focusing upon the degraded air systems, and the vulnerability of safety-related equipment to common mode failures associated with air systems. As a result of this analysis, the following five recommendations were developed:

1. Licensees should ensure that air system quality is consistent with equipment specifications and that it is periodically monitored and tested.

2. Anticipated transient and system recovery procedures and related training for loss of air systems should be reviewed for adequacy and revised as necessary.

3. Plant staff should be trained regarding the importance of air systems.

4. The adequacy of safety-related back-up air accumulators for safety-related equipment should be verified.

5. All operating plants should be required to perform gradual loss of instrument air system pressure tests.

In May of 1988. the Institute of Nuclear Power Operations (INPO) issued Significant Operating Experience Report (SOER) 88-1, "Instrument Air System Failures", SOER 88-1 evaluated many of the safety significant events identified in NUREG 1275 Volume 2.

When the NRC Staff made their presentation to the Committee to Review Generic Requirements concerning the issue of Generic Letter 88-14 (proposed), the staff regarded recommendation 5 of NUREG 1275, Volume II (the gradual loss of air test) to be a new requirement that needed further justification (cost/benefit). A NUMARC letter dated November 8, 1988 provides additional details concerning the NRC presentation.

2.2 Summary of Generic Letter 88-14

The Nuclear Regulatory Commission (NRC) issued Generic Letter 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment" on August 8, 1988. The generic letter was issued to address the NRC's concerns with the possible adverse impact of failures of plant instrument air systems on safety-related equipment.

In the generic letter, the NRC requests that each licensee review NUREG 1275, Volume 2 and perform a design and operations verification of plant instrument air systems. Specifically, this design and operations verification should include:

1. Verification by test that actual Instrument Air quality is consistent with manufacturers' recommendations for individual components served.

2. Verification that maintenance practices, emergency procedures and training are adequate to ensure that safety-related equipment will function as intended on loss of instrument air.

3. Verify that the design of the entire instrument air system is in accordance with its intended function, including verification by test that air-operated safety-related components will perform as expected in accordance with all design-basis events including the loss of the normal instrument air system.

The actions requested in Generic Letter 88-14 closely parallel the recommendations included in NUREG 1275, Volume 2. However, the gradual loss of air test (NUREG 1275, Volume 2, Recommendation 5) is not explicitly included in the generic letter.

In addition to the requirements delineated above, the licensee should:

1. Provide a discussion of their program for maintaining proper instrument air quality.

2. Identify components that cannot accomplish their intended function and state the corrective action taken or the corrective action scheduled to be taken and identify the components in the response to the Generic Letter.

3. Prepare a letter to the NRC describing the actions taken in response to this generic letter.

3 DESCRIPTION OF ACTION TAKEN

In response to Generic Letter 88-14, Washington Public Power Supply System (WNP-2) has undertaken the following actions to verify that the design, construction and maintenance of the instrument air systems at WNP-2 is in accordance with the recommendations presented therein:

1. The equipment number, the equipment name, the supplier name and model number of all safety-related air actuators have been tabulated in a database.

2. The manufacturers of the components tabulated above have been consulted to determine the required instrument air quality for the supplied components. This information has been identified in the database.

3. The failure position of each of the air users tabulated above have been determined from the applicable system documentation and are identified in the database.

4. Upstream components (such as filter/regulators and solenoid valves) associated with each safety-related actuator, along with their manufacturers and model numbers have been identified. The manufactures have been consulted to determine the performance characteristics. This information has also been added to the database.

5. All the safety-related instrument air accumulators have been identified and tabulated in a separate database. This database includes:

   a. The accumulator equipment number and equipment name.

   b. The equipment number of the associated valve actuator.

   c. The check valve type, manufacture and model number.

   d. The accumulator size and the sizing design basis (i.e., sizing calculation, General Electric documentation).

6. The design air quality performance of each of the plant air systems has been documented based on manufacturer data for the installed equipment. The following air systems are included in the evaluation:

   a. The Control Air System (CAS)

   b. The Containment Instrument Air System (CIA)

   c. The Diesel Generator Starting Air Systems (DSA)

   The plant service air system does not serve any safety-related equipment. Therefore, it is not included in this evaluation.

7. A procedure was developed to test the air quality of each of the systems defined above. The air quality test criteria was based on the air quality requirements of the actuators and associated components. Air quality tests will be performed at key points in each system. The initial tests will be

completed and the results will be included in the final report. The frequency of additional testing will be established once the initial test data has been evaluated.

8. The operation of all safety-related actuators will be verified to ensure that they fail to their fail safe positions upon a loss of instrument air. This verification will be done by one of the following methods:

   a. The preoperational test reports will be reviewed to assure that during startup each applicable valve actuator was subjected to a loss of air test.

   b. Any valve actuators that were not tested during startup will be tested.

   c. All system design changes will be reviewed to establish the associated impact on the failure position of the applicable valves. Any valve actuators impacted by design changes after the preoperational tests will be retested.

   d. Valves which are not required to change position on loss of air will not be tested.

9. The plant operating, maintenance and training procedures will be reviewed to assure that they are responsive to the design and installation characteristic of each of the instrument air systems.

4 DESCRIPTION OF AIR SYSTEMS

4.1 Control and Service Air Systems

The Control and Service Air Systems (CAS & SA) function to supply control and service air at appropriate flowrates and pressures. The systems consist of two distribution systems and common air compressors, air dryers, filters and receivers. The system flow diagram is presented in Figure 4-1. The description centers on the Control Air System, as Generic Letter 88-14 does not address Service Air Systems.

The CAS is designed to supply clean, dry, oil free compressed air to station instrumentation, controls, and various remote accumulators for valve actuators. The system is not safety-related but is designed to provide uninterruptable service during normal plant operation.

Control air is supplied by three electric driven, oil free, reciprocating compressors; CAS-C-1A ,B & C. The compressors are packaged units complete with water-cooled intercoolers, aftercoolers and cylinder jackets. The three compressors discharge into a common header which in turn supplies air to three receivers, CAS-AR-1A, B & C. The receivers serve two functions; to dampen the pulsation inherent in reciprocating compressors, and to store a supply of compressed air adequate to prevent the compressors from cycling on and off at an unacceptable rate.

In the event of a loss of offsite power, compressor 1A and 1B and their associated cooling water system can be powered from the emergency diesel generators. Compressor 1C can not be powered from the generators.

The receivers discharge to a header which is common to the SA and CAS distribution systems. Control air then passes through prefilters, CAS-F-2A & B, dual tower desiccant dryer CAS-DY-1A & B, and afterfilters, CAS-F-3A & B, before being distributed to the different control air users throughout the plant. In the event of low CAS pressure downstream of the drying towers, a bypass valve CAS-PCV-1 will automatically open allowing instrument air to bypass the dryer towers.

A fourth compressor, SA-C-1, was recently installed in the southwest corner of the 467 foot elevation of the radwaste building. This new compressor is a single stage rotary screw compressor complete with aftercooler and controls. The compressor discharges into a new refrigerated air filter-dryer and a new receiver before discharging into the radwaste building service air header.

Design data for the SA and CAS equipment described above is provided in Table 4-1.

Control valve SA-PCV-2 is located in the common section of distribution piping downstream of receivers CAS-AR-1A, B & C. This control valve functions to isolate the flow of air from compressors CAS-C-1A, 1B, and 1C to the service air header whenever the pressure in the control air system falls below 80 psig. The new service air compressor SA-C-1, will normally supply air to the CAS through this intertie. However, if the intertie isolates, this new compressor will supply the service air header only.

The CAS distribution piping is routed throughout the main power block and to a number of the outlying buildings to serve some safety-related and non-safety-related air users as required. In addition to serving these users, the CAS also serves as a source of purge air for the Containment Instrument Air System during plant shutdown.

The distribution system is constructed of carbon steel pipe and fittings. All safety related take-off connections are piped off the top of the header to minimize the carry over of any entrained moisture or particulate matter. In addition, the majority of the safety-related air users are equipped with filter regulator sets to filter out any foreign material and thereby assuring proper valve operation.

4.2 Containment Instrument Air System

The Containment Instrument Air (CIA) System functions to supply compressed nitrogen to all the gas operated components inside the primary containment vessel. The system is primarily a pressurized nitrogen system as shown in Figure 4-2. During normal operation the Containment Nitrogen (CN) System supplies pressurized nitrogen from an 11,000 gallon (1 million standard cubic feet) cryogenic storage tank as required to meet the requirements of the following valves inside the primary containment vessel:

Full supply pressure (150 psig) loads:

- The seven dedicated accumulators to support the Automatic Depressurization System (ADS) Mode of seven specific Main Steam Safety/Relief Valves (MSRVs).

Reduced pressure (100 psig) loads:

- The four accumulators associated with the inboard Main Steam Isolation Valves (MSIVs).
- The eighteen MSRVs associated with the power assisted pressure relief mode actuators.
- The two Reactor Recirculation Cooling (RRC) pump seal staging drain valve pilot control valves.

In the event that the cryogenic system should fail, the seven accumulators associated with the ADS MSRVs are automatically isolated from the reduced pressure loads and supplied by two backup high pressure nitrogen cylinder banks. A bank of 15 cylinders supplies three of the ADS accumulators, and a separate set of 19 cylinders supply the other four ADS accumulators. These backup cylinders automatically provide 30-day supply of nitrogen for ADS function during a postulated LOCA.

An intertie with the CAS system is provided to supply the remaining reduced pressure CIA loads in the event that the cryogenic system should fail. This manually initiated intertie is also used to purge the CIA system during plant shutdown. The CAS intertie consists of two 100 percent capacity prefilters, a dual tower desiccant type dryer, two 100 percent capacity after filters, and an air receiver.

The design criteria for the CIA system components described above is presented in Table 4-2.

The CIA distribution system is constructed of carbon steel pipe and fittings. Accumulators equipped with soft seat, spring loaded check valves, are located adjacent to the loads served in containment. All piping and accumulators downstream of the accumulator check valves are stainless steel. All piping inside containment is Quality Class 1 and Seismic Class 1.

4.3 Emergency Diesel Starting Air Systems

The standby power systems at WNP-2 consist of 3 diesel generator sets. Two sets consist of 2 diesel engines driving a common generator. The third set, serving the High Pressure Core Spray (HPCS) system, consists of a single diesel engine driving a generator. The systems are shown schematically in Figure 4-3.

Each of the five diesel engines is equipped with an independent, redundant starting air system. The starting air systems function to compress, filter, dry and store a sufficient volume of air, at a sufficient pressure, for a minimum of five engine start attempts, assuming a single failure in one starting air train. In addition, each starting air system provides air to the safety-related actuators identified in Appendix 1.

Each divisional starting air system consists of two redundant reciprocating compressors which draw air from within the diesel generator room. One compressor is motor driven, and the second is motor driven with a diesel engine backup. The compressors discharge into a common header. The compressed air then passes through a prefilter and a dryer. The dry filtered air is then distributed through two independent headers to two banks of four air receivers. Each bank of air receivers has sufficient storage capacity for a minimum of five diesel engine starting attempts. Each bank of receivers serves two of the four air start motors on each engine. The receivers also serve the actuators and controls described above.

The HPCS diesel generator starting air system is identical to the one described above with the following exceptions:

a. The system includes two receivers. Each receiver stores a sufficient volume of air for three diesel start attempts.

b. The redundant compressor is engine driven only.

c. The distribution piping consists of a single header.

The design data for the Diesel Generator Starting Air System components described above is presented in Table 4-3.

5 SAFETY-RELATED AIR OPERATED CONTROL VALVES AND ACCUMULATORS

5.1 Air Operated Control Valves

Appendix 1, Safety-Related Control Valve Database, is a database of all the safety-related air operated actuators served by the plant instrument air systems. This database was developed as a tool to accomplish the following tasks:

1. To summarize the normal (operating) position, identify the fail-safe position of each of the safety-related actuators and to verify that the failure positions are consistent with the original design intentions.

2. To determine the air quality requirements (i.e. particulate, moisture and hydrocarbons) of the different safety-related users.

3. To determine which safety-related air users require upstream in-line filters to assure reliable operation.

4. To determine the air quality test criteria for the air systems.

5. To determine the locations in the air distribution systems where air quality tests should be performed.

To this end, the database includes the following information:

1. The component identification number.

2. A brief description of the component and its intended function.

3. The components location on an applicable flow diagram.

4. The actuators normal operating position, its fail safe position, and a description of its safety function.

5. The air quality requirements (i.e. particulate size, humidity and hydrocarbon) in accordance with the manufactures' recommendations.

6. The supplier purchase order number and the applicable vendor print number.

7. Any comments required to clarify the information described above. These comments are included in the back of the appendix.

From the information gathered in the process of developing this database, the following conclusions were reached:

1. All of the safety-related actuators are designed to fail to the position which provides the highest degree of plant safety. At this time the as-built failure positions are being verified. As described in Section 3 of this report, this verification is being done in the following ways:

    a. The preoperational test reports are being reviewed to assure that during startup each applicable valve actuator was subjected to a loss of air test.

b. Any valve actuators that were not tested during startup are currently being tested or will be tested during the next scheduled outage.

c. All system design changes are being reviewed to establish the associated impact on the failure position of the applicable valves. Any valve actuators impacted by design changes after the preoperational tests are currently being retested or will be retested during the next scheduled outage to verify that the actual failure position reflects the current fail safe design philosophy.

d. Valves which are not required to change position on loss of air will not be tested.

2. The air quality requirements for all of the plant safety-related air actuators have been determined. Based on this information the air quality test requirements discussed in Section 6 were developed. As described below, the air supplies to air actuators which have more stringent air quality requirements than the air quality test criteria requirements have been checked to see that they have an in-line filter to assure proper air quality.

3. As presented in Section 6, different air quality test locations have been identified based on the air quality requirements of the specific actuators and their intended safety function.

Appendix 2, Safety-Related Control Valve Filter Regulator Database, is also a database of the safety-related actuators along with a description of the associated in-line filters. This database was developed to accomplish the following:

1. To identify the actuators which have in-line filters (or in-line filter/regulators) installed in the instrument air supply lines.

2. To summarize the performance characteristics of each of these filter/regulators and compare these characteristic to the air quality requirements of the associated actuators.

3. To determine which actuators require in-line filters on the supply air line and identify those actuators that may need in-line filters with higher particulate removal efficiencies.

Like the database presented in Appendix 1, this data base includes the component identification number, a brief description of the component and its intended function, the components location on the applicable flow diagram, and the actuator air quality requirements (i.e., particulate size, humidity and hydrocarbon) in accordance with the manufactures' recommendations. In addition to these items, this database also includes the filter/regulator manufacture and model number, if one exists, the filter's removal efficiency, and any comments required to clarify the information described above. These comments are included in the back of the appendix.

From the information gathered in the process of developing this database, the following conclusions were reached. These conclusions are based on the

assumptions that the quality of the air supplied by the plant instrument air systems is within the boundaries of the test criteria presented in Section 6.

1. Only those valves whose air quality requirements are more stringent than the test criteria need filter/regulators. There are a number of valves that have filter/regulators, even though they are not technically required (i.e., the valve's maximum allowable particulate size is 40 microns or greater).

2. The following actuators are currently being walked down to verify the existence of a filter/regulator:

02-SW-AO-214	Diesel Cooling Water Supply
02-SW-AO-215	Diesel Cooling Water Supply
02-SW-AO-216	Diesel Cooling Water Supply
02-SW-AO-217	Diesel Cooling Water Supply
02-FPC-AO-1	Fuel Pool Flow Control

3. In-line filters are required on the air supply to the following actuators to assure adequate air quality:

   None at this time. To be reaccessed once the valves listed above have been walked down.

4. The in-line filter/regulator on the air supply to the following actuators removes particles 40 microns and larger. Currently, the actuators require air with a maximum particulate size of 35 microns. To date there have been no problems with valve operators. The valves and operators will be replaced within the next two years due to a design change associated with the leakage characteristics of the existing containment isolation valves. The new operators will be designed in conformance with the upstream filter specification.

02-EDR-AO-19	Drywell Sump Drain
02-EDR-AO-20	Drywell Sump Drain
02-FDR-AO-3	Drywell Floor Drain
02-FDR-AO-4	Drywell Floor Drain

5.2 Accumulators

This section will discuss the functional and design requirements of the safety-related air receivers, accumulators, bottles and associated check valves that are used in the WNP-2 design. The individual tanks and associated design data are listed in Appendix 3, Safety-Related Accumulators.

5.2.1 Main Steam Isolation Valve (MSIV) Accumulators

(Inboard and Outboard)

GE Specification 23A1886, Revision 0 requires that a pneumatic accumulator be located close to each MSIV to provide pneumatic pressure for the purpose of assisting in valve closure when isolation is desired or in the event of failure of the pneumatic supply pressure to the valve operator system.

GE Specification 23A1886 also requires that the accumulator volume be adequate to provide full stroking of the valve through one-half cycle (open to close) when gas supply to the accumulator has failed. The required accumulator volume of 35 gallons was determined by GE and specified in GE Data Sheet 23A1886AA, Revision 11.

The check valves associated with each of the MSIV accumulators were provided to prevent leakage of gas out of the accumulator in the event of a pneumatic supply failure. The check valves are required by design to have resilient seats, be spring loaded and provide "bubble tight" shut-off. Since redundant MSIVs are used on each line, the redundant means of effecting valve closure (i.e., pneumatic pressure or spring force) is intended to improve valve reliability, rather than accomplish a safety-related design function. Moreover, since MSIV isolation would follow a postulated loss of pneumatic pressure, postulated leakage through the check valves is a negligible consideration.

5.2.2 Main Steam Relief Valve (MSRV) Accumulators

GE Specification 23A1886 requires that a pneumatic accumulator be provided for each MSRV for the relief function. The relief function allows valve operation at pressures below the safety setpoint to minimize the number and frequency of challenges involving the MSRVs spring-loaded mode of operation. The required accumulator volume of 10 gallons was determined by GE and specified in GE Data Sheet 23A1886AA, Revision 11. The document states that for the relief function, a 10 gallon accumulator is required for each valve to provide one actuation against normal drywell pressure with reactor pressure at approximately 1000 psig. The document further indicates that the function of the accumulators is to provide the surge capacity needed during the instantaneous opening of all MSRVs and closure of all (inboard) MSIVs in the air distribution header.

The check valves associated with each of the MSRV accumulators were provided to prevent leakage of gas out of the accumulator in the event of a pneumatic supply failure. The check valves are required by design to have resilient seats, be spring loaded and provide "bubble tight" shut-off. The check valves are not periodically leak rate tested because loss of gas pressure to the MSRV actuator does not preclude the valve's spring-loaded mode operation. The valves will still pop open when the valve inlet pressure force exceeds the spring force. Moreover, since MSRV relief function would generally be required immediately following a postulated loss of pneumatic pressure, postulated leakage through the check valves is a negligible consideration.

5.2.3 Automatic Depressurization System (ADS) Accumulators

GE Specification 23A1886 states that an additional pneumatic accumulator shall be provided for each MSRV used for automatic depressurization during an assumed loss-of-coolant accident condition. The accumulators allow the MSRVs to reduce the reactor pressure to the point where the residual heat removal and/or the low

pressure core spray system can adequately cool the core. The required accumulator volume was determined by GE and specified in GE Data Sheet 23A1886AA, Revision 11. The document states that for the ADS function, a 42 gallon accumulator for each ADS valve is required to provide one actuation against maximum drywell pressure with reactor pressure a 0 psig. The document indicates that the function of the accumulators is to provide the surge capacity needed for the instantaneous opening of all the ADS valves on the same air distribution header.

Check valves are provided on the safety-related pneumatic line supplying the ADS accumulators. This prevents leakage of gas out of the accumulator in the event of a pneumatic supply failure. The check valve is seat leak tested as part of the ASME Pump and Valve Program. Postulated loss of the Quality Class I pneumatic gas supply system, concurrent with the need to provide ADS valve operation, is not considered credible due to the multiple failures required and the separate CIA bottle racks and pneumatic piping.

5.2.4 Backup Nitrogen Cylinder Banks

Once open, the ADS valves are not expected to be cycled during the post-accident period. However, a back-up gas supply has been provided to allow for extra cycles of operation if they are needed for alternate shutdown cooling.

The long-term gas demands of the ADS valves are provided by two backup nitrogen cylinder banks. A bank of 15 nitrogen cylinders supplies three of the ADS valves and a separate bank of 19 nitrogen cylinders supplies the other four ADS valves. These two subsystems provide a 30-day supply of nitrogen for the ADS function following a postulated loss-of-coolant accident.

Calculations have been performed to show that all 7 ADS valves can be cycled (closed-open) 14 times during the first 30 days after a loss of the normal gas supply source.

This conclusion is based on the following assumptions:

1. The 34 cylinders are charged to the minimum pressure of 2200 psig . (This is based on Technical Specification limits on allowable pressure in each cylinder).

2. A leakage rate of 1 SCFH per ADS.

3. An additional leakage rate of 1 SCFH per cylinder bank.

4. A requirement of 6.7 SCF per actuation (closed-open) against high drywell pressure coincident with zero reactor pressure.

The results of this calculation are documented in Supply Steam Calculation 5.46.05 and summarized in FSAR Section 9.3.1. Periodic leak rate test are performed on each bank to confirm that system leakages are consistent with calculation assumptions.

5.2.5 Remote Nitrogen Bottle Station

The extended-term gas demands of the ADS valves are provided by two remote

nitrogen cylinder connections. The manual connection of nitrogen cylinders at these stations allows the ADS function to be maintained for at least 100 days following a postulated LOCA event.

Periodic leak rate tests on each Backup Nitrogen Cylinder Bank assure that system leakage will be consistent with the ability to provide replacement cylinders following an accident.

5.2.6 Reactor Outside Air (ROA) and Reactor Exhaust Air (REA) Accumulators

These accumulators allow the associated reactor building isolation valves to open without excessive pressure fluctuations (drops) in the branch piping. Although the associated isolation valves are safety-related, neither the accumulators nor the accumulator check valves have any safety-related function.

5.2.7 Containment Vacuum Breaker Accumulator Tank

To be added later

5.2.8 Contaiment Vacuum Breaker Bottle Station

To be added later

5.2.9 High Pressure Core Spray (HPCS) Starting Air Receivers

To be added later

5.2.10 Emergency Diesel Generator Starting Air Receivers

To be added later

6 TESTING CRITERIA AND PROCEDURES

A procedure for testing the air quality in each of the instrument air systems has been developed.

The air quality test criteria for each of the instrument air systems are presented in Table 6-1. The basis for these criteria is as follows:

1. Particulate Size

The maximum allowable particulate size for the containment instrument air and control air systems, as stated in Table 6-1, was based on the air quality requirements for each of the safety-related air actuators. These requirements are presented in the Safety-Related Air Actuator Database (Appendix 1). There are rare exceptions where the requirement for maximum particulate size is more restrictive than the test criteria. In these rare cases the air supply line has been examined to assure that a filter regulator, sized to provide the proper filtration, is installed upstream of the actuator.

The diesel starting air systems are designed to function on service air quality air. Therefore, no filtration is required. Yet, for conservatism, the starting air systems are equipped with in-line filters which are designed to remove all particles 1 micron and larger. As a check, the starting air systems will be tested to verify that particulate matter does not exceed 40 microns. This is the same criteria as that used for the Control Air System.

2. Dewpoint Temperature (Humidity)

The dewpoint is the compressed air temperature at which moisture in the compressed air would begin to condense and form water droplets. Compressed air dryers are usually rated by the dewpoint and air flowrate. Since the only moisture in the air system is that entrained in the ambient air before entering the compressor, the dewpoint measured at the dryer discharge would reflect the dewpoint temperature throughout the system. Therefore, the dewpoint test criteria for the control air system was based on the rated dryer performance.

The primary gas supply for the Containment Instrument Air System is the cryogenic liquid nitrogen tank. By definition, liquid nitrogen does not contain any moisture Therefore there should not be any moisture in the CIA, and for this reason, the CIA system is not tested for excess moisture.

The diesel starting air systems are designed to function with service air quality air. That is, air that is free of entrained moisture but not necessarily dried to a specified dewpoint. It is expected that any moisture entrained in the compressed air stream at the discharge of the compressor aftercoolers would settle out in the air receivers before being transported into the engine air start motors. For conservatism, the starting air systems are equipped with deliquescing type dryers which are capable of lowering the dewpoint by 30 degrees F. Based on this conservative design approach, the starting air systems do not require a moisture test.

3. Hydrocarbon Contamination

Hydrocarbons can be introduced into a compressed air stream at the compressor. All of the compressors installed in the WNP-2 air systems are oil free. Therefore, no oil should be present in the compressed air piping. To verify this, the CAS air system will be tested for the presence of hydrocarbons in accordance with the criteria presented in ANSI Standard ISA-S7.3, "Quality Standard for Instrument Air."

The air quality in each system will be tested at a number of key locations. These locations will be selected to be close to the compressors, and to important safety-related actuators such as the ADS Valves, MSRV's, and the MSIV's.

The results of the testing effort are presented in the following section.

7 RESULTS OF TESTING

This section will be completed once the air quality tests are completed.

8 EVALUATION OF APPLICABLE PLANT PROCEDURES

8.1 Evaluation Criteria

The plant operating, training and maintenance procedures are currently being reviewed for acceptability and completeness. The criteria developed to review these procedures and to assess the necessity for additional procedures are presented in Table 8-1; Operating and Training Procedures Criteria, and Table 8-2; Maintenance/Testing Criteria.

A summary of the procedures review follows. This summary is divided into 3 sections; operating procedures, training procedures, and maintenance procedures. To date, each of these sections include the procedures which are being reviewed. The recommended changes to these procedures as a result of the review, and recommendations for the development of additional procedures required to address review criteria not currently covered by the existing procedures will be added once the evaluation is complete.

8.2 Operating Procedures

The following operating procedures are being reviewed in accordance with the criteria presented in Table 8-1. Recommendations for change to the procedures and additional procedures, required so that operating procedures for the different plant air systems fully envelope the criteria presented in Table 8-1, will be added later.

Reviewed Procedures

Procedure 4.8.1.1 Loss of Control Air

Recommended Additional Procedures

Recommendations for additional procedures will be added later.

8.3 Training Procedures

The following training procedures are being reviewed in accordance with the criteria presented in Table 8-1. Recommendations for changes to procedures and additional procedures required for the different plant air systems, will be added later. The changes will be established on the basis of the guide criteria presented in Table 8-1.

Reviewed Procedures

Procedures reviewed will be added later

Recommended Additional Procedures

Recommendations for additional procedures will be added later.

8.4 Maintenance Procedures

The following maintenance procedures are being reviewed in accordance with the criteria presented in Table 8-2. Recommendations for change to the procedures and additional procedures, required so that so that maintenance procedures for the different plant air systems fully envelope the criteria presented in Table 8-2, will be added later.

Reviewed Procedures

Procedure 10.1.13 System Cleanliness Control

Procedure 10.2.40 Installation/Modification of Instrument and Process Tubing

Procedure 10.2.55 Compressor Testing

Procedure 10.2.56 Air Operated Valve Testing

Procedure 10.17.1 Main Steam Relief Valve Removal and Replacement

Procedure 10.17.6 Main Steam Relief Valve Solenoid Replacement and Overhaul

Procedure 10.17.7 Main Steam S/RV Actuator Rebuild

Procedure 10.20.10 Diesel Air Start Motor Maintenance

Procedure 10.23.5 Heating and Ventilation Damper Testing

Procedure 10.24.121 PM Cal/Test - Fisher Model 4160 Controller

Procedure 10.24.122 PM Cal/Test - Fisher Valve Positioner Model 3580

Procedure 10.24.159 PM Cal/Test - Fisher Valve Positioner Model 3570

Recommended Additional Procedures

Recommendations for additional procedures will be added later.

9 RECOMMENDATIONS FOR CORRECTIVE ACTION

Once all work has been completed, recommendations will be made in the following areas:

1. Additional air quality testing and the frequency of such tests.

2. Modifications (if required) to the air systems to assure adequate air quality.

3. Changes to plant operating, maintenance and training procedures as required to assure proper system operation.

TABLE 4-1

CONTROL AIR AND SERVICE AIR
DESIGN DATA

Service	Control Air System
Compressors:	
Equipment Numbers	CAS-C-1A CAS-C-1B CAS-C-1C
Type	2 Stage Reciprocating
Design Flowrate	450 scfm
Design Pressure	125 psig
Hosepower	100 hp
Receivers:	
Equipment Numbers	CAS-AR-1A CAS-AR-1B CAS-AR-1C
Volume	96 ft^3
Filters:	
Prefilters:	
Equipment Numbers	CAS-F-2A CAS-F-2B
Type	Note 1
Filter Area	9 ft^2
Removal Rate	9 microns
Removal Efficiency	99.9+%
Afterfilter:	
Equipment Numbers	CAS-F-3A CAS-F-3B
Type	Removal Cartridge
Filter Area	8 ft^2
Removal Rate	9 microns
Removal Efficiency	99.9+%
Dryers:	
Equipment Numbers	CAS-DY-1A CAS-DY-1B
Type	Regenerative Desiccant
Design Flowrate	750 scfm
Dew Point Rating	-40 degrees

TABLE 4-1 (con't)

CONTROL AIR AND SERVICE AIR
DESIGN DATA

Service Air System:

Compressors:		
	Equipment Numbers	SA-C-1
	Type	Single Stage Helical
	Design Flowrate	620 scfm
	Design Pressure	100 psig
	Horsepower	125 hp
Receivers:		
	Equipment Numbers	SA-AR-1
	Volume	140 ft3
Filters:		
	Equipment Number	SA-F-1
	First Stage:	
	Type	Coalescing Filter/ Separator
	Removal Rate	.3 microns
	Removal Efficency	99.9+ %
	Second Stage:	
	Type	Coalescing Filter
	Removal Rate	.01 microns
	Removal Efficency	99.9+ %
Dryers:		
	Equipment Numbers	SA-DY-1
	Type	Refrigerant
	Design Flowrate	750 scfm
	Dew Point Rating	40 degrees F

Notes: 1. Prefilters are combination moisture separator / filters with removable cartridges.

TABLE 4-2

CONTAINMENT INSTRUMENT AIR SYSTEM
DESIGN DATA

Containment Instrument Air System

Cryogenic Tank:

Equipment Number	CN-TK-1
Tank Size	11,000 Gallons
Storage Capacity	1,000,000 Std. Ft^3
Fluid	Liquid Nitrogen
Purity	99.99+%

Backup Storage Bottles:

Equipment Numbers	CIA-TK-1A through 15A CIA-TK-1B through 19B
Storage Capacity	223 Std. Ft^3
Fluid	Compressed Nitrogen
Purity	99.99+%

Filters:

Prefilters:

Equipment Numbers	CIA-F-1A CIA-F-1B
Type	(to be submitted later)
Filter Area	ft^2
Removal Rate	microns
Removal Efficiency	%

Afterfilter:

Equipment Numbers	CIA-F-2A CIA-F-2B
Type	(to be submitted later)
Filter Area	ft^2
Removal Rate	microns
Removal Efficiency	%

Dryers:

Equipment Numbers	CIA-DY-1A CIA-DY-1B
Type	Regenerative Desiccant
Design Flowrate	50 scfm
Dew Point Rating	-40 degree F

Receivers:

Equipment Numbers	CAS-AR-1A
Volume	34 ft^3

TABLE 4-3

DIESEL GENERATOR STARTING AIR SYSTEMS
DESIGN DATA

Starting Air Systems:

Compressors:

Equipment Numbers	DSA-C-1A1 DSA-C-1B1 DSA-C-2A1 DSA-C-2B1 DSA-C-1C
Type	Two Stage Reciprocating Motor Driven
Design Flowrate	42 acfm
Design Pressure	250 psig
Horsepower	15 hp
Equipment Numbers	DSA-C-1A2 DSA-C-1B2 DSA-C-2A2 DSA-C-2B2 DSA-C-2C
Type	Two Stage Reciprocating Motor/Engine Driven
Design Flowrate	42 acfm
Design Pressure	250 psig
Horsepower (Motor) (Engine)	15 hp (Note 1) 13.5 to 20 bhp

Filter:

Equipment Numbers	DSA-F-1A2 DSA-F-1B2 DSA-F-2A2 DSA-F-2B2 DSA-F-1C
Type	(To be submitted later)
Design Flow Rate	46 scfm
Design Pressure Drop	2 psi
Particle Removal Rate	1 micron
Removal Efficiency	100 percent
Aerosol Removal Rate	.04 microns
Removal Efficiency	95 percent

TABLE 4-3 (Con't)

DIESEL GENERATOR STARTING AIR SYSTEMS
DESIGN DATA

Dryer:

Equipment Numbers	DSA-DY-1A2 DSA-DY-1B2 DSA-DY-2A2 DSA-DY-2B2 DSA-DY-1C
Type	Coalescing Filter
Design Flowrate	46 scfm
Dew Point Suppression	30 degrees F

NOTES:

1. The redundant air compressor for the HPCS diesel generator starting air system is engine driven only.

TABLE 6-1

AIR QUALITY
TEST CRITERIA

Instrument Air System	Maximum Particulate Size (microns)	Maximum Dewpoint (degrees F)	Maximum Hydrocarbon Content (PPM)
Control Air System	40	-40	1
Containment Instrument Air System	40	NA	NA
Diesel Generator Starting Air Systems	40	NA	1

TABLE 8-1

OPERATING AND TRAINING
PROCEDURES CRITERIA

Operating Procedures Criteria

The following criteria are based on the recommendations contained in INPO SOER 88-1, Instrument Air System Failures, and EPRI document NSAC-128, Pneumatic Systems and Nuclear Plant Safety. After reviewing these documents it was determined that, as a minimum, the operating and training procedure addressing the loss and restoration of instrument air should address the following considerations:

1. Shall be "staged" so that specific operator actions are to be taken at various air supply header pressure (i.e. when the pressure drops to x psi, the operator should initiate actions a, b, & c).

2. Have a list describing the symptoms associated with the various loss-of-air scenarios (e.g., dryer purge open, turbine header broken).

3. Identify the location of main air line isolation valves and the portions of the system affected by their closure.

4. Contain the following types of activities intended to achieve plant stability when air is lost:

   a. Manual reactor trip or verification of automatic trip at a specific decreasing air pressure.

   b. Verification of plant stability.

   c. Location, detection, and isolation of branch line failures.

   d. Preservation of air pressure to critical components by isolating various usage paths.

   e. Shutdown of operating components (using air) if their continued use could cause equipment damage and/or difficulty with core cooling or steam generator heat removal.

   f. Corrections for containment isolation effects.

   g. Corrections for failures that could permit radioactive release (i.e. gaseous waste).

5. Instructions for starting and aligning all available air compressors should be clearly defined.

TABLE 8-1 (con't)

OPERATING AND TRAINING
PROCEDURES CRITERIA

6. List and identify all air-operated valves and their expected failure position (identifying the effects of bottled air supplies) and at which pressure movement to the failure position occurs.

7. List all pneumatic instrumentation and its expected failure indication or control output.

8. Include instructions on how to recover from a partial and/or total loss of instrument air. Equipment that could lock up should be identified along with the method for restoration. If a transient can be created by restoration, the procedure should advise the operator.

Training Procedures Criteria

1. Operators and plant personnel will be trained for the various loss of air scenarios. Attention will be placed on identifying the symptoms of loss of air, locating isolation valves to minimize the systems lost, and knowing the failure positions of key valves associated with decay heat removal.

2. Plant personnel will be trained on the importance of the instrument air system, why its use for tools is prohibited, and the necessity of immediately reporting air system damage.

3. A "Loss of Instrument Air" simulator scenario is included as a portion of regularly scheduled Licensed Operator Requalification Training on an annual basis.

TABLE 8-2

MAINTENANCE/TESTING CRITERIA

COMPONENT	TESTING	SUGGESTED PERIODICITY
Control Air System Dryer Outlet	Dew point verification in accordance with ASNI/ISA-S7.3-1975.	Weekly
Control Air System Dryer Outlet	Particulate and hydrocarbon content verification in accordance with ANSI/ISA-S7.3-1975.	Quarterly
CAS Dryer & Associated Filters	Perform regular maintenance and desiccant replacement	Per vendor recommendations and operating history.
Service Air System (Particulate and Coalescent Filter Outlet)	Inspect contaminant indicator for signs of compressor lubricant	Weekly
Safety-Related and Random Remotely Located Component Locations (CAS, CIA & DSA)	Particulate verification to maintain air quality within specifications of equipment/component vendors. (See Table 6.1).	To be established based on evaluation of initial plant air quality tests
CAS and DSA Receivers	Water inspection/draining. Inspection of condensate trap operation.	To be established based on history of water accumulation, season, and operating history.
Service & Control Air Compressor	General compressor performance trending (vibration, etc.)	Quarterly
CAS Backup Compressors Startup & Run/Load	Sequencer checkout & general compressor performance for trending (vibration, etc.)	Quarterly
CAS Compressor Protective Trips/System Alarms	Verify setpoint for equipment protection to ensure protection trips do not inadvertently shutdown the system.	Refueling
Bottled Air Reservoirs	Integrity and pressure holding ability.	Alternate refueling periods.

TABLE 8-2 (Con't)

MAINTENANCE/TESTING CRITERIA

Piping & Drains	Leakage walkdown & inspection. Water accumulation & blowdown.	To be established based on operating history & dryer performance.
Safety-Related Receivers, Accumulators & Associated Check Valves.	Verify capability of performing intended function on loss of air.	Refueling
Satellite Filters	Particulate verification. Pressure drop/accumulation. Assess contaminant level in system and replace in-line filters if required. (Appendix 2).	To be established based on history and delta-P.
Backup Cross-connections to Service Air & Other Air Sources (CAS & CIA)	Verify that all interties downstream of the dryers are normally closed.	Weekly

APPENDIX 1

SAFETY-RELATED CONTROL VALVE DATABASE

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: DIESEL OIL AND MISC.				FLOW DIAGRAM: M512 SHEET 2, REVISION 5							
02-SW-A0-214 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-A0-215 **	DIESEL COOLING WTR SUPPLY	H-2	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
SYSTEM: DIESEL OIL AND MISC.				FLOW DIAGRAM: M512 SHEET 3, REVISION 4							
02-SW-A0-216 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-A0-217 **	DIESEL COOLING WTR SUPPLY	H-1	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
SYSTEM: RCIC				FLOW DIAGRAM: M519, REVISION 57							
02-RCIC-A0-4	RCIC COND PUMP DISCH TO DRN	B-10	OPEN NE	CLOSED	S, R	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30 1	(2),(3)
02-RCIC-A0-5	RCIC COND PUMP DISCH TO DRN	B-10	CLOSED ND	CLOSED	S, R	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30 1	(2),(3)
02-RCIC-PCV-15	RCIC PUMP DISCH TO LUBE OIL CLR	F-10	MODLT'D	OPEN	U	CLEAN	DRY	OIL FREE	F-130	02-42A-01,13	(10)
02-RCIC-A0-25	RCIC DRAIN POT TO MN COND ISOL	E-9	OPEN NE	CLOSED	S, R	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30 1	(2),(3)
02-RCIC-A0-26	RCIC DRAIN POT TO MN COND ISOL	D-9	OPEN NE	CLOSED	S, R	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30 1	(2),(3)
02-RCIC-A0-54	RCIC DRAIN POT ST BYPASS	E-9	CLOSED ND	CLOSED	T	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30 1	(2),(3)
02-RCIC-A0-65	OUTBOARD RCIC HEAD SPRAY VALVE	H-6	---	---	NA	---	---	---	---	---	(17)
02-RCIC-A0-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	NA	---	---	---	---	---	(17)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: HPCS AND LPCS				FLOW DIAGRAM: M520, REVISION 60							
02-HPCS-A0-5	HPCS INJECTION TO RPV	H-10	---	---	NA	---	---	---	---	---	(17)
02-LPCS-A0-6	LPCS INJECTION TO RPV	H-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 1, REVISION 68							
02-RHR-A0-41A	LPCI PATH TO RPV	G-6	---	---	NA	---	---	---	---	---	(17)
02-RHR-A0-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 2, REVISION 64							
02-RHR-A0-41B	LPCI PATH TO RPV	H-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-A0-41C	LPCI PATH TO RPV	D-11	---	---	NA	---	---	---	---	---	(17)
02-RHR-A0-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-A0-89	SERVICE WTR INTERTIE	J-10	---	---	NA	---	---	---	---	---	(17)
SYSTEM: FUEL POOL COOLING & CLEANUP				FLOW DIAGRAM: M526, REVISION 48							
02-FPC-A0-1	FUEL POOL FLOW CONTORL	C-9	MODLT'D ND	OPEN	C	CLEAN	DRY	OIL FREE	F130	---	(10)

APPENDIX 1

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: CONTROL ROD DRIVE				FLOW DIAGRAM: M528, REVISION 48							
02-CRD-AO-10	SDV VENT	K-6	OPEN NE	CLOSED	F	50	20 DEG.F @ 100 PSIG	OIL FREE	I208		(1)
02-CRD-AO-11	SDV DRAIN	F-6	OPEN NE	CLOSED	F	50	20 DEG.F @ 100 PSIG	OIL FREE	I208		(1)
02-CRD-AO-180	SDV VENT	K-6	OPEN NE	CLOSED	F	50	20 DEG.F @ 100 PSIG	OIL FREE	I208		(1)
02-CRD-AO-181	SDV DRAIN	F-6	OPEN NE	CLOSED	F	50	20 DEG.F @ 100 PSIG	OIL FREE	I208		(1)
02-CRD-V-126	SCRAM CHG VALVE (HCU TYP OF 185)	C-4	CLOSED NE	OPEN	G	10	20 DEG.F @ 100 PSIG	OIL FREE			(16)
02-CRD-V-127	SCRAM DSCHG VLV (HCU TYP OF 185)	C-3	CLOSED NE	OPEN	G	10	20 DEG.F @ 100 PSIG	OIL FREE			(16)
SYSTEM: NUCLEAR BOILER - MAIN STEAM				FLOW DIAGRAM: M529, REVISION 57							
02-MS-AO-1A * (B22-F013J)	STEAM LINE A MSRV	F-11	CLOSED ND	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-1B * (B22-F013E)	STEAM LINE B MSRV	D-11	CLOSED ND	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-1C * (B22-F013L)	STEAM LINE C MSRV	F-6	CLOSED ND	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-1D * (B22-F013K)	STEAM LINE D MSRV	D-7	CLOSED ND	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-2A * (B22-F013A)	STEAM LINE A MSRV	F-10	CLOSED ND	CLOSED	P	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-2B * (B22-F013F)	STEAM LINE B MSRV	D-11	CLOSED ND	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: NUCLEAR BOILER - MAIN STEAM FLOW DIAGRAM: M529, REVISION 57 (Con't)											
02-MS-AO-2C * (B22-F013D)	STEAM LINE C MSRV	F-7	CLOSED ND	CLOSED	P	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-2D * (B22-F013C)	STEAM LINE D MSRV	D-7	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-3A * (B22-F013B)	STEAM LINE A MSRV	F-9	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-3B * (B22-F013H)	STEAM LINE B MSRV	D-10	CLOSED ND	CLOSED	P	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-3C * (B22-F013G)	STEAM LINE C MSRV	F-7	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-3D * (B22-F013V)	STEAM LINE D MSRV	D-8	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-4A * (B22-F013S)	STEAM LINE A MSRV	F-9	CLOSED ND	CLOSED	O	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-4B * (B22-F013R)	STEAM LINE B MSRV	D-9	CLOSED ND	CLOSED	O	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-4C * (B22-F013M)	STEAM LINE C MSRV	F-8	CLOSED ND	CLOSED	O	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-4D * (B22-F013P)	STEAM LINE D MSRV	D-8	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-5B * (B22-F013U)	STEAM LINE B MSRV	D-9	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-5C * (B22-F013H)	STEAM LINE C MSRV	F-8	CLOSED ND	CLOSED	N	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-22A *	STEAM LINE A MSIV	F-12	OPEN NE	CLOSED	O	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: NUCLEAR BOILER - MAIN STEAM FLOW DIAGRAM: M529, REVISION 57 (Cont'd)											
02-MS-AO-22B *	STEAM LINE B MSIV	E-12	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-22C *	STEAM LINE C MSIV	F-5	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-22D *	STEAM LINE D MSIV	E-5	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-28A	STEAM LINE A MSIV	F-13	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-28B	STEAM LINE B MSIV	E-13	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-28C	STEAM LINE C MSIV	F-4	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-MS-AO-28D	STEAM LINE D MSIV	E-4	OPEN NE	CLOSED	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
02-RFW-AO-32A	REACTOR FEEDWTR LINE A	G-13	OPEN NE	CLOSED	B	40	NO SPCFD LIMITS	NA	M322		(3), (13)
02-RFW-AO-32B	REACTOR FEEDWTR LINE B	G-4	OPEN NE	CLOSED	B	40	NO SPCFD LIMITS	NA	M322		(3), (13)
SYSTEM: EQUIPMENT DRAINS FLOW DIAGRAM: M537, REVISION 40											
02-EDR-AO-19	DRYWELL SUMP DRAIN	D-9	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	OIL FREE	K-125		(8)
02-EDR-AO-20	DRYWELL SUMP DRAIN	D-9	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	OIL FREE	K-125		(8)
02-EDR-AO-394	RB SUMP DSCHG ISOL	C-15	OPEN NE	CLOSED	II	CLEAN	DRY	NA	B350		(7)
02-EDR-AO-395	RB SUMP DSCHG ISOL	C-15	OPEN NE	CLOSED	II	CLEAN	DRY	NA	B350		(7)
SYSTEM: FLOOR DRAINS-REACTOR BLDG FLOW DIAGRAM: M539, REVISION 58											
02-FDR-AO-3	DRYWELL FLOOR	E-6	OPEN	CLOSED	A	35	FREE OF	OIL FREE	K-125		(8)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: HVAC-REACTOR BLDG; FLOW DIAGRAM: M545; REVISION 61											
02-ROA-AO-10	HVAC DAMPER TO DIV. II HCC RM	E-15	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-11	HVAC DAMPER TO DIV. I HCC RM	E-7	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-12	HVAC DAMPER TO DIV I D.C.HCC RM	C-7	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-13	HVAC DAMPER TO DIV I H2 RECOMB	G-15	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-14	HVAC DAMPER TO DIV II H2 RECOMB	G-13	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-15	HVAC DAMPER TO SAMPLING ANALYZER	G-13	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
02-ROA-AO-17	HVAC DAMPER TO SAMPLING ANALYZER	G-14	OPEN NE	CLOSED	I	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	M139		(11)
SYSTEM: CONTAINMENT INSTRUMENT AIR; FLOW DIAGRAM: M556 SHEET 1; REVISION 38											
02-CIA-AO-39A *	INST AIR FR DRYER TO ACCUMULATORS	J-11	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)
02-CIA-AO-39B *	INST AIR FR DRYER TO ACCUMULATORS	E-10	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: STANDBY GAS TREATMENT				FLOW DIAGRAM: M544, REVISION 41							
02-SGT-AO-2A	SGTS REACTOR BUILDING INTAKE	M-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-SGT-AO-2B	SGTS REACTOR BUILDING INTAKE	D-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-SGT-AO-F16	SGT CHRCOAL FLTR DELUDGE VALVE	F-12	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F26	SGT CHRCOAL FLTR DELUDGE VALVE	F-11	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F36	SGT CHRCOAL FLTR DELUDGE VALVE	F-10	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F46	SGT CHRCOAL FLTR DELUDGE VALVE	B-12	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F56	SGT CHRCOAL FLTR DELUDGE VALVE	B-11	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F66	SGT CHRCOAL FLTR DELUDGE VALVE	B-9	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
SYSTEM: HVAC-REACTOR BLDG				FLOW DIAGRAM: M545,REVISION 61							
02-REA-AO-1	REA REACTOR BLDG ISOL VALVE	K-3	OPEN NE	CLOSED	H	40	NO SPCFD LIMITS	NA	M322	02-68-00-30 1	(3)
02-REA-AO-2	REA REACTOR BLDG ISOL VALVE	K-3	OPEN NE	CLOSED	H	40	NO SPCFD LIMITS	NA	M322	02-68-00-30 1	(3)
02-ROA-AO-1	ROA REACTOR BLDG ISOL VALVE	G-4	OPEN NE	CLOSED	H	40	NO SPCFD LIMITS	NA	M322	02-68-00-30 1	(3)
02-ROA-AO-2	ROA REACTOR BLDG ISOL VALVE	G-4	OPEN NE	CLOSED	H	40	NO SPCFD LIMITS	NA	M322	02-68-00-30 1	(3)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
SYSTEM: PRIMARY CONT. COOLING & PURGING				FLOW DIAGRAM: M543 SHEET 1, REVISION 61							
02-CSP-AO-8	WETWELL VAC BREAKER	B-15	----	----	NA	----	----	----			(17),(18)
02-CSP-AO-9	WETWELL VACUUM RELIEF VALVE	B-6	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	NA	----	----	----			(17),(18)
02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CEP-AO-1B	DRYWELL PURGE BYPASS EXHST VLV	J-13	CLOSED ND	CLOSED	A	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	I-208		(9)
02-CEP-AO-2A	DRYWELL PURGE EXHAUST VALVE	J-13	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CEP-AO-2B	DRYWELL PURGE BYPASS EXHST VLV	J-13	CLOSED ND	CLOSED	A	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	I-208		(9)
02-CEP-AO-3A	WETWELL PURGE EXHAUST VALVE	C-14	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CEP-AO-3B	WETWELL PURGE BYPASS EXHST VLV	J-13	CLOSED ND	CLOSED	A	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	I-208		(9)
02-CEP-AO-4A	WETWELL PURGE EXHAUST VALVE	J-13	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CEP-AO-4B	WETWELL PURGE BYPASS EXHST VLV	J-13	CLOSED ND	CLOSED	A	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	I-208		(9)
02-CVB-AO-1AB (TYP 18)	WETWELL DOWNCOMER VACUUM BREAKERS	B7-13	----	----	NA	----	----	----			(17),(18)

Component ID No.	Component Description	Dwg. Loc	Normal Position	Fail Safe Position	Fail Safe Function	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier	CVI No.	Comments
	DRAIN		NE				LIQ WTR				
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	OIL FREE	K-125		(8)
02-FDR-AO-219	REACTOR BLDG SUMP DRAIN	D-14	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
02-FDR-AO-220	REACTOR BLDG SUMP DRAIN	D-15	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
02-FDR-AO-221	REACTOR BLDG SUMP DRAIN	C-14	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
02-FDR-AO-222	REACTOR BLDG SUMP DRAIN	C-15	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
SYSTEM: PRIMARY CONT. COOLING & PURGING				FLOW DIAGRAM: M548		SHEET 1	REVISION 61				
02-CSP-AO-1	DRYWELL PURGE SUPPLY VLV	D-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-5	WETWELL VACUUM RELIEF VALVE	C-5	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-6	WETWELL VACUUM RELIEF VALVE	B-15	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-80, 1	(3)
02-CSP-AO-7	WETWELL VAC BREAKER	C-5	----	----	NA	----	----	----			(17),(18)

APPENDIX 1 NOTES

I. General Note(s):

1. All equipment part numbers (EPNs) identified in the "Component ID No." Column are pneumatically powered from the Control Air System (CAS), unless otherwise indicated.

2. All EPNs identified with an (*) in the "Component ID No."Column are pneumatically powered from the Containment Instrument Air (CIA) System.

3. All EPNs identified with an (**) in the "Component ID No. "Column are pneumatically powered from the Diesel Starting Air System.

4. "Filtered" air is interpreted to mean a requirement for air that does not contain particles greater than 40 microns in size. This is based on standard industry practices for the specification of satellite filters.

II. Fail Safe Function(s):

A. Isolates to provide Containment Isolation. Isolation of the primary containment is effected in order to assure that public radiation exposures are maintained below the guideline limits of 10 CFR 100 following a loss-of-coolant accident inside the primary containment.

B. Changes state to support containment and reactor coolant system isolation. The feedwater isolation valves are spring-loaded piston-actuated check valves. The actuator is intended to prevent the valve from "sticking" in the open position.

When the valve operator is in the open position, the operator will not resist valve closure. In this position the valve will function much like a simple check valve. In the de-energized position, the spring-loaded piston will assist in closing the valve. However, it will not close the valve against flow from the normal direction. This allows the condensate and condensate booster pumps to continue to supply feedwater to the reactor pressure vessel (if available).

C. The function of this valve is not safety-related. The valve is designated Seismic Category I and Quality Class I because it was purchased after January 1, 1980. This safety class designation is intended to be part of an upgrade of systems required for the safe storage of spent fuel.

D. Isolates to provide containment and reactor coolant system isolation. The valve isolates to limit public radiation exposure below 10 CFR 100 limits and isolates to maintain the integrity of the reactor coolant pressure boundary.

On a loss of air pressure, the actuator spring and the remaining pressure in the valve actuator accumulator act together to close the valve.

E. Allows Standby Service Water flow to provide safety system support to the Emergency Diesel Generators.

F. Isolates to prevent a loss of reactor coolant inventory after a reactor scram.

G. Allows flow to provide reactor shutdown and reactivity control.

H. Isolates the Reactor Building to provide secondary containment isolation. Isolation of the secondary containment is effected in order to maintain reactor building integrity during Standby Gas Treatment System (SBGS) operation and thus assure that public radiation exposures are maintained below the guideline limits of 10 CFR 100 following a loss-of-coolant accident inside the primary containment.

I. Isolates to maintain a controlled environment in areas that house safety-related support equipment.

J. Isolates to maintain the pressure boundary integrity of the safety-related portions of the Containment Instrument Air (CIA) upon loss or low supply pressure.

K. Allows SBGS operation needed to maintain secondary containment integrity and thus assure that public radiation exposures are maintained below the guideline limits of 10 CFR 100 following a loss-of-coolant accident inside the primary containment.

L. The fail safe function of this valve is not safety-related.

The valve isolates to prevent inadvertent actuation of the STGS filter deluge system. The deluge spray systems in atmosphere cleanup systems are installed to perform the following functions:

(1) Provide automatic fire suppression in an area with high combustible loading.

(2) Prevent fission product releases due to desorption caused by radioactivity-induced auto-ignition of the carbon adsorber following a single-failure in the SBGS.

Because the postulated loading of the carbon adsorber is much less than what is required for the auto-ignition of the charcoal filter, the SBGS filter deluge system is merely required to provide a fire protection function (Item 1 above). During a fire the non-safety-related Control Air

System is assumed to be available to (remote-manually) initiate the deluge flow.

M. Isolates to maintain the integrity of the reactor coolant pressure boundary (RCPB).

The fail safe operation of the actuator does not prevent the self-actuated operation of the relief valves for reactor pressure vessel overpressure protection.

N. Isolates to maintain the integrity of the reactor coolant pressure boundary (RCPB).

The fail safe operation of the actuator does not prevent the self-actuated operation of the relief valves for reactor pressure vessel overpressure protection. Moreover, the valve is backed by a safety-related pneumatic supply that is needed to achieve its emergency core cooling function (i.e., automatic depressurization system (ADS) function).

O. Isolates to maintain the integrity of the reactor coolant pressure boundary (RCPB).

The fail safe operation of the actuator does not prevent the self-actuated operation of the relief valves for reactor pressure vessel overpressure protection. Moreover, the valve is backed by a safety-related pneumatic supply that is needed to achieve its emergency core cooling function (i.e., automatic depressurization system (ADS) function) and the residual heat removal alternate cooling path.

P. Isolates to maintain the integrity of the reactor coolant pressure boundary (RCPB).

The fail safe operation of the actuator does not prevent the self-actuated operation of the relief valves for reactor pressure vessel overpressure protection. The normal (non-safety-related) pneumatic supply is assumed to be available following events that require the use of this valve for the residual heat removal alternate cooling path.

Q. Allows air flow for containment vacuum protection.

The valve has two different mutually exclusive safety-related functions:

(1) It must open to allow containment vacuum protection.

(2) It must isolate to provide containment isolation.

The valve is backed by safety-related air supplies to allow the valve to remain closed for containment isolation when the driving forces seek to expel gases from the containment. When the driving forces seek to imploded the containment,

the actuator is design to allow containment vacuum protection. (Further review of the system design required.)

R. Isolates to support Reactor Core Isolation Cooling (RCIC) operation needed to support decay heat removal.

S. Isolates to support RCIC operation needed to maintain reactor pressure vessel level.

T. The fail safe function of this valve is not safety-related and there is no preferred fail direction.

Failure in the open position bypasses the steam trap and allows reactor steam to discharge directly to the condenser, lowering the work output of the plant.

Failure in the closed position allows condensate to overfill the drainpot and possibly allows a slug of water to enter the RCIC turbine. This is not a design concern because the turbine has been designed to initiate operation under entrained liquid conditions.

U. Valve fails open to maintain cooling to the lube oil cooler. An in-line orifice keeps flow from becoming excessive.

III. Comments

1. The air quality requirements for these valves are documented in the following documents:

   (a) CVI 02-02C12-05,72,0,1 (GE Drawing 112D3231, Revision 0).

   (b) CVI 02-02C12-18,2 (GE Specification 23A1331, Revision 2).

   (c) GE Topical Report NEDE-30525 (Contained in QID-361403 and QID-361501).

   (d) CVI 02-02C12-13,19,2.

2. Air quality requirements are assumed to be identical to those of other Miller actuators (i.e., ROA-V-1, ROA-V-2, REA-V-1, etc.).

3. CVI No. 02-68-00-30-1 states: "Prove an oiler, filter, and water separator in the air line, and use a light mineral oil as a lubricant. Use a pressure regulator to conserve air and provide a smoother action." Air qualities are based on the telephone call between M>R>/A>T> Osborne (BPC) and Bob Frane (Miller Air Cylinder) in December 1988.

4. CVI No. 02-586-00-2-1 states: "Good instrument practices are also recommended. Clean, dry air or gas is essential for long service life and satisfactory operation. It should be noted that new air line often have scale and other debris in them. This debris can damage control valves, solenoids, seals, etc."

5. Air quality requirements for these actuators are assumed to be identical to those identified for valve actuators 02-CIA-AO-39 A and B per GH Bettis Valve operation manual P/N 65043.

6. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and Dave Borick (Sheffer Corp./Ralph Hiller Co.) on January 12, 1989.

7. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and William Klenner (BW/IP International Inc.) on January 12, 1989.

8. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and Ed Lund (Keiley Mueller Inc.) on January 12, 1989.

9. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and Rich Messemino (Hammel Dahl) on January 12, 1989.

10. Air Supply requirements are based on the telephone call between W. Sarakbi (BPC) and Kay Gowdy (Fisher Controls) on January 10 , 1989.

11. Air Supply requirements are based on the telephone call between W. Sarakbi (BPC) and Rick Evans (Marks Control Corp.) on January 13, 1989.

12. Air supply requirements per GE Purchase Specification No. 21A9257, Revision 4, Section 4.3.7.2 (02-02B22-2,4) are for a supply system that provides oil-free, filtered air, died to a dew point of -40 degrees F.

13. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and Philip Howell (BPC) on January 30, 1989.

14. Air supply requirements per GE Test Specification No. 23A1331, Revision 2 are for a supply system that provides 50 micron (filtered) and oil-free air.

15. Air supply requirements are based on the telephone call between W. Sarakbi (BPC) and Jim Morehouse (Contromatics) on January 24, 1989.

16. The particulate size requirement per GE Operating Manual GEK-71317A is 5 microns. The CRD-F-6 filter requirements (CVI 02-215-03, 29) are for the removal of 10 microns. This discrepancy needs to be reconciled. Standard GE recommendations for moisture and oil content have been assumed for the actuators.

17. The actuator is designated Quality Class II and non-safety-related.

The testable check valves are designed for remote opening (i.e., stroking the valve) with zero differential pressure across the valve seat. The valves will close on reverse flow even though the actuator may be in the open position. The valves open on forward flow when discharge pressure exceeds the downstream pressure.

18. The swing check valves have opening and closing air operators for testing purposes only. The valves operate independently of the air operators which are only used for periodic testing. The closed air operator is only used for emergencies and is not capable of preventing the valve from opening on high differential pressure.

APPENDIX 2

SAFETY-RELATED CONTROL VALVE

FILTER REGULATOR DATABASE

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
SYSTEM: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 2, REVISION 5					
02-SW-AO-214 **	DIESEL COOLING WTR SUPPLY	H-14	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS			(5)
02-SW-AO-215 **	DIESEL COOLING WTR SUPPLY	H-2	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS			(5)
SYSTEM: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 3, REVISION 4					
02-SW-AO-216 **	DIESEL COOLING WTR SUPPLY	H-14	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS			(5)
02-SW-AO-217 **	DIESEL COOLING WTR SUPPLY	H-1	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS			(5)
SYSTEM: RCIC			FLOW DIAGRAM: M519, REVISION 57					
02-RCIC-AO-4	RCIC COND PUMP DISCH TO DRN	B-10	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RCIC-AO-5	RCIC COND PUMP DISCH TO DRN	B-10	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RCIC-PCV-15	RCIC PUMP DISCH TO LUBE OIL CLR	F-10	CLEAN	DRY	OIL FREE	FISHER 67FR	40	(1)
02-RCIC-AO-25	RCIC DRAIN POT TO MN COND ISOL	E-9	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RCIC-AO-26	RCIC DRAIN POT TO MN COND ISOL	D-9	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RCIC-AO-54	RCIC DRAIN POT ST BYPASS	E-9	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RCIC-AO-65	OUTBOARD RCIC HEAD SPRAY VALVE	H-6	---	---	---	FISHER 67FR	40	(1), (7)
02-RCIC-AO-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	---	FISHER 67FR	40	(1), (7)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
SYSTEM: HPCS AND LPCS		FLOW DIAGRAM: M520, REVISION 60						
02-HPCS-A0-5	HPCS INJECTION TO RPV	H-10	---	---	---			(7)
02-LPCS-A0-6	LPCS INJECTION TO RPV	H-7	---	---	---			(7)
SYSTEM: RHR		FLOW DIAGRAM: M521 SHEET 1, REVISION 63						
02-RHR-A0-41A	LPCI PATH TO RPV	G-6	---	---	---			(7)
02-RHR-A0-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	---			(7)
SYSTEM: RHR		FLOW DIAGRAM: M521 SHEET 2, REVISION 64						
02-RHR-A0-41B	LPCI PATH TO RPV	H-12	---	---	---			(7)
02-RHR-A0-41C	LPCI PATH TO RPV	D-11	---	---	---			(7)
02-RHR-A0-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	---			(7)
02-RHR-A0-89	SERVICE WTR INTERTIE	J-10	---	---	---			(7)
SYSTEM: FUEL POOL COOLING & CLEANUP		FLOW DIAGRAM: M526, REVISION 48						
02-FPC-A0-1	FUEL POOL FLOW CONTORL	C-9	CLEAN	DRY	OIL FREE			(5)
SYSTEM: CONTROL ROD DRIVE		FLOW DIAGRAM: M528, REVISION 48						
02-CRD-A0-10	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
02-CRD-A0-11	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)
02-CRD-A0-180	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)
02-CRD-A0-181	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)
02-CRD-V-126	SCRAM CHG VALVE (HCU TYP OF 185)	C-4	10	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)
02-CRD-V-127	SCRAM DSCHG VLV (HCU TYP OF 185)	C-3	10	20 DEG.F @ 100 PSIG	OIL FREE	CRD-F-6	10	(8)
SYSTEM: NUCLEAR BOILER - MAIN STEAM		FLOW DIAGRAM: M529, REVISION 57						
02-MS-A0-1A * (B22-F013J)	STEAM LINE A MSRV	F-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-1B * (B22-F013E)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-1C * (B22-F013L)	STEAM LINE C MSRV	F-6	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-1D * (B22-F013K)	STEAM LINE D MSRV	D-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-2A * (B22-F013A)	STEAM LINE A MSRV	F-10	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-2B * (B22-F013F)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-2C * (B22-F013D)	STEAM LINE C MSRV	F-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-A0-2D * (B22-F013C)	STEAM LINE D MSRV	D-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
SYSTEM: NUCLEAR BOILER - MAIN STEAM FLOW DIAGRAM: 6N529, REVISION 57 (Cont'd)								
02-MS-AO-3A * (B22-F013B)	STEAM LINE A MSRV	F-9	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-3B * (B22-F013H)	STEAM LINE B MSRV	D-10	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-3C * (B22-F013G)	STEAM LINE C MSRV	F-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-3D * (B22-F013U)	STEAM LINE D MSRV	D-8	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-4A * (B22-F013S)	STEAM LINE A MSRV	F-9	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-4B * (B22-F013R)	STEAM LINE B MSRV	D-9	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-4C * (B22-F013H)	STEAM LINE C MSRV	F-8	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-4D * (B22-F013P)	STEAM LINE D MSRV	D-8	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-5B * (B22-F013U)	STEAM LINE B MSRV	D-9	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-5C * (B22-F013N)	STEAM LINE C MSRV	F-8	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-22A *	STEAM LINE A MSIV	F-12	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-22B *	STEAM LINE B MSIV	E-12	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-22C *	STEAM LINE C MSIV	F-5	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)

APPENDIX 2

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
02-MS-AO-22D *	STEAM LINE D MSIV	E-5	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-28A	STEAM LINE A MSIV	F-13	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-28B	STEAM LINE B MSIV	E-13	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-28C	STEAM LINE C MSIV	F-4	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-MS-AO-28D	STEAM LINE D MSIV	E-4	40	35 DEG.F @ 100 PSIG	NO SPCFD LIMITS	NO F/R		(2)
02-RFW-AO-32A	REACTOR FEEDWTR LINE A	G-13	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
02-RFW-AO-32B	REACTOR FEEDWTR LINE B	G-4	40	NO SPCFD LIMITS	NA	FISHER 67FR	40	(1)
SYSTEM: EQUIPMENT DRAINS		FLOW DIAGRAM: M537, REVISION 49						
02-EDR-AO-19	DRYWELL SUMP DRAIN	D-9	35	FREE OF LIQ WTR	OIL FREE	FISHER 67FR	40	(4)
02-EDR-AO-20	DRYWELL SUMP DRAIN	D-9	35	FREE OF LIQ WTR	OIL FREE	FISHER 67FR	40	(4)
02-EDR-AO-394	RB SUMP DSCHG ISOL	C-15	CLEAN	DRY	NA	FISHER 67FR	40	(1)
02-EDR-AO-395	RB SUMP DSCHG ISOL	C-15	CLEAN	DRY	NA	FISHER 67FR	40	(1)
SYSTEM: FLOOR DRAINS-REACTOR BLDG		FLOW DIAGRAM: M539, REVISION 58						
02-FDR-AO-3	DRYWELL FLOOR DRAIN	E-6	35	FREE OF LIQ WTR	OIL FREE	FISHER 67F	40	(4)
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	35	FREE OF LIQ WTR	OIL FREE	FISHER 67F	40	(4)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
02-FDR-AO-219	REACTOR BLDG SUMP DRAIN	D-14	CLEAN	DRY	NA	FISHER 67F	40	(1)
02-FDR-AO-220	REACTOR BLDG SUMP DRAIN	D-15	CLEAN	DRY	NA	FISHER 67F	40	(1)
02-FDR-AO-221	REACTOR BLDG SUMP DRAIN	C-14	CLEAN	DRY	NA	FISHER 67F	40	(1)
02-FDR-AO-222	REACTOR BLDG SUMP DRAIN	C-15	CLEAN	DRY	NA	FISHER 67F	40	(1)
SYSTEM: PRIMARY CONT. COOLING & PURGING FLOW DIAGRAM: M543 SHEET 1 REVISION 61								
02-CSP-AO-1	DRYWELL PURGE SUPPLY VLV	D-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CSP-AO-5	WETWELL VACUUM RELIEF VALVE	C-5	40	NO SPCFD LIMITS	NA	NO F/R		(2)
02-CSP-AO-6	WETWELL VACUUM RELIEF VALVE	B-15	40	NO SPCFD LIMITS	NA	NO F/R		(2)
02-CSP-AO-7	WETWELL VAC BREAKER	C-5	----	----	----	FISHER 67AF	40	(7)
02-CSP-AO-8	WETWELL VAC BREAKER	B-15	----	----	----	FISHER 67F	40	(7)
02-CSP-AO-9	WETWELL VACUUM RELIEF VALVE	B-6	40	NO SPCFD LIMITS	NA	NO F/R	40	(1)
02-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	----	FISHER 67F	40	(7)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
SYSTEM: PRIMARY CONT. COOLING & PURGING			FLOW DIAGRAM: M543 SHEET 1, REVISION 61					
02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CEP-AO-1B	DRYWELL PURGE BYPASS EXHST VLV	J-13	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-CEP-AO-2A	DRYWELL PURGE EXHAUST VALVE	J-13	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CEP-AO-2B	DRYWELL PURGE BYPASS EXHST VLV	J-13	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-CEP-AO-3A	WETWELL PURGE EXHAUST VALVE	C-14	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CEP-AO-3B	WETWELL PURGE BYPASS EXHST VLV	J-13	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-CEP-AO-4A	WETWELL PURGE EXHAUST VALVE	J-13	40	NO SPCFD LIMITS	NA	FISHER 95H	(6)	(2)
02-CEP-AO-4B	WETWELL PURGE BYPASS EXHST VLV	J-13	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-CVB-AO-1AB (TYP 18)	WETWELL DOWNCOMER VACUUM BREAKS	C-6	----	----	----			(7)
SYSTEM: STANDBY GAS TREATMENT			FLOW DIAGRAM: M544, REVISION 41					
02-SGT-AO-2A	SGTS REACTOR BUILDING INTAKE	H-15	40	NO SPCFD LIMITS	NA	NO F/R		(2)
02-SGT-AO-2B	SGTS REACTOR BUILDING INTAKE	D-15	40	NO SPCFD LIMITS	NA	NO F/R		(2)
02-SGT-AO-F16	SGT CHRCOAL FLTR DELUDGE VALVE	F-12	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
02-SGT-AO-F26	SGT CHRCOAL FLTR DELUDGE VALVE	F-11	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)
02-SGT-AO-F36	SGT CHRCOAL FLTR DELUDGE VALVE	F-10	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)
02-SGT-AO-F46	SGT CHRCOAL FLTR DELUDGE VALVE	B-12	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)
02-SGT-AO-F56	SGT CHRCOAL FLTR DELUDGE VALVE	B-11	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)
02-SGT-AO-F66	SGT CHRCOAL FLTR DELUDGE VALVE	B-9	CLEAN	DRY	CLEAN	FISHER 95H	(6)	(2)
SYSTEM: HVAC-REACTOR BLDG		FLOW DIAGRAM: M545,REVISION 61						
02-REA-AO-1	REA REACTOR BLDG ISOL VALVE	K-3	40	NO SPCFD LIMITS	NA			(2)
02-REA-AO-2	REA REACTOR BLDG ISOL VALVE	K-3	40	NO SPCFD LIMITS	NA			(2)
02-ROA-AO-1	ROA REACTOR BLDG ISOL VALVE	G-4	40	NO SPCFD LIMITS	NA			(2)
02-ROA-AO-2	ROA REACTOR BLDG ISOL VALVE	G-4	40	NO SPCFD LIMITS	NA			(2)
02-ROA-AO-10	HVAC DAMPER TO DIV. II HCC RM	E-15	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-11	HVAC DAMPER TO DIV. I HCC RM	E-7	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-12	HVAC DAMPER TO DIV I D.C.HCC RM	C-7	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-13	HVAC DAMPER TO DIV I H2 RECOMB	G-15	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)

Component ID No.	Component Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Filter Regulator Manufacture & Model #	Filter Performance Characteristics (Microns)	Comments
02-ROA-AO-14	HVAC DAMPER TO DIV II H2 RECOMB	G-13	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-15	HVAC DAMPER TO SAMPLING ANALYZER	G-13	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-17	HVAC DAMPER TO SAMPLING ANALYZER	G-14	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
SYSTEM: CONTAINMENT INSTRUMENT AIR		FLOW DIAGRAM: M556 SHEET 1, REVISION 38						
02-CIA-AO-39A *	INST AIR FR DRYER TO ACCUMULATORS	J-11	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)
02-CIA-AO-39B *	INST AIR FR DRYER TO ACCUMULATORS	E-10	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)

APPENDIX 2 NOTES

1. With the installed in-line filter, the quality of the air supplied to the actuator meets or exceeds the air quality requirements dictated by the actuator supplier.

2. The air quality supplied to the valve meets or exceeds the air quality requirements dictated by the actuator supplier. Therefore an in-line filter is not required.

3. The air quality supplied to the valve does not meet the air quality requirements dictated by the actuator supplier. Therefore an in-line filter is required and will be installed during the next scheduled outage.

4. With the installed in-line filter, the quality of the air supplied to the actuator does not meet the air quality requirements dictated by the actuator supplier. Therefore the existing in-line filter will be replaced with a properly sized filter during the next scheduled outage.

5. The air supply to the actuator is currently being walked down or will be walked down during the next outage to verify the existence of an in-line filter.

6. Regulator does not include a filter. A strainer is located upstream of the regulator.

7. Actuators are not safety related, see Appendix 1 for an explanation.

8. The CRD (Control Rod Drive) System actuators are protected by a common filter CRD-F-6 which has a rating of 10 microns.

APPENDIX 3

SAFETY-RELATED AIR ACCUMULATORS

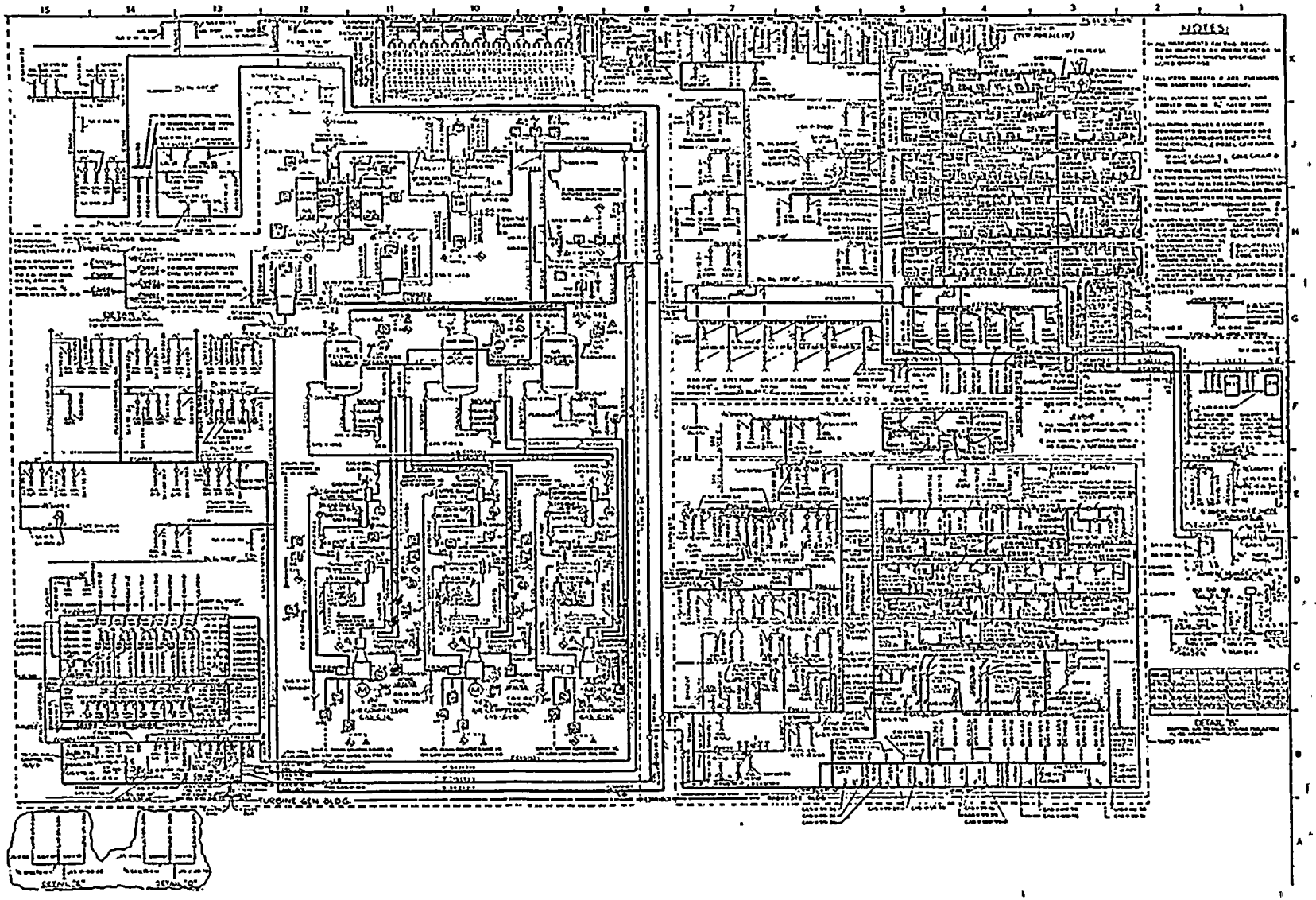
APPENDIX 3

COMPONENT ID NO.	COMPONENT DESCRIPTION	PROCESS FLOW DIAGRAM NO.	SHT NO.	REV. NO.	DWG. LOC	COMMENTS
02-MS-TK-1A	INBOARD MSIV ACCUMULATOR	M556	1	38	J-4	
02-MS-TK-1B	INBOARD MSIV ACCUMULATOR	M556	1	38	J-3	
02-MS-TK-1C	INBOARD MSIV ACCUMULATOR	M556	1	38	K-4	
02-MS-TK-1D	INBOARD MSIV ACCUMULATOR	M556	1	38	K-3	
02-MS-TK-2A	OUTBOARD MSIV ACCUMULATOR	M510	1	65	H-5	
02-MS-TK-2B	OUTBOARD MSIV ACCUMULATOR	M510	1	65	H-5	
02-MS-TK-2C	OUTBOARD MSIV ACCUMULATOR	M510	1	65	H-5	
02-MS-TK-2D	OUTBOARD MSIV ACCUMULATOR	M510	1	65	H-5	
02-MS-TK-4A	MSRV ACCUMULATOR	M556	1	38	F-3	
02-MS-TK-4B	MSRV ACCUMULATOR	M556	1	38	F-4	
02-MS-TK-4C	MSRV ACCUMULATOR	M556	1	38	D-4	
02-MS-TK-4D	MSRV ACCUMULATOR	M556	1	38	C-2	
02-MS-TK-4E	MSRV ACCUMULATOR	M556	1	38	F-4	
02-MS-TK-4F	MSRV ACCUMULATOR	M556	1	38	G-3	
02-MS-TK-4G	MSRV ACCUMULATOR	M556	1	38	C-4	
02-MS-TK-4H	MSRV ACCUMULATOR	M556	1	38	H-4	
02-MS-TK-4J	MSRV ACCUMULATOR	M556	1	38	E-3	
02-MS-TK-4K	MSRV ACCUMULATOR	M556	1	38	E-4	
02-MS-TK-4L	MSRV ACCUMULATOR	M556	1	38	E-3	
02-MS-TK-4M	MSRV ACCUMULATOR	M556	1	38	B-2	
02-MS-TK-4N	MSRV ACCUMULATOR	M556	1	38	B-3	

COMPONENT ID NO.	COMPONENT DESCRIPTION	PROCESS FLOW DIAGRAM NO.	SHT NO.	REV. NO.	DWG. LOC	COMMENTS
02-MS-TK-4P	MSRV ACCUMULATOR	M556	1	38	C-3	
02-MS-TK-4R	MSRV ACCUMULATOR	M556	1	38	H-3	
02-MS-TK-4S	MSRV ACCUMULATOR	M556	1	38	G-3	
02-MS-TK-4U	MSRV ACCUMULATOR	M556	1	38	H-4	
02-MS-TK-4V	MSRV ACCUMULATOR	M556	1	38	D-2	
02-MS-TK-3M	ADS ACCUMULATOR	M556	1	38	C-3	
02-MS-TK-3N	ADS ACCUMULATOR	M556	1	38	B-4	
02-MS-TK-3P	ADS ACCUMULATOR	M556	1	38	D-4	
02-MS-TK-3R	ADS ACCUMULATOR	M556	1	38	J-4	
02-MS-TK-3S	ADS ACCUMULATOR	M556	1	38	G-4	
02-MS-TK-3U	ADS ACCUMULATOR	M556	1	38	J-5	
02-MS-TK-3V	ADS ACCUMULATOR	M556	1	38	D-3	
02-ROA-ACC-1	OUTBOARD ROA ACCUMULATOR	M545	1	61	F-3	
02-ROA-ACC-2	INBOARD ROA ACCUMULATOR	M545	1	61	F-3	
02-REA-ACC-1	INBOARD REA ACCUMULATOR	M545	1	61	J-3	
02-REA-ACC-2	OUTBOARD REA ACCUMULATOR	M545	1	61	J-3	
02-CIA-TK-1A thru 02-CIA-TK-15A	BACKUP NITROGEN CYLINDERS	M556	1	38	F-11	
02-CIA-TK-1B thru 02-CIA-TK-19B	BACKUP NITROGEN CYLINDERS	M556	1	38	A-11	
02-CIA-TK-20A	REMOTE NITROGEN BOTTLES	M556	1	38	H-13	
02-CIA-TK-20B	REMOTE NITROGEN BOTTLES	M556	1	38	D-13	

APPENDIX 3

COMPONENT ID NO.	COMPONENT DESCRIPTION	PROCESS FLOW DIAGRAM NO.	SHT NO.	REV. NO.	DWG. LOC	COMMENTS
02-CSP-TK-51	CONTAINMENT VACUUM BREAK TANK	M619	161	11	---	
02-CSP-TK-1 thru 02-CSP-TK-10	BACKUP NITROGEN CYLINDERS	M619	161	11	---	

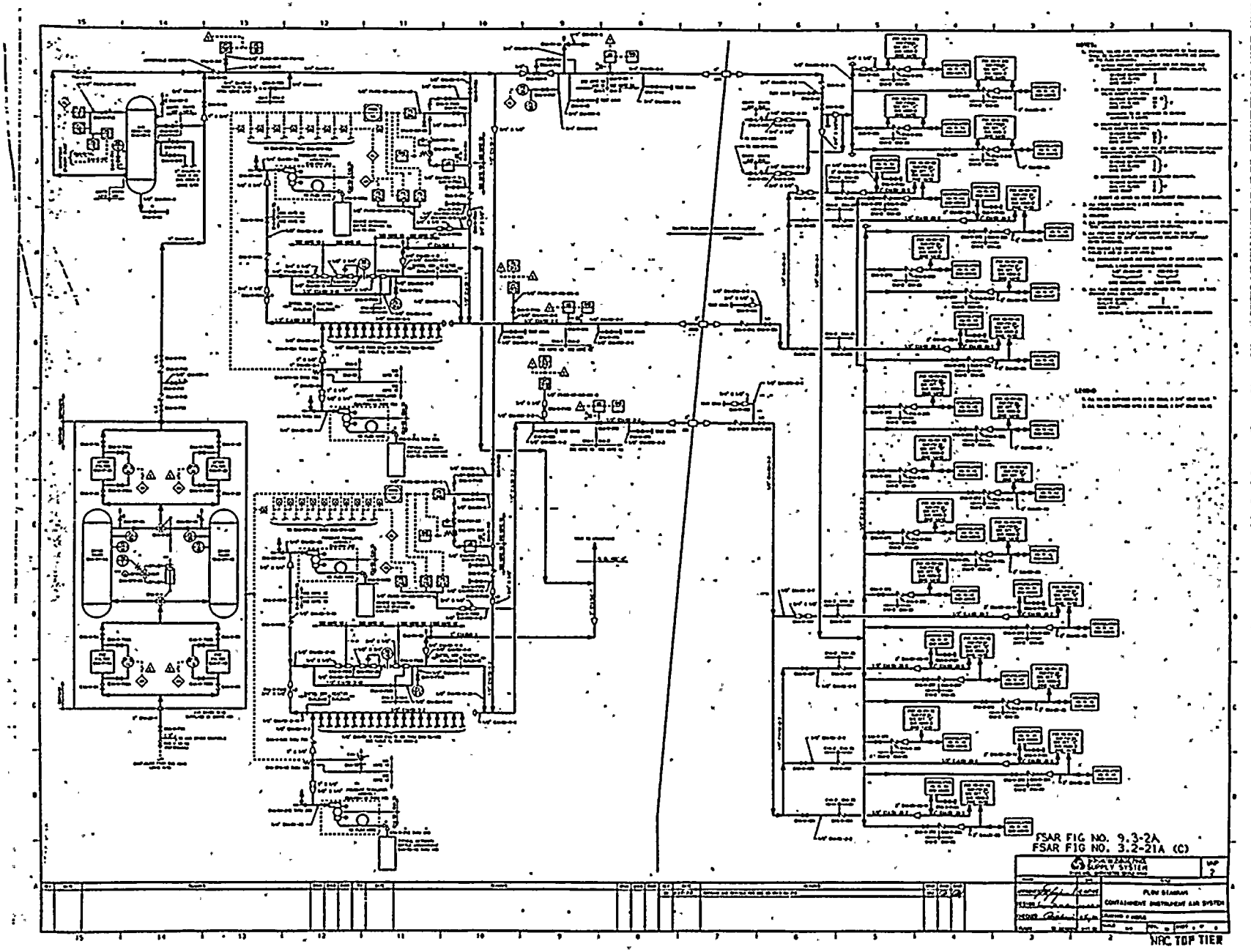


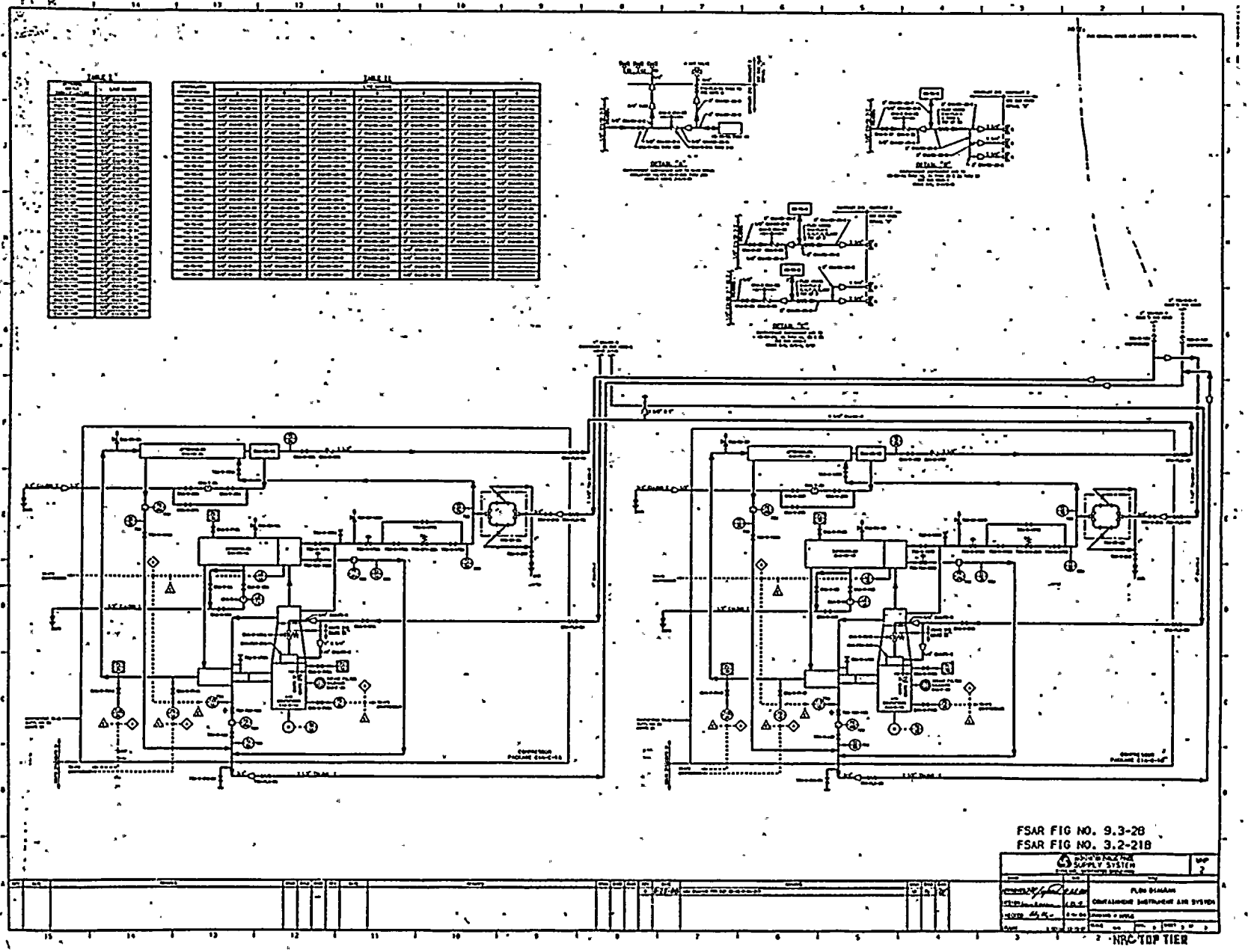
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

CONTROL AND SERVICE AIR SYSTEM

Figure 4-1

DRAW NO. M510 | SHEET 1 OF 1

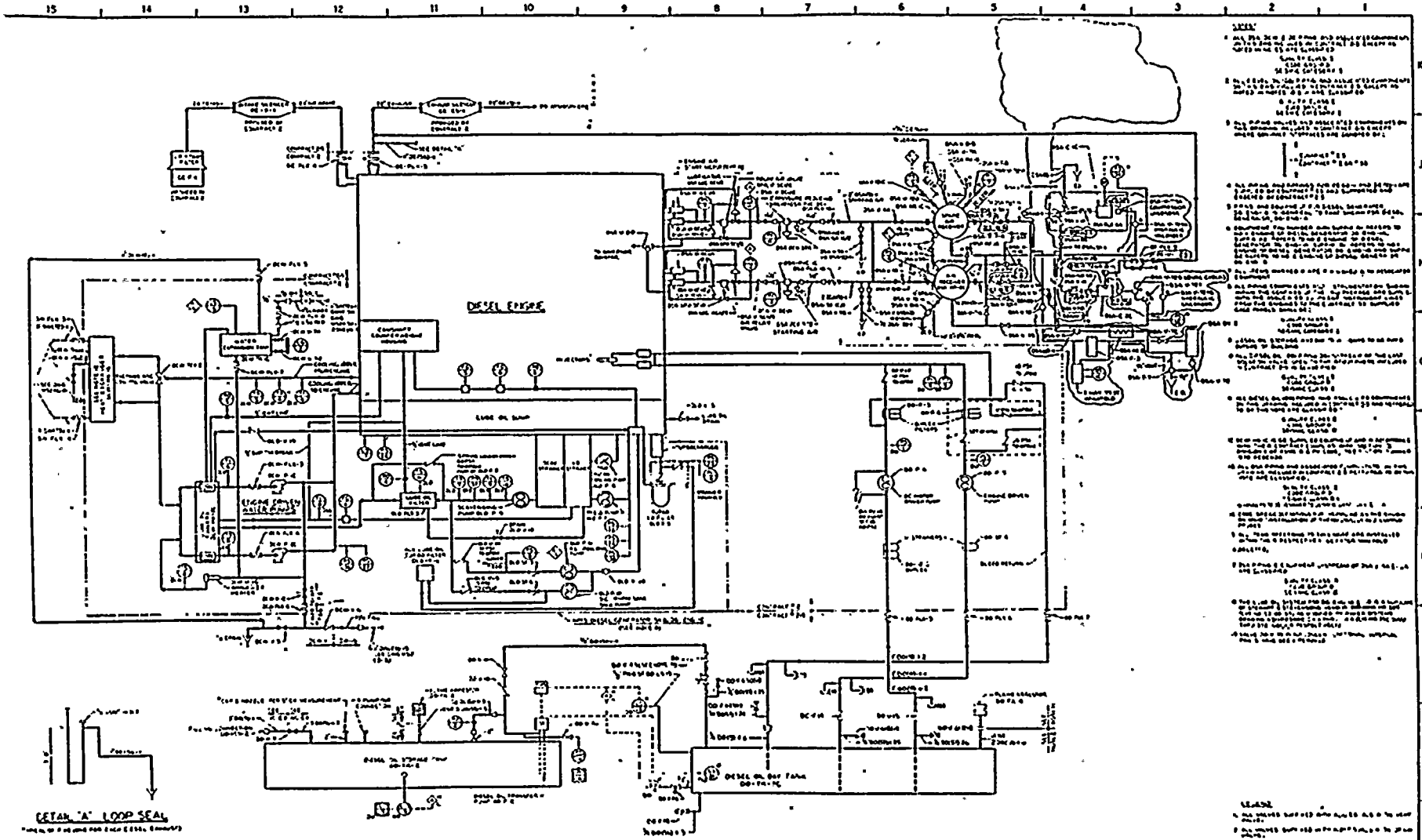

FSAR FIG NO. 9.3-2A
FSAR FIG NO. 3.2-21A (C)
NRC TOP TIER



FSAR FIG NO. 9.3-28
FSAR FIG NO. 3.2-218

NRC TOP TIER

AMENDMENT NO. 39
August 1988



FSAR FIG NO
3.2-22A(C)

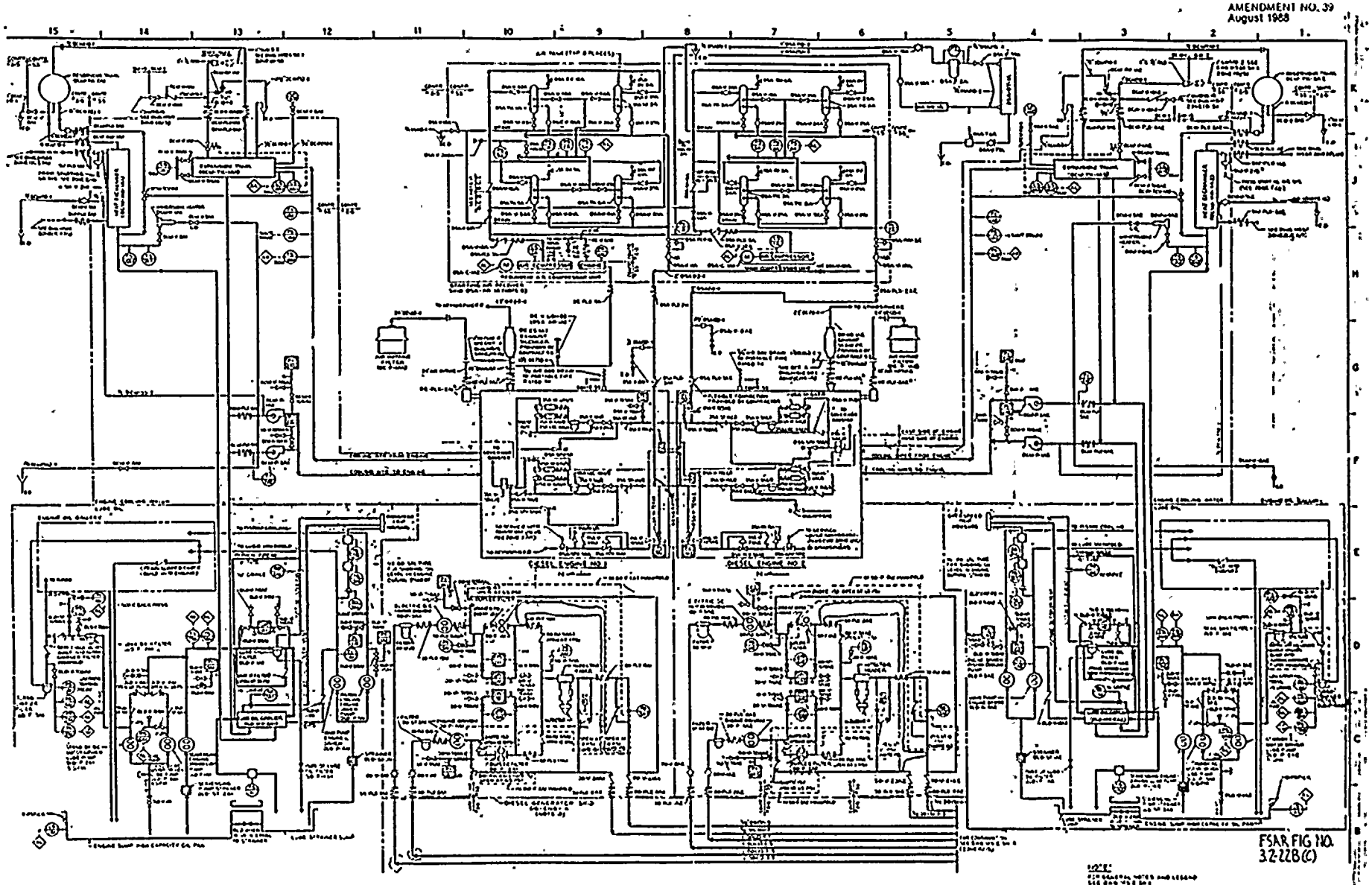
WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS

Figure 9

DRAW NO. 11512-1	SHEET 1 OF 4	4-3

AMENDMENT NO. 39
August 1988

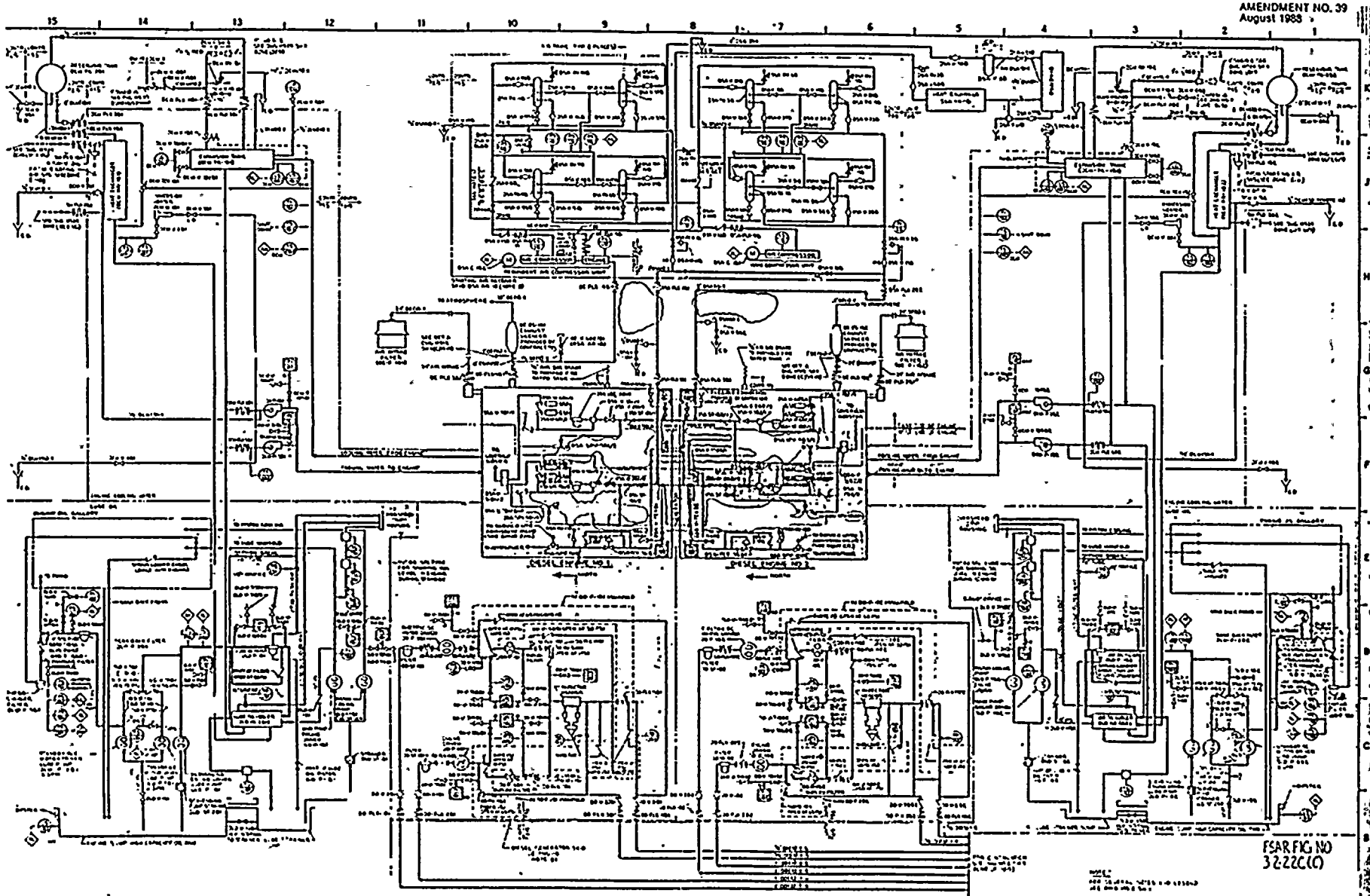


FSAR FIG NO.
3.2-22B(C)

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS

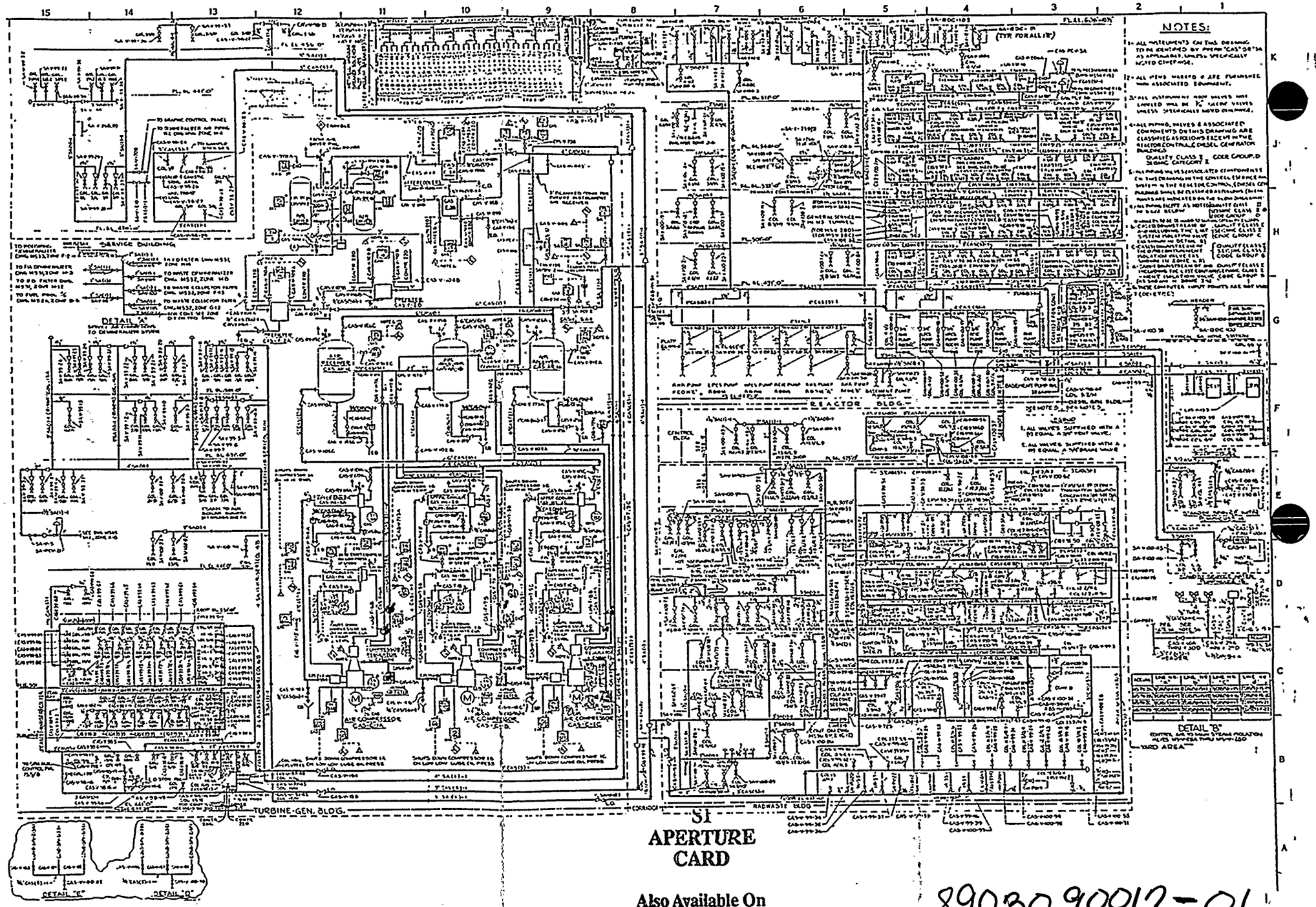
DRAW NO. M512-2	SHEET 2 OF 4	Figure 4-3 (con't)



WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS
Figure

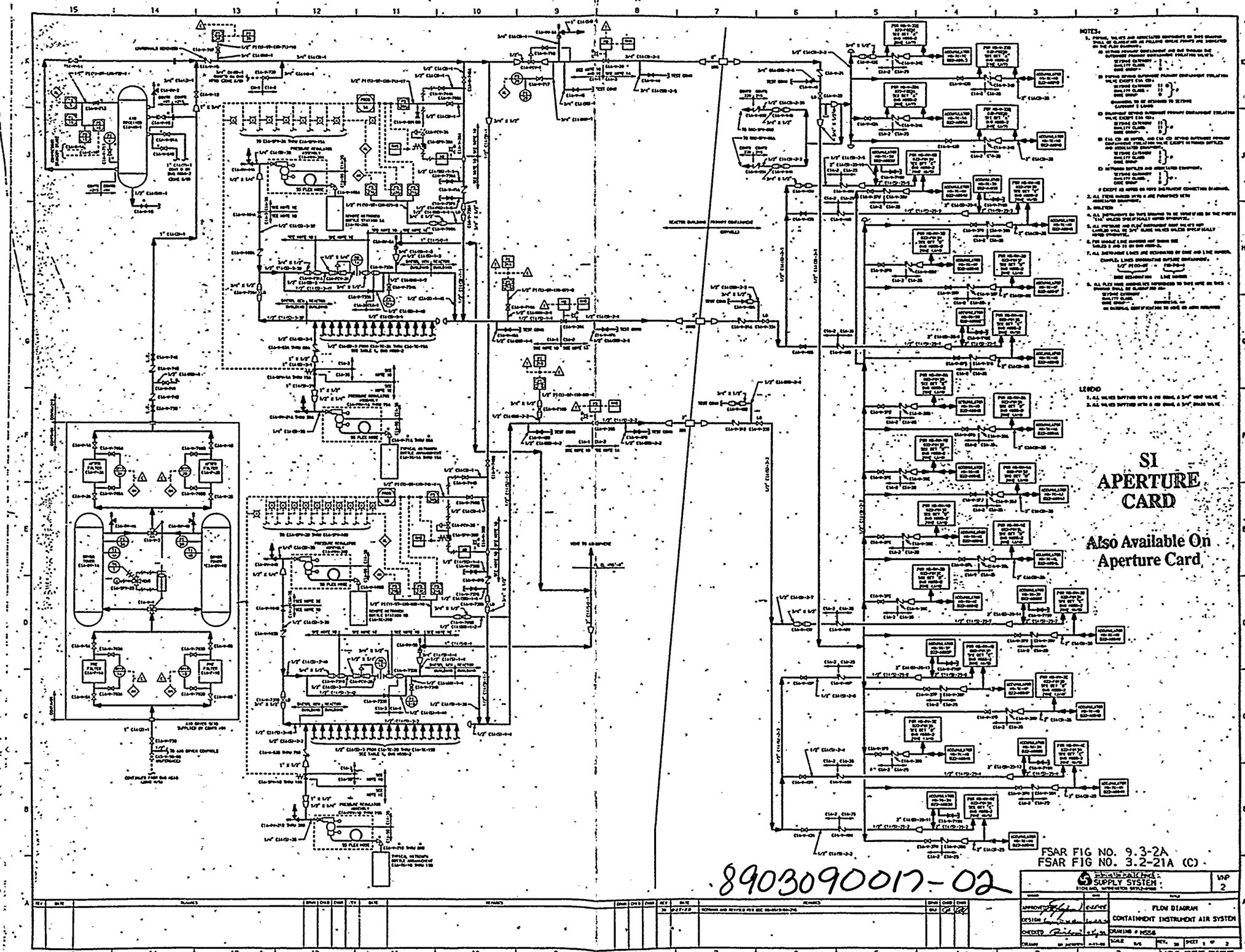
DRAW NO. M512-3	SHEET 3 OF 4	4-3 (con't)



WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

CONTROL AND SERVICE AIR SYSTEM

DRAW NO. M510	SHEET 1 OF 1	Figure 9.3-1



FSAR FIG NO. 9.3-2A
FSAR FIG NO. 3.2-21A (C)

8903090017-02

SUPPLY SYSTEM

FLOW DIAGRAM
CONTAINMENT INSTRUMENT AIR SYSTEM

NRC TOP TIER

TABLE I

ATTACHED TO LINE NO. & TYPE CONNECTION	"Y" LINE NUMBER
C11A-10-36	1/2" C11A129-Y-5
C11A-10-38	1/2" C11A129-Y-6
C11A-10-34	1/2" C11A129-Y-7
C11A-10-88	1/2" C11A129-Y-8
C11A-10-46	1/2" C11A129-Y-9
C11A-10-48	1/2" C11A129-Y-10
C11A-10-44	1/2" C11A129-Y-11
C11A-10-48	1/2" C11A129-Y-12
C11A-10-44	1/2" C11A129-Y-13
C11A-10-68	1/2" C11A129-Y-14
C11A-10-76	1/2" C11A129-Y-15
C11A-10-78	1/2" C11A129-Y-16
C11A-10-84	1/2" C11A129-Y-17
C11A-10-88	1/2" C11A129-Y-18
C11A-10-88	1/2" C11A129-Y-19
C11A-10-88	1/2" C11A129-Y-20
C11A-10-98A	1/2" C11A129-Y-21
C11A-10-98B	1/2" C11A129-Y-22
C11A-10-114	1/2" C11A129-Y-23
C11A-10-118	1/2" C11A129-Y-24
C11A-10-126	1/2" C11A129-Y-25
C11A-10-128	1/2" C11A129-Y-26
C11A-10-134	1/2" C11A129-Y-27
C11A-10-138	1/2" C11A129-Y-28
C11A-10-144	1/2" C11A129-Y-29
C11A-10-148	1/2" C11A129-Y-30
C11A-10-154	1/2" C11A129-Y-31
C11A-10-158	1/2" C11A129-Y-32
C11A-10-168	1/2" C11A129-Y-33
C11A-10-170	1/2" C11A129-Y-34
C11A-10-178	1/2" C11A129-Y-35
C11A-10-188	1/2" C11A129-Y-36

TABLE II

SCHEDULE/SIZE WEIGHT OF PIPE/TYPE	LINE NUMBER a	b	c	d	e	f	g
C11A-10-36	1/2" C11A129-Y-13	3" C11A129-Y-13	3" C11A129-Y-13	3" C11A129-Y-31	3" C11A129-Y-31	3" C11A129-Y-53	1/2" C11A129-Y-73
C11A-10-38	1/2" C11A129-Y-14	3" C11A129-Y-14	3" C11A129-Y-14 *	3" C11A129-Y-32	3" C11A129-Y-54	3" C11A129-Y-54	1/2" C11A129-Y-74
C11A-10-34	1/2" C11A129-Y-15	3" C11A129-Y-15	3" C11A129-Y-15	3" C11A129-Y-33	3" C11A129-Y-55	3" C11A129-Y-55	1/2" C11A129-Y-75
C11A-10-88	1/2" C11A129-Y-16	3" C11A129-Y-16	3" C11A129-Y-16	3" C11A129-Y-34	3" C11A129-Y-56	3" C11A129-Y-56	1/2" C11A129-Y-76
C11A-10-46	1/2" C11A129-Y-17	3" C11A129-Y-17	3" C11A129-Y-17	3" C11A129-Y-35	3" C11A129-Y-57	3" C11A129-Y-57	1/2" C11A129-Y-77
C11A-10-48	1/2" C11A129-Y-18	3" C11A129-Y-18	3" C11A129-Y-18	3" C11A129-Y-36	3" C11A129-Y-58	3" C11A129-Y-58	1/2" C11A129-Y-78
C11A-10-44	1/2" C11A129-Y-19	3" C11A129-Y-19	3" C11A129-Y-19	3" C11A129-Y-37	3" C11A129-Y-59	3" C11A129-Y-59	1/2" C11A129-Y-79
C11A-10-68	1/2" C11A129-Y-20	3" C11A129-Y-20	3" C11A129-Y-20	3" C11A129-Y-38	3" C11A129-Y-60	3" C11A129-Y-60	1/2" C11A129-Y-80
C11A-10-76	1/2" C11A129-Y-21	3" C11A129-Y-21	3" C11A129-Y-21 *	3" C11A129-Y-39	3" C11A129-Y-61	3" C11A129-Y-61	1/2" C11A129-Y-81
C11A-10-78	1/2" C11A129-Y-22	3" C11A129-Y-22	3" C11A129-Y-22	3" C11A129-Y-40	3" C11A129-Y-62	3" C11A129-Y-62	1/2" C11A129-Y-82
C11A-10-84	1/2" C11A129-Y-23	3" C11A129-Y-23	3" C11A129-Y-23	3" C11A129-Y-41	3" C11A129-Y-63	3" C11A129-Y-63	1/2" C11A129-Y-83
C11A-10-88	1/2" C11A129-Y-24	3" C11A129-Y-24	3" C11A129-Y-24	3" C11A129-Y-42	3" C11A129-Y-64	3" C11A129-Y-64	1/2" C11A129-Y-84
C11A-10-88	1/2" C11A129-Y-25	3" C11A129-Y-25	3" C11A129-Y-25	3" C11A129-Y-43	3" C11A129-Y-65	3" C11A129-Y-65	1/2" C11A129-Y-85
C11A-10-98A	1/2" C11A129-Y-26	3" C11A129-Y-26	3" C11A129-Y-26	3" C11A129-Y-44	3" C11A129-Y-66	3" C11A129-Y-66	1/2" C11A129-Y-86
C11A-10-98B	1/2" C11A129-Y-27	3" C11A129-Y-27	3" C11A129-Y-27	3" C11A129-Y-45	3" C11A129-Y-67	3" C11A129-Y-67	1/2" C11A129-Y-87
C11A-10-114	1/2" C11A129-Y-28	3" C11A129-Y-28	3" C11A129-Y-28	3" C11A129-Y-46	3" C11A129-Y-68	3" C11A129-Y-68	1/2" C11A129-Y-88
C11A-10-118	1/2" C11A129-Y-29	3" C11A129-Y-29	3" C11A129-Y-29	3" C11A129-Y-47	3" C11A129-Y-69	3" C11A129-Y-69	1/2" C11A129-Y-89
C11A-10-126	1/2" C11A129-Y-30	3" C11A129-Y-30	3" C11A129-Y-30	3" C11A129-Y-48	3" C11A129-Y-70 *	3" C11A129-Y-70 *	1/2" C11A129-Y-90
C11A-10-128	1/2" C11A129-Y-31	3" C11A129-Y-31	3" C11A129-Y-31	3" C11A129-Y-49	3" C11A129-Y-71	3" C11A129-Y-71	1/2" C11A129-Y-91
C11A-10-134	1/2" C11A129-Y-32	3" C11A129-Y-32	3" C11A129-Y-32	3" C11A129-Y-50	3" C11A129-Y-72	3" C11A129-Y-72	1/2" C11A129-Y-92
C11A-10-138	1/2" C11A129-Y-33	3" C11A129-Y-33	3" C11A129-Y-33	3" C11A129-Y-51	3" C11A129-Y-73	3" C11A129-Y-73	1/2" C11A129-Y-93
C11A-10-144	1/2" C11A129-Y-34	3" C11A129-Y-34	3" C11A129-Y-34	3" C11A129-Y-52	3" C11A129-Y-74	3" C11A129-Y-74	1/2" C11A129-Y-94
C11A-10-148	1/2" C11A129-Y-35	3" C11A129-Y-35	3" C11A129-Y-35	3" C11A129-Y-53	3" C11A129-Y-75	3" C11A129-Y-75	1/2" C11A129-Y-95
C11A-10-154	1/2" C11A129-Y-36	3" C11A129-Y-36	3" C11A129-Y-36	3" C11A129-Y-54	3" C11A129-Y-76	3" C11A129-Y-76	1/2" C11A129-Y-96
C11A-10-158	1/2" C11A129-Y-37	3" C11A129-Y-37	3" C11A129-Y-37	3" C11A129-Y-55	3" C11A129-Y-77	3" C11A129-Y-77	1/2" C11A129-Y-97
C11A-10-168	1/2" C11A129-Y-38	3" C11A129-Y-38	3" C11A129-Y-38	3" C11A129-Y-56	3" C11A129-Y-78	3" C11A129-Y-78	1/2" C11A129-Y-98
C11A-10-170	1/2" C11A129-Y-39	3" C11A129-Y-39	3" C11A129-Y-39	3" C11A129-Y-57	3" C11A129-Y-79	3" C11A129-Y-79	1/2" C11A129-Y-99
C11A-10-178	1/2" C11A129-Y-40	3" C11A129-Y-40	3" C11A129-Y-40	3" C11A129-Y-58	3" C11A129-Y-80	3" C11A129-Y-80	1/2" C11A129-Y-100
C11A-10-188	1/2" C11A129-Y-41	3" C11A129-Y-41	3" C11A129-Y-41	3" C11A129-Y-59	3" C11A129-Y-81	3" C11A129-Y-81	1/2" C11A129-Y-101

DETAIL "A"

DETAIL "B"

DETAIL "C"

NOTE: FOR GENERAL NOTES AND LEGEND SEE DRAWING M556-1.

COMPRESSOR PACKAGE C11A-C-1A

COMPRESSOR PACKAGE C11A-C-1B

S1 APERTURE CARD

Also Available On Aperture Card

8903090017-03

FSAR FIG NO. 9.3-2B
FSAR FIG NO. 3.2-21B

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

APPROVED		
DESIGN		
CHECKED		
DRAWN		

TITLE: FLOW DIAGRAM CONTAINMENT INSTRUMENT AIR SYSTEM

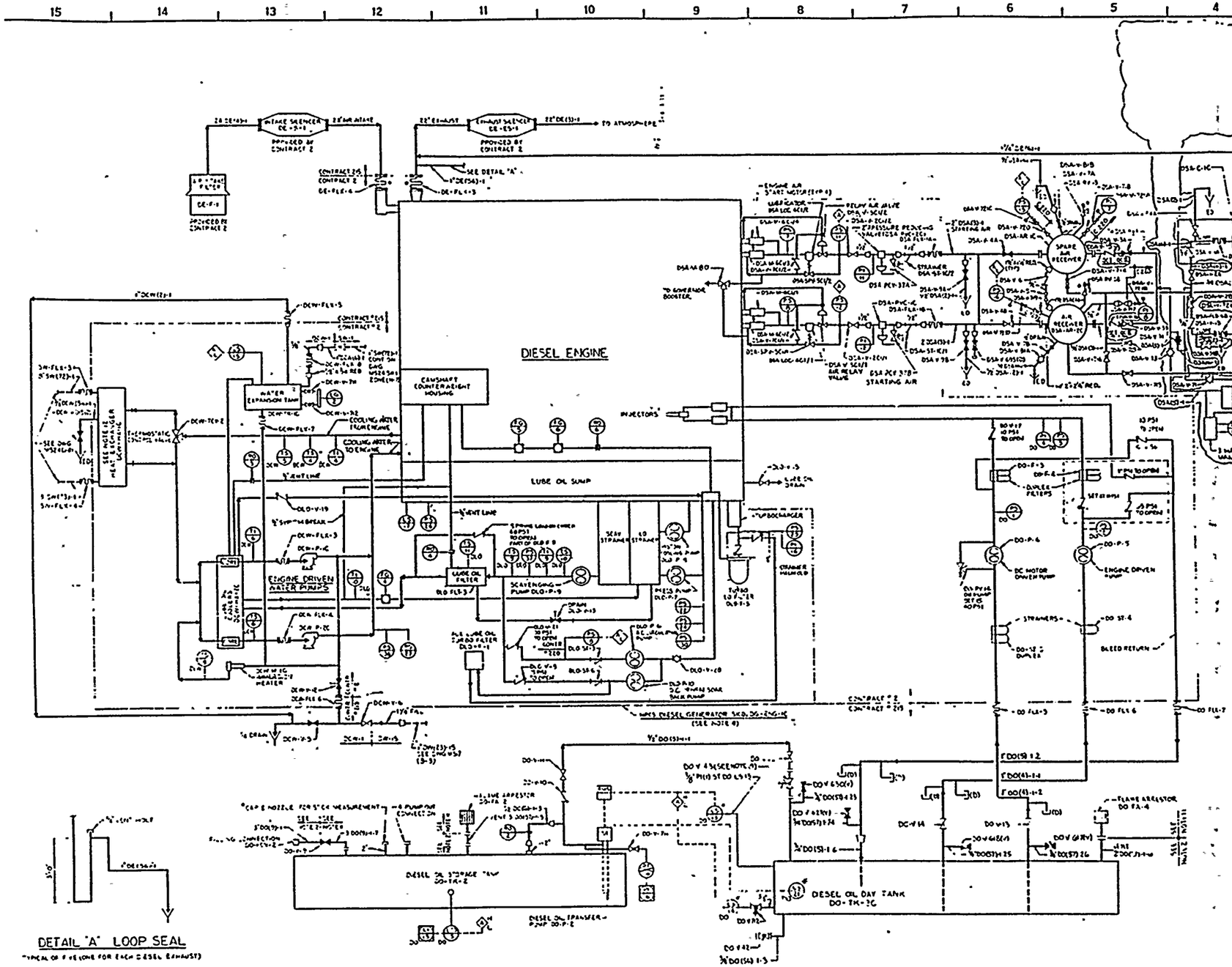
DRAWING # M556

SCALE: 3/4" REV. 0 SHEET 2 OF 2

WNP 2

NRC TOP TIER

AMENDMENT NO. 39
August 1988



NOTES:

1. ALL DSA, DCW & DE PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 2S EXCEPT AS NOTED IN NOTES ARE CLASSIFIED:
   QUALITY CLASS I
   CODE CLASS 3
   SEISMIC CATEGORY I
2. ALL DIESEL OIL (DO) PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 2S EXCEPT AS NOTED IN NOTES J & K ARE CLASSIFIED:
   QUALITY CLASS I
   CODE CLASS 3
   SEISMIC CATEGORY I
3. ALL PIPING VALVES AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 2S EXCEPT WHERE CONTRACT INTERFACES ARE DENOTED BY:
   CONTRACT "2S" / CONTRACT "3" ERN "33"
4. ALL PIPING AND FITTINGS (CPP-1XX AND DE-P2-1XX) ARE SUPPLIED BY CONTRACT "2S" AND SUPPORTED AND ERECTED BY CONTRACT "2S".
5. PIPING AND EQUIPMENT FOR DIESEL GENERATOR DE-EG-1B IS IDENTICAL TO THAT SHOWN FOR DIESEL GENERATOR, DE-EG-1A.
6. EQUIPMENT TAG NUMBER WITH SUFFIX A1 REFERS TO NO 1 ENGINE OF DIESEL GENERATOR DE-EG-1A. SUFFIX A2 REFERS TO NO 2 ENGINE OF DIESEL GENERATOR DE-EG-1A. SUFFIX B1 REFERS TO NO 1 ENGINE OF DIESEL GENERATOR DE-EG-1B AND SUFFIX B2 REFERS TO NO 2 ENGINE OF DIESEL GENERATOR DE-EG-1B.
7. ALL ITEMS MARKED (#) ARE FURNISHED WITH ASSOCIATED EQUIPMENT.
8. ALL PIPING COMPONENTS AND INSTRUMENTATION SHOWN WITHIN THE CONFINES OF THE (#) PACKAGE ARE SUPPLIED AND INSTALLED BY (#). ALL INSTRUMENT LINES FROM THE ENGINES TO THE CONTRACT "3S" SUPPLIED GAGE PANELS SHALL BE:
   QUALITY CLASS I
   CODE GROUP B
   SEISMIC CATEGORY I
9. DIESEL OIL STORAGE AND DAY TANK VENTS TO BE PIPED OUTSIDE OF BUILDING.
10. ALL DIESEL OIL (DO) PIPING DOWNSTREAM OF THE LAST SOLENOID VALVE OPEN TO THE ATMOSPHERE INCLUDED IN CONTRACT "2S" IS SUPPLIED:
    QUALITY CLASS I
    CODE GROUP B
    SEISMIC CLASS I
11. ALL DIESEL OIL (DO) PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT "2S" AND REFERRED TO BY THIS NOTE ARE CLASSIFIED:
    QUALITY CLASS III
    CODE GROUP D
    SEISMIC CLASS III
12. DCW-V-1C IS GLOBE, SUPPLIED EQUIPMENT AND IN ACCORDANCE WITH THEIR CONTRACT "2S" WITH "ARTICLE 2, DIVISION 1 OF ASME B & PV CODE, SECTION III, 1980 EDITION WITH ADDENDA THROUGH WINTER 1980 ADDENDA".
13. ALL DSA PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT "2S" REFERRED TO BY THIS NOTE ARE CLASSIFIED:
    QUALITY CLASS II
    CODE GROUP C
    SEISMIC CLASS II
14. CODE BREAK DEFINITION FOR THIS VALVE IS THE FLANGE CONNECTION FOR INSTALLATION OF THE ORIFICE PLATE.
15. ALL ITEMS REFERRING TO THIS NOTE ARE INSTALLED AT THE RESPECTIVE DIESEL ENGINE MANIFOLD.
16. DELETED.
17. DSA PIPING & EQUIPMENT DOWNSTREAM OF DSA-V-1A, 1B ARE CLASSIFIED:
    QUALITY CLASS III
    CODE GROUP D
    SEISMIC CLASS III
18. THE DIESEL OIL SYSTEM FOR DG-EG-1A & 1B IS A DUPLICATE OF STEAM & STEAM/ENGINE VENDOR DRAWING NO. [illegible] AS MODIFIED BY POWER SYSTEMS DRAWING P-SIP-91006 SHEETS 1 & 2 REV. [illegible] AND SPEC. [illegible] FOR [illegible] PROJECT (PPSP).
19. VALVE DO-V-1B IS A NO-CHECK INTERNAL INTEGRAL PART. SEE [illegible]

LEGEND:

1. ALL VALVES SUFFIXED WITH A(1) ARE AS A 3/4 VENT VALVE.
2. ALL VALVES SUFFIXED WITH A(2) ARE A 3/4 DRAIN VALVE.

FSAR FIG NO.
3.2-22A(C)

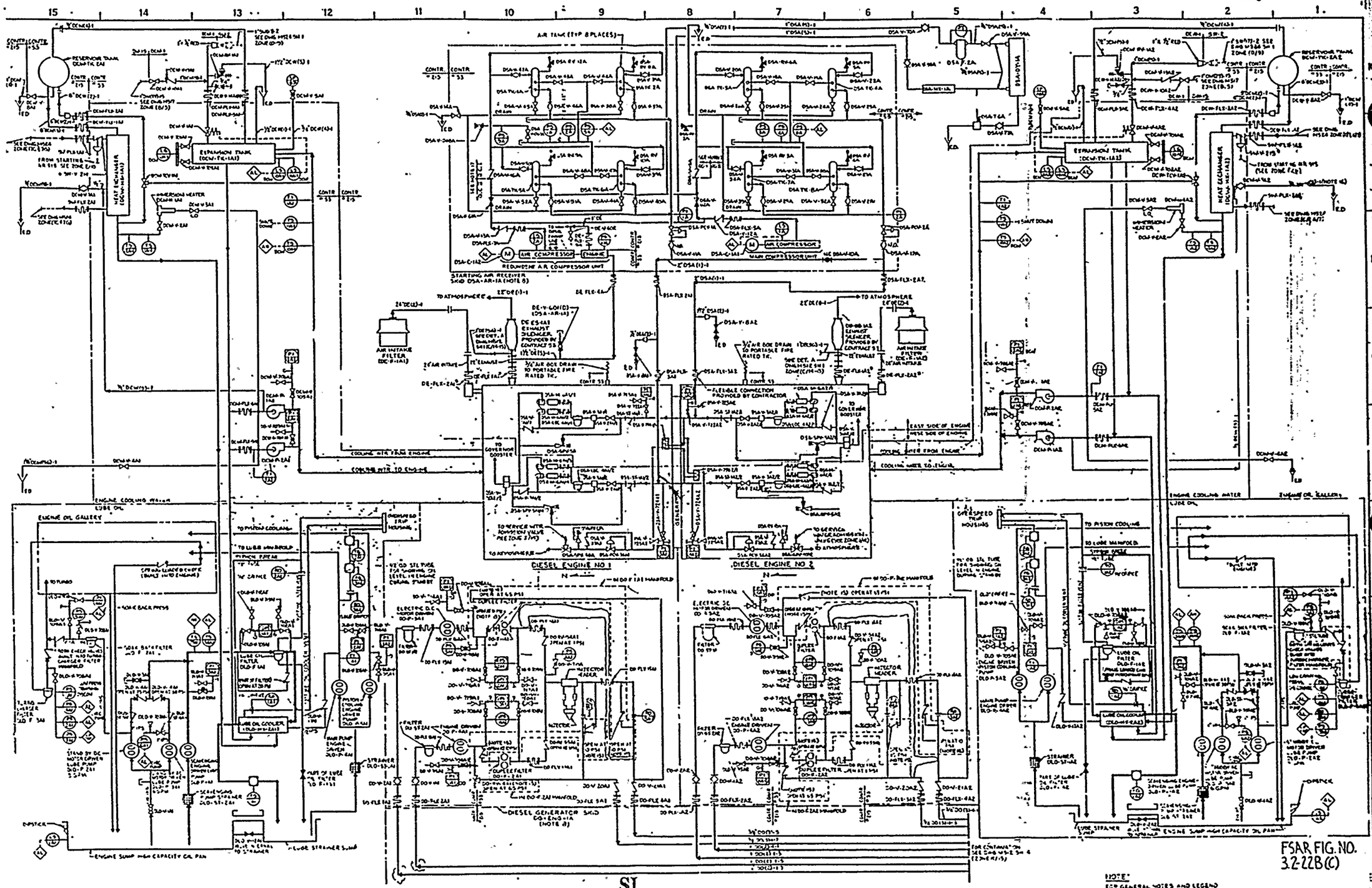
8903090017-04

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS

Figure

DRAW NO. M512-1 | SHEET 1 OF 4 | 4-3



FSAR FIG. NO.
3.2-22B(C)

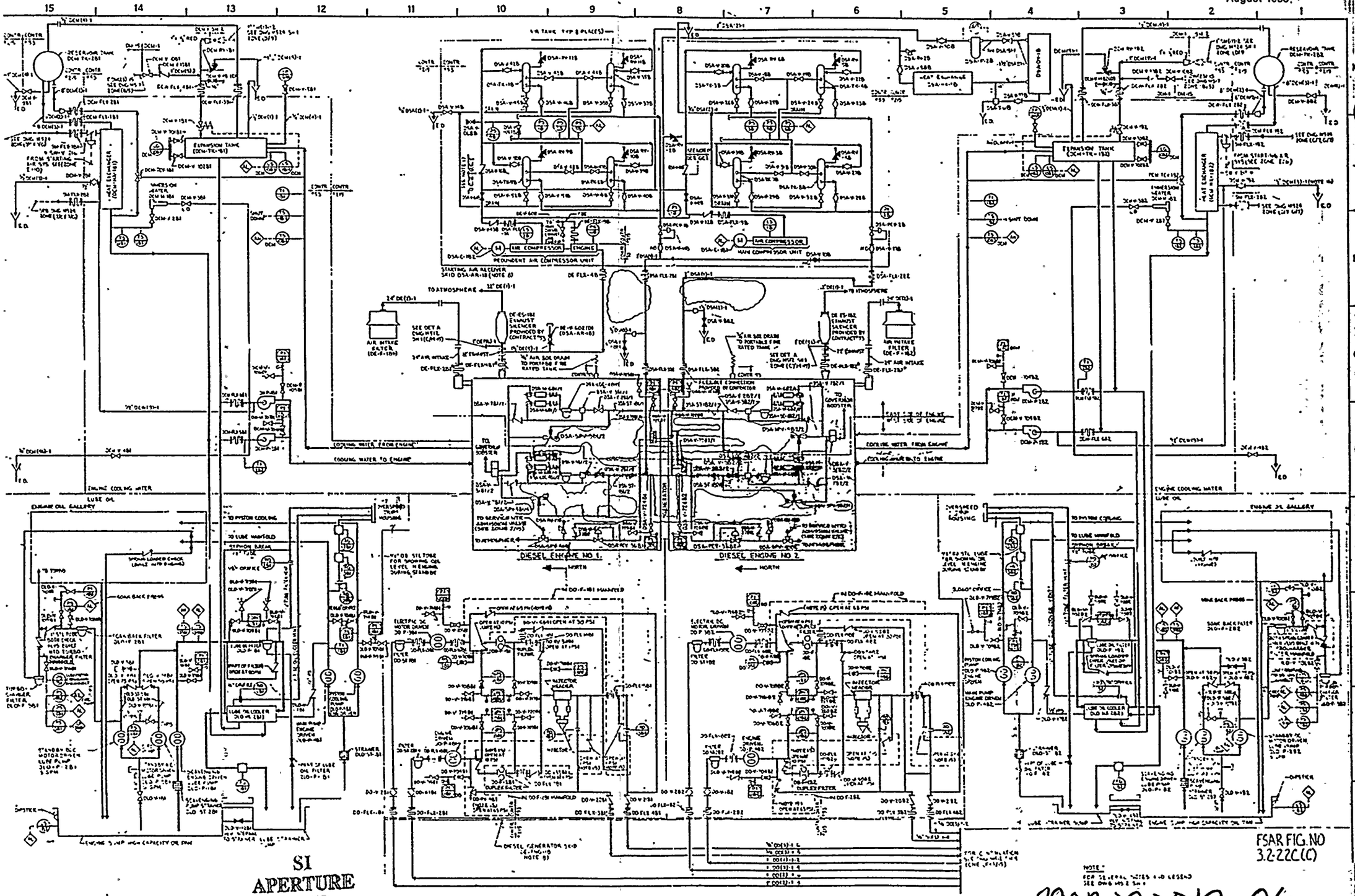
NOTE:
FOR GENERAL NOTES AND LEGEND SEE DWG M5E SH 1

8903090017-05

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS

DRAW NO. M512-2 | SHEET 2 OF 4 | .. Figure 4-3 (con't)



FSAR FIG. NO
3.2-22C(C)

8903090017-06

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
NUCLEAR PLANT 2

DIESEL OIL AND MISCELLANEOUS SYSTEMS

Figure

DRAW NO. M512-3	SHEET 3 OF 4	4-3 (con't)