INSTRUMENT AIR SYSTEMS REVIEW

RESPONSE TO GENERIC LETTER 88-14

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for

Washington Public Power Supply System

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1 REPORT SUMMARY

1. INTRODUCTION

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 plant instrument air systems failures on safety-related equipment. Pursuant to two previous responses submitted to the NRC, dated February 24, 1989 and April 28, 1989, this report provides the Supply System's final summary of collected review data and findings with further action identified where applicable. Implementation plan and subsequent notification of completed action will be handled by separate correspondence.

1.1 Summary of Study Activities

This summary briefly describes the scope of work required by GL 88-14 and includes a short compilation of the work performed and conclusions reached by the Supply System. In addition, it provides an overall assessment of the program to maintain adequate instrument air quality at WNP-2. A detailed description of the work is provided in the succeeding sections.

The air systems that were included in this evaluation are the Control Air System (CAS), Containment Instrument Air (CIA) System and each of the Emergency Diesel Generator Starting Air (DSA) Systems. A description of each of these systems and their performance criteria are presented in Section 4.

The safety-related air actuators in the plant were identified. The manufacturers of these actuators and the other in-line components (e.g., pilot operators) were consulted in order to determine the component's minimum air quality requirements. These requirements were compared against the system design and performance criteria. (Where in-line filters exist upstream of the air actuators, manufacturers were contacted to determine performance.) A discussion of this review is provided in Section 5.1 and detailed data is listed in Appendixes 1, 2 and 3.

Instrument air quality test criteria were developed from the survey of manufacturers' requirements for minimum air quality, and tests were conducted as discussed in Section 6. Results are provided in Section 7.

The normal operating position, fail-safe position and fail-safe function of the safety-related air actuators in the plant were identified. The fail-safe position of each of these actuators was evaluated to assure that the specified and as-built fail-safe positions reflect the design intent. Additionally, the valves were verified to close to their fail-safe positions following loss of supply air. This is discussed further in Section 5.1.1.

The safety-related instrument air accumulators were identified and evaluated to determine their safety function. In addition, the accumulators were confirmed to be sized for their intended design function. The accumulator check valve design was reviewed and the maximum allowable leak rate was determined. A detailed discussion of the accumulator evaluation is presented in Section 5.2.

Criteria for evaluating the plant operating (normal and abnormal), maintenance and testing procedures as well as plant personnel training plans, were developed. These criteria are presented in Section 8.1. The plant operating, maintenance and testing procedures and training plans were identified and evaluated to the extent possible in accordance with this criteria. A complete list of the procedures that were reviewed is shown in Table 8-3. The results of this review along with changes considered for existing procedures and practices are presented in Sections 8.2 through 8.4.

NUREG-1275, Vol. 2 (AEOD/C701) "Operating Experience Feedback Report - Air System Problems" has been reviewed for applicability to WNP-2. The details of this review are discussed in Section 9 as well as in a separate report in the Supply System's possession.

Finally, further changes to be considered in the plant procedures and modifications to the air systems design resulting from the review discussed above, have been developed and are presented in Section 10.

In summary, an exhaustive review was conducted of the design, operation and maintenance of the instrument air systems at WNP-2. The review examined the design to verify that system equipment was specified, procured and installed to supply air quality that conformed to applicable codes and standards, and that satisfied the minimum requirements of the safety-related instrument air users. Additionally, operating and maintenance practices were reviewed to verify that they are directed to accomplish the same objectives through the use of adequate procedures and training. It was found that, with a few exceptions, these goals are met at WNP-2. Safety-related design objectives are satisfied according to FSAR commitments. The review efforts conducted in preparation for the generic letter response identified items requiring further evaluation. These items are further discussed in Section 10. The findings are summarized below.

1.2 Summary of Findings

The following summarizes the findings of the air systems review as well as identifies the issues that require further study.

- o The design supply air quality met the requirement of all user components except for:

  a) Control Rod Drive (CRD) system valves: Replacing the existing 10-micron filter element with a 5-micron element will be considered further. The vendor recommendation is currently considered conservative and the existing design should be adequate.

  b) Floor Drain Radioactive (FDR)/Equipment Drain Radioactive (EDR) containment isolation valves: The current 40-micron filters are not quite compatible with the maximum allowable valve operator particle size of 35 microns. However, it is considered a relatively insignificant deficiency which does not warrant immediate corrective action. Filter changes will be considered further as the FDR valves and operators will soon be replaced for other reasons.

- The actual supply air quality, as established by testing, indicated the followings:

  a) Particles greater than 50 microns were found in the supply air. Where in-line filters do not exist, this exceeds maximum particle size allowed by the air users. However, the larger sizes were in extremely small concentrations (less than three particles per sample). A subsequent large sample (72 cubic feet) taken in the CAS supply header did not identify any particles greater than 50 microns and only one particle in the 25 to 50 micron range. Therefore, even though there may be particles present greater than the maximum allowed by the air users, their concentrations are believed to be too low to jeopardize the safe operation and shutdown capability of the plant. Maximum allowable particle sizes will be re-evaluated with the suppliers in an effort to reduce conservatism and raise limits. If required, the addition of in-line filters will be pursued further.

  b) The dewpoint in the DSA system was measured during the recent refueling outage and found to be slightly higher than required by the criteria. However, the value was still below ambient temperature at operating pressure. The high values were attributed to the fact that the starting air accumulators were filled at reduced pressures (atmospheric). The applicable operating procedure has been revised to eliminate this deficiency and the air in the system has subsequently been dried out. Dewpoint measurements during plant operation revealed values that satisfied the criteria.

  c) No hydrocarbons were detected in any of the air systems.

  The Supply System is continuing to evaluate the air quality test results to establish corrective actions.

- All safety-related air operated valves were verified to have been designed with a failure position that would promote safe operation and shutdown of the plant. Moreover, the design failure positions were verified through testing, either prior to the original plant startup or during a recent special testing effort.

- All safety-related air accumulators (or storage bottles) were found to be properly sized. Associated piping and valves were found to be periodically tested as required to ensure adequate leak tightness.

- o A review of the operating, maintenance and testing procedures revealed a need to consider the following revisions:

  a) A procedure to periodically establish air quality at various locations in the systems was developed and is now in effect. Minor changes will be made to this procedure based on experiences gained during initial testing.

  b) Abnormal Condition Procedures will be revised to include a description on how to locate, detect and isolate branch line failures.

- o A review of the personnel training plans revealed that these plans are continuously updated to include the latest revisions of applicable operating procedures as well as the latest documentation on related industry events and concerns. No additional changes are deemed necessary to satisfy the Generic Letter requirements.

- o The systems design review, conducted both as a general review and as a review of the events discussed in NUREG-1275, identified design modifications that will be considered further to enhance the quality of the instrument and control air at WNP-2. The following design modifications are included:

  a) A second air dryer to be added in parallel with the existing CAS dryer.

  b) A blowdown device to be added upstream of the automatic dryer bypass.

  c) In-line air filters to be added in the air supplies to the MSIVs and the MSRVs.

  d) In-line oilers to be added for certain air operators per vendor recommendations.

All of the above findings were classified as either failures to meet established criteria or items that would enhance supply air quality at WNP-2. Although all the findings will initiate revisions/modifications of the current design and operating/maintenance practices, there were no findings identified that would jeopardize continued safe operation or the capability to safely shut down the plant. While some of the findings involve action currently underway, many of the findings will result in further evaluation prior to establishing final resolution. The plan of action and resolution of these findings will be subjects of separate correspondence with the NRC.

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 that emphasizes 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 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 implications 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 2 "Operating Experience Feedback Report - Air System Problems." In addition, the Supplement requested recipients to review NUREG-1275, Volume 2 for applicability and to 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 2 (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 plant instrument air systems failures 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. Verification 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 for all design-basis events, including 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 generic letter requests the licensee to:

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.

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 has undertaken the following actions to verify that the design, construction and maintenance of the instrument air systems at WNP-2 are in accordance with the recommendations presented therein:

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

2. The manufacturers of the components tabulated above have been consulted to determine the required instrument air quality for the supplied components.

3. The failure position of each of the air users tabulated above has been determined from the applicable system documentation.

   The information described in Items 1, 2 and 3 above is tabulated in Appendix 1 and discussed in Section 5.1.1.

4. The solenoid valves and other safety-related in-line components associated with each safety-related actuator, along with their manufacturers and model numbers, have been identified. The manufacturers of these components have been consulted to determine the filter/regulator performance characteristics.

   This information is tabulated in Appendix 2 and discussed in Section 5.1.2.

5. The filter/regulators associated with each safety-related actuator, along with their manufacturers and model numbers, have been identified. The manufacturers have been consulted to determine the filter/regulators' performance characteristics.

   This information is tabulated in Appendix 3 and discussed in Section 5.1.3.

6. 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 accumulator size and the sizing design basis (e.g., sizing calculation, General Electric documentation).

   c. The associated check valve equipment number, size, type and manufacturer.

   This information is tabulated in Appendix 4 and discussed in Section 5.2.

7. 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 (DSA) Systems

   The plant service air system does not serve any safety-related equipment. Therefore, it is not included in this evaluation. Detailed descriptions of the three air systems identified above and their design specifications are provided in Section 4 and Tables 4-1, 4-2 and 4-3.

8. A procedure has been 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 have been performed by taking air samples at key points in each system. Testing will be performed on a quarterly basis on all instrument air systems.

9. The operation of all safety-related actuators has been verified to ensure that they move to their fail-safe positions upon a loss of instrument air. This verification was completed by:

   a. Reviewing the preoperational test reports to assure that each applicable valve actuator was subjected to a loss of air test during startup and that the valve failed to the intended position as verified in Appendix 1.

   b. Testing those valves whose fail-safe position could not be confirmed from available startup records.

   c. Reviewing all system design changes implemented since startup to establish the impact of the changes on the failure position of the applicable valves.

   Section 5.1.1 identifies the valves that were tested, and discusses the results of the tests, to verify the as-built fail-safe positions.

10. The plant operating and maintenance procedures as well as the training program plan have been reviewed to assure that they are responsive to the design and installation characteristics of each of the instrument air systems. The results of this review, along with a number of items identified for further consideration, are presented in Section 8.

11. The events described in NUREG-1275, Vol. 2 have been evaluated to determine the potential for the occurrence of the same type of event at WNP-2. For those events which have the potential to occur, changes to plant operating and maintenance procedures, as well as to the system design to improve system reliability and overall supply air quality, were identified. A summary of this evaluation is included in Section 9. The resulting findings are included in Section 10.

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 the appropriate flowrates and pressures to the different air users in the plant. The systems consist of two distribution systems and common air compressors, air dryers, filters and receivers. This description centers on the Control Air System, which supplies safety-related components, 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: (1) to dampen the pulsation inherent in reciprocating compressors and (2) 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, compressors 1A and 1B and their associated cooling water system can be powered from the emergency diesel generators. Compressor 1C cannot 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, a 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 (75 psig) downstream of the dryer towers, bypass valve CAS-PCV-1 automatically opens, 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 CAS and SA system components 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 primarily 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, thereby assuring proper valve operation.

4.2 Containment Instrument Air Systems

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. 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 (non-safety related).

In the event the cryogenic nitrogen supply 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 supplies the other four ADS accumulators. These backup cylinders automatically provide a 30-day supply of nitrogen for the 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 the cryogenic nitrogen supply 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 afterfilters and an air receiver.

The design criteria for the CIA system components described above are 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 inside 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 I.

4.3 Emergency Diesel Starting Air Systems

The standby power system at WNP-2 consists of three engine/generator sets, labeled division 1, 2 and 3. The division 1 and 2 engine/generator sets each consist of two diesel engines driving a common generator. The division 3 engine/generator set, serving the High Pressure Core Spray (HPCS) system, consists of a single diesel engine driving a generator.

Each engine/generator set is equipped with an independent 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 three engine start attempts, assuming a single failure in one starting air train.

The division 1 and 2 starting air systems consist of two redundant reciprocating compressors which draw air from within the diesel generator room. The compressors are motor driven, with one having a diesel engine backup. The compressors discharge into a common header. The compressed air then passes through an air cooled aftercooler, a deliquescent air dryer and a dryer afterfilter. 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 start attempts. Each bank of receivers serves two of the four air start motors on each engine.

The division 3 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 driven by a diesel engine. The compressors discharge into a common header. The compressed air then passes through an air cooled aftercooler, a deliquescent air dryer and a dryer afterfilter. The dry filtered air is then distributed through a single air header to two air receivers. One is a backup to the other. Each air receiver has sufficient storage capacity for a minimum of three diesel engine start attempts. The receiver serves all four diesel engine air start motors.

In addition to providing dry filtered air to the engine starting air motors, the starting air systems also provide air to the governor boosters. The governor boosters act to boost the hydraulic pressure for the governors as the engines start, to assure proper speed control. In addition to the governor boosters, the division 1 and 2 starting air systems also provide air to two,

service water supply isolation valves in the Standby Service Water System which, upon a start signal, open to admit water to the cooling water heat exchangers.

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

4.4 System Flow Diagrams

System flow diagrams for the Control and Service Air Systems, the Containment Instrument Air System and the Emergency Diesel Starting Air Systems are presented in Figures 4-1, 4-2 and 4-3, respectively. These figures are intended to be illustrative of the system configuration. Although the figures are the latest revisions of the controlled drawings for these systems, they may not necessarily reflect all the recent design changes mentioned in this report.

5 DESIGN REVIEW

5.1 Air Operated, Safety-Related Valves, Filter-Regulators and Solenoid Valves

5.1.1 Safety-Related Air Operated Valve Database

Appendix 1, Safety-Related Air Operated 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 of each of the safety-related actuators, identify the fail-safe position of the actuators, to verify that the failure positions are consistent with the original design intent, and to verify, through tests if necessary, that the valves (and actuators) do move to their intended failure positions.

2. To determine the air quality requirements (i.e., particulate, moisture and hydrocarbons requirements) 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 component's location on the applicable flow diagram.

4. The actuator's 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 requirements) in accordance with the manufacturers' recommendations.

6. The supplier identification (Supply System code) 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 have been designed to fail to a position that promotes safe plant operation and shutdown. The as-built failure positions were verified for all valves. This verification was completed by:

   a. Reviewing the preoperational test reports to assure that during startup each applicable valve actuator was subjected to a loss of air test and that the valve failed to the intended position. Test records were located and reviewed for all but the following valves:

Air Operated Valve Number	Fail-Safe Position
02-CRD-V-126 (Typical of 185)	Open (NE)
02-CRD-V-127 (Typical of 185)	Open (NE)
02-SGT-V-F16	Closed (ND)
02-SGT-V-F26	Closed (ND)
02-SGT-V-F36	Closed (ND)
02-SGT-V-F46	Closed (ND)
02-SGT-V-F56	Closed (ND)
02-SGT-V-F66	Closed (ND)
02-MS-RV-2B	Closed (ND)
02-MS-RV-3A	Closed (ND)

   Both the CRD and MS valves are frequently operated and are considered adequately tested for the purpose required here. The remaining six valves were tested, and their failure positions were verified. The balance of the valves in our review have records indicating that the valves will fail to their intended fail-safe position on loss of air.

   b. Reviewing the system design changes implemented since startup to establish the impact on the failure position of the applicable valves. To date, there have not been any design changes which impact the current fail-safe positions.

2. The air quality requirements for all of the plant safety-related air actuators were determined based on manufacturers' literature and conversations with manufacturers' representatives.

3. All the air actuators requiring upstream filtering devices were found to have one. The existing filter performance was generally found to satisfy the actuator requirements. Exceptions are identified in Section 5.1.3.

4 The air quality test requirements discussed in Section 6, were developed on the basis of the requirements compiled in Appendix 1. As described below, some actuators have more stringent air quality requirements than those defined by the test acceptance criteria. In those instances, air supply piping to the actuators was verified to contain an in-line filter.

5. Several air quality test locations were identified based on the requirements of the actuators and their intended safety function. Specific test locations were selected according to accessibility considerations. This is further discussed in Section 6.

5.1.2 Safety-Relaed Air User Solenoid Valve and In-Line Component Database

Appendix 2, the Safety-Related Air User Solenoid Valve and In-Line Component Database, is a database of all the air system pilot valves and other in-line components associated with the safety-related actuators and end users compiled in Appendix 1. This database was compiled as a tool to accomplish the following tasks:

1. To identify the air system solenoid valves and in-line components associated with each safety-related end user.

2. To determine the air quality requirements (i.e., particulate, moisture and hydrocarbons requirements) of the components identified above.

3. To determine which of the solenoid valves and in-line components require upstream filters to assure reliable operation.

To this end, the Appendix 2 database includes the following information:

1. The solenoid valve or component numbers.

2. A brief description of the associated air actuator or other end user.

3. The applicable process flow diagram number and component location.

4. The applicable component supplier code number. (Note 8 in the back of the appendix identifies the vendor associated with each number.)

5. The air quality requirements (i.e., particulate, moisture and hydrocarbon requirements) for each component. The air quality requirements were based on manufacturers' literature and conversations with manufacturers' representatives.

6. References to supporting documentation (CVI Nos.).

From the information gathered in the process of developing this database it was concluded that all of the associated pilot valves and in-line components have air quality requirements that are within the limits for the systems. Any need for upstream filtering devices were generally found to be satisfied with the exceptions described in Section 5.1.3.

5.1.3 Safety-Related Air User Filter/Regulator Database

Appendix 3, Safety-Related Air Users Filter/Regulator Database, is also a database of the safety-related actuators and other air users, along with a description of the associated in-line filters. This database was developed to accomplish the following:

1. To identify the actuators that 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 characteristics 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 efficiency than the ones currently installed.

Like the database presented in Appendix 1, the database presented in Appendix 3 includes the component identification number, a brief description of the component and its intended function, the component's location on the applicable flow diagram and the actuator air quality requirements (i.e., particulate size, humidity and hydrocarbon requirements) in accordance with the manufacturers' recommendations. In addition to these items, this database includes the filter/regulator manufacturer 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 conclusions identified below 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 the actuators with more stringent air quality requirements 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 actuator's maximum allowable particulate size is 40 microns or greater).

2. All the actuators that require filtered instrument air have filter/regulators installed in their instrument air supply piping.

3. The in-line filter/regulators currently installed in the air supply to the following actuators remove particles 40 microns and larger. According to the supplier's data, the actuators require air with a maximum particulate size of 35 microns.

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

The FDR valve operators identified above and the respective valves are currently scheduled to be replaced within the next two years. This modification is being made in response to concerns associated with the leakage characteristics of the existing containment isolation valves. When the new operators are installed, the necessary system design modifications will be made to assure that the air quality requirements of the actuators and the performance characteristics of the filter/regulators are consistent. WNP-2 is currently evaluating the EDR maximum allowable particulate size.

4. The Control Rod Drive System valves have a common filter, CRD-F-6, rated for 10 microns. General Electric technical document GEK-71317A requires that the common filter be rated for 5 microns. Replacing the existing filter will be considered further.

5.2 Accumulators

This section describes the design requirements and the function of the safety-related air receivers, accumulators and bottles and the associated check valves that are used in the WNP-2 design. The individual vessels and associated design data are compiled in Appendix 4, Safety-Related Accumulators. Sections 5.2.1 through 5.2.10 describe the safety function of the components listed in Appendix 4.

The database in Appendix 4 includes the following:

1. The component identification number and description.

2. The applicable flow diagram and its location on that flow diagram.

3. The component size and reference to the documentation that justifies the sizing.

4. The component identification number and the size of the check valve associated with a particular accumulator, receiver or backup bottle.

5. The type of check valve and the purchase order under which it was purchased.

6. The allowable check valve leak rate.

From the information gathered in the process of developing this database it was concluded that all the safety-related accumulators, receivers and backup bottles are adequately sized in accordance with the design intent reflected in the supporting documentation. The check valves associated with the safety-related accumulators are all equipped with soft seats. In addition, the valves are spring return to assure near leak tight closing, even under a gradual loss of control air pressure. The leak rates are all acceptable in accordance with the design documentation.

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, any subsequent leakage through the check valves is of little concern.

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 set point to minimize the number of challenges involving the MSRV's 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 affect the valve's spring-loaded mode of operation. The valves will still pop open when the valve inlet pressure force exceeds the spring force.

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. These MSRVs are used 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 at 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 existence of 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 located in the reactor building railroad lock. 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 valve.

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 System Calculation 5.46.05 and summarized in FSAR Section 9.3.1. Periodic leak rate tests are performed on each bank to confirm that Quality Class 1 air supply piping and inter-system valve leakage does not exceed the leak rate assumed in the design calculations.

5.2.5 Remote Nitrogen Bottle Station

The extended-term gas demands of the ADS valves are provided by two remote nitrogen cylinder connections located in the diesel generator building corridor, outside the secondary containment building. 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 the Quality Class 1 portions of air supply piping and inter-system valves 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. The preferred failure direction of the isolation valves is closed, and accumulator pressure is not used by the actuators to close the valves.

5.2.7 Containment Vacuum Breaker Accumulator

This accumulator allows the containment vacuum breaker valves to open and close without excessive pressure fluctuation in the branch piping. Burns and Roe Calculation 7.10.01, dated February 25, 1976 states that the accumulator was necessary because the flow rate upon valve actuation was too great for the gas system to handle.

The accumulator was sized on the basis of maintaining a minimum supply pressure of 70 psig immediately after valve operation, assuming an initial system pressure of 75 psig. The safety-related functions of this accumulator

are to maintain sufficient pressure in the distribution header, and thus ensure proper operation of the vacuum breaker valves and to serve as a reliable extension of the Quality Class I air supply system.

5.2.8 Containment Vacuum Breaker Bottle Station

The reactor building-to-wetwell vacuum relief valves must open to prevent excessive vacuum from developing in the primary containment vessel as a result of inadvertent containment spray actuation. They must also close to effect isolation of the containment. The valves are equipped with a spring-to-open, air-to-close actuator. In the event the normal CAS supply is lost a spring-loaded soft seat check valve closes and 10 remote nitrogen bottles automatically supply 85-psig (regulator setpoint) pressure to maintain the vacuum breakers operable. The 10 bottles at the bottle station are sized to allow three cycles of valve operation for containment vacuum protection and hold the valves shut for 15 days to effect long-term isolation of the containment.

The adequacy of the bottle station design is documented in Supply System Calculation NE-02-84-12, Revision 2, dated March 12, 1986. Periodic tests are performed to verify that the Quality Class 1 air supply piping and inter-system check valve leakage does not exceed the design leak rate assumed in the calculation.

5.2.9 High Pressure Core Spray (HPCS) Diesel Generator Starting Air Receivers

As described in Section 4.3, the starting air system for the HPCS diesel generator (Division 3) includes two starting air receivers; one is a backup to the other. The motor driven compressor in the starting air system cycles on and off as required to maintain the receivers at the required pressure. A second diesel engine driven compressor (a separate small stand-alone diesel) is provided as a backup, should the motor driven compressor fail. Although these compressors do provide a high degree of reliability, they are not safety-related, and cannot be counted on for starting the diesel generator during an emergency. Therefore, each of the receivers is sized to provide enough air for three diesel generator start attempts, per General Electric NEDO-10905 73NED47 Class 1, dated May of 1973. The number of possible start attempts, without compressor operation, has been verified by actual tests.

The air receivers are equipped with check valves with soft seats and spring return features to assure minimal leakage from the accumulator. Because check valve leakage would be detected by excessive compressor cycling, and automatic diesel generator initiation would follow the loss of both starting air compressors, leakage through the receiver check valves is of little concern.

The diesel engine, and therefore the starting air system, is inspected and tested on a regular basis.

5.2.10 Emergency Diesel Generator Starting Air Receivers

As described in Section 4.3, the starting air systems for the division 1 and 2 diesel generators each include two banks of starting air receivers. Each bank of receivers supplies air to one of the independent starting air headers. Each starting air system includes two compressors, one motor driven and the second motor driven with a diesel driver (a separate small stand-alone diesel) backup. These two compressors cycle on and off as required to maintain the receivers at the required pressure. Should power be lost to the compressor motors, the diesel driver starts as required to maintain receiver pressure. Although these compressors do provide a high degree of reliability, they are not safety-related and cannot be counted on for starting the diesel generators during an emergency. Therefore, each bank of receivers is sized to provide enough air for five diesel generator starting attempts, in accordance with regulatory requirements. The number of possible start attempts, without compressor operation, has been verified by actual tests.

The air receivers are equipped with check valves with soft seats and spring return features to assure minimal leakage from the accumulator. Because check valve leakage would be detected by excessive compressor cycling, and automatic diesel generator initiation would follow a loss of both starting air compressors, leakage through the receiver check valves is of little concern.

The diesel engine, and therefore the starting air system, is inspected and tested on a regular basis.

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 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 is based on the air quality requirements for each of the safety-related air actuators. These requirements are presented in the Safety-Related Air Operated Valve Database (Appendix 1). There are rare instances 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 were 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. Dew Point 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°F. The dewpoint limit is based on saturated conditions for 250 psig air at the minimum room temperature of 70°F.

3. <u>Hydrocarbon Contamination</u>

Hydrocarbons can be introduced into a compressed air stream at the compressor or from vapors in the intake air. All of the compressors installed in the WNP-2 air systems are oil free. Therefore, no hydrocarbons should be present in the compressed air piping. To verify this, the CAS air system was and will continue to 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 was tested at a number of key locations. These locations were selected to be close to the compressors, the air dryers and to important safety-related air users such as the ADS Valves, MSRVs and the MSIVs. Test locations were also selected on the basis of accessibility considerations.

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

7 RESULTS OF TESTING

Representative sample points were chosen for all of the instrument air systems. Three samples were taken from each system. Filter cartridges were microscopically analyzed by an independent laboratory for particulate size and total deposit and spectrographically analyzed for composition. Results indicated the presence of particles greater than 50 microns but with a less than measurable total deposit (0.5 mg) even on samples of several cubic feet. Although the presence of the larger particles is of concern, it is of sufficiently low concentration as not to jeopardize the safe plant operation and shutdown capability. A much larger sample (72 cubic feet) was subsequently taken of the CAS. The largest particle identified was no greater than 50 microns (one particle between 25 and 50 microns). A separate test with a laser particulate detector connected to a high pressure diffuser was conducted to allow samples to be taken at representative piping flow rates. This test indicated particulates greater than 40 microns but only in concentrations less than three per cubic foot. Forty micron particulates were present even after flushing the piping and when the supply was known to be less than 10 micron (from an upstream sample) indicating that the larger particles originate in the carbon steel supply headers. The contaminants were primarily barium, calcium, sulfur and silicon.

The testing also showed that the dewpoint in the DSA systems was slightly higher than desired during startup following the annual refueling outage. The value was still above saturation. This was attributed to charging the accumulators during the outage at zero backpressure. The deliquescent dryers were inspected and the operating procedure revised to institute a feed and bleed process to dry the starting air. Subsequent dewpoint readings met the criteria.

None of the systems had detectable levels of hydrocarbons.

Air quality tests will continue to be performed on a quarterly basis.

8 EVALUATION OF APPLICABLE PLANT PROCEDURES

The following is a summary of the plant procedures reviewed in response to Generic Letter 88-14. This summary includes the review criteria, a list of the procedures reviewed, items being considered for changes to the existing procedures and the possible addition of new procedures.

8.1 Evaluation Criteria

eVAThe WNP-2 Plant Procedures Manual is comprised of fourteen volumes. Each volume is divided into sections and each section contains individual procedures. Procedures from the following volumes of the Plant Procedures Manual have been reviewed for acceptability and completeness:

1. Volume 2 - System Operating Procedures
2. Volume 4 - Abnormal Condition Procedures (including the single page abnormal condition procedures)
3. Volume 7 - Surveillance Procedures
4. Volume 8 - Operating and Engineering Test Procedures
5. Volume 10 - Maintenance Programs and Procedures

A list of specific procedures that were reviewed is presented in Table 8-3. These procedures were reviewed in accordance with the criteria presented in Table 8-1 and Table 8-2.

8.2 Changes Being Considered for Reviewed Procedures

As a result of the procedures review, the changes discussed below will be considered further:

1. The Abnormal Condition Procedure will be revised to include a section that describes how to locate, detect and isolate branch line failures.
2. The Air Quality Test Procedure will be revised to require samples of at least one cubic foot for particulates.

The Surveillance Procedures were considered in the procedures review. However, they were not evaluated against the criteria of Table 8-2, because it was concluded that they pertain to matters that are outside the scope of Generic Letter 88-14.

8.3 Considerations for Additional Procedures

With the exception of the loss of control air procedure and the operating and engineering test procedures for leakage integrity verification of the Quality Class I portions of the CIA system and nitrogen system for the Containment Vacuum Breakers, the applicable plant guidance documents pertained to issues that were largely peripheral to the concerns of Generic Letter 88-14.

The concerns of Generic Letter 88-14 are adequately encompassed by the loss of control air procedure, the leakage integrity procedures and by the newly developed air quality test procedure.

8.4 Personnel Training Plans

Operations and plant maintenance personnel have recently been provided training on loss of instrument air. Additional training on the abnormal procedure "Control Air System Failure" has also been provided to licensed operators. It should be noted that a "Loss of Instrument Air" simulator scenario is included as part of the initial licensed operator training as well as regularly scheduled licensed operator requalification training on an annual basis, and will be covered again later this year. Currently the instrument air portions of the systems training curriculum are being updated to reflect the latest modifications to these systems.

Training on air system failures will continue to be provided on at least a biannual basis as part of the licensed operator requalification and equipment operator continuing training. The additional aspects covered by INPO's SOER 88-01 will be included in this continuing training, as well as in the initial training for operators and maintenance personnel.

As more detailed information becomes available relative to the WNP-2 specific plant response, and when procedures are modified, additional modifications to the WNP-2 simulator as well as to the applicable training plans, will be considered.

9 REVIEW OF NUREG 1275 "OPERATING EXPERIENCE FEEDBACK REPORT - AIR SYSTEM PROBLEMS" AND ITS IMPACT ON WNP-2

As part of the air systems evaluation, NUREG-1275, Vol. 2 "Operating Experience Feedback Report - Air System Problems" has been reviewed for applicability to WNP-2. This review is documented separately in a formal report to the Supply System (on file with the Supply System).

NUREG-1275 presents a number of events or failures which have occurred at different plants. The cause of these events or failures was traced to the plant air systems. The Supply System report evaluated each of the events or failures described in NUREG-1275 and determined whether the potential exists for the occurrence of the same type of event or failure at WNP-2. This review did not identify any unacceptable weaknesses in the WNP-2 design. For the most part, the report provided a different perspective on the same areas of concern identified in this GL 88-14 review. The recommendations resulting from this report are included among the items identified in Section 10.

10 AIR QUALITY IMPROVEMENT CONSIDERATIONS

As a result of the reviews and evaluation presented in the preceding sections, considerations to improve the quality of the instrument air systems were divided into three separate categories as follows:

Air Quality Testing

A program to periodically sample the instrument air systems was developed and initial samples were taken. A detailed discussion of the test results is provided in Section 7.

Air Systems Modifications

1. WNP-2 is considering the addition of a second dryer to be installed in parallel with the existing CAS dryer. This would allow a continuous supply of dry instrument air in the event of extended maintenance or repairs to the existing dual tower desiccant dryer.

2. A manual and/or automatic blowdown device to be installed on the upstream side of the automatic dryer bypass valve is being considered. This would eliminate any moisture buildup in the low point of the service air system.

3. The CAS supply header to the CRD hydraulic control units is equipped with an in-line filter (CRD-F-6) sized to remove all particles 10 microns and larger. General Electric document GEK-71317A requires a filter sized to remove particles 5 microns and larger. Replacing the existing in-line filter with a filter that meets the GE design requirements is being evaluated.

4. The installation of in-line air filters in the air supplies to the MSIVs and MSRVs is being considered.

5. Certain air cylinder manufacturers call for the use of in-line oilers to assure proper operation of their actuators. These requirements are identified in Appendix 1. However, there are no oilers installed in any of the WNP-2 air systems. To reduce wear and assure smooth actuator operation, the addition of oilers is being considered.

6. The in-line filter/regulators on the air supply to the following actuators remove particles 40 microns and larger. Currently, the actuators require air with a maximum particulate size of 35 microns.

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

The FDR valve operators identified above and the respective valves are currently scheduled to be replaced within the next two years. This modification is being made in response to concerns associated with the leakage characteristics of the existing containment isolation valves. When the new operators are installed, the necessary system design modifications will be made to assure that the air quality requirements of the actuators and the performance characteristics of the filter/regulators are consistent. WNP-2 is evaluating the EDR maximum allowable particulate size. The small deficiency in filter medium design should have negligible effect on short-term system operation.

Revisions to Plant Operating, Maintenance and Training Procedures

Potential revisions to the plant operating and maintenance procedures are presented in Section 8.

TABLE 4-1

CONTROL AIR AND SERVICE AIR
DESIGN DATA

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
	Horsepower	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	1 micron
	Removal Efficiency	98 %
	Afterfilter:	
	Equipment Numbers	CAS-F-3A CAS-F-3B
	Type	Removable Cartridge
	Filter Area	8 ft^2
	Removal Rate	10 microns
	Removal Efficiency	98 %
Dryers:		
	Equipment Numbers	CAS-DY-1A CAS-DY-1B
	Type	Regenerative Desiccant
	Design Flowrate	750 scfm
	Dew Point Rating	-40 degree F

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 Screw
Design Flowrate	620 scfm
Design Pressure	100 psig
Horsepower	125 hp
Receivers:	
Equipment Numbers	SA-AR-1
Volume	140 ft^3
Filters:	
Equipment Number	SA-F-1
First Stage:	
Type	Coalescing Filter/ Separator
Removal Rate	0.3 microns
Removal Efficency	99.9+ %
Second Stage:	
Type	Coalescing Filter
Removal Rate	0.01 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	
Tank Size	11,000 Gallons
Storage Capacity	1,000,000 SCF
Fluid	Liquid Nitrogen
Design Pressure	245 psig @ 150^{o}F
Purity	99.9+ Percent
Backup Storage Bottles:	
Equipment Numbers	CIA-TK-1A through 15A CIA-TK-1B through 19B
Storage Capacity	223 SCF
Fluid	Compressed Nitrogen
Purity	99.9+ Percent
Filters:	
Prefilters:	
Equipment Numbers	CIA-F-1A CIA-F-1B
Afterfilter:	
Equipment Numbers	CIA-F-2A CIA-F-2B
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	CIA-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-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-2C
Type:	Two Stage Reciprocating Motor/Engine Driven
Design Flowrate	42 acfm
Design Pressure	250 psig
Horsepower (Motor)	15 hp (Note 1)
(Engine)	13.5 to 20 bhp
Compressor Aftercooler	
Equipment Numbers	DSA-HX-1A DSA-HX-1B
Type	Air Cooled Fin Tube
Flowrate	50 acfm
Pressure	250 psig
Outlet Temperature	10 Degrees F Above Ambient
Equipment Numbers	DSA-HX-1C
Type	Air Cooled Fin Tube
Flowrate	10 acfm
Pressure	250 psig
Outlet Temperature	10 Degrees F Above Ambient

TABLE 4-3 (con't)

DIESEL GENERATOR STARTING AIR SYSTEMS
DESIGN DATA

Dryer:

Equipment Numbers	DSA-DY-1A DSA-DY-1B DSA-DY-1C
Type	Deliquecent
Design Flowrate	
DSA-DY-1A & 1B	100 scfm
DSA-DY-2A	30 scfm
Dew Point Suppression	30 Degrees F

Filter:

Equipment Numbers	DSA-F-2A DSA-F-2B DSA-F-3
Type	
Design Flow Rate	50 scfm
Design Pressure Drop	2 psi
Particle Removal Rate	1 microns
Removal Efficency	100 percent
Aerosol Removal Rate	0.04 microns
Removal Efficency	95 percent

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)	Design Maximum Dewpoint (degrees F)	Maximum Hydrocarbon Content (PPM)
Control Air System	40	-40 (@100 psig)	1
Containment Instrument Air System	40	NA	NA
Diesel Generator Starting Air Systems	40	+70 (@250 psig)	1

TABLE 8-1

OPERATING AND TRAINING
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, both modified to suit the WNP-2 design. After reviewing these documents it was determined that, as a minimum, the operating and training aspects addressing the loss and restoration of instrument air should address the considerations identified below:

Loss-of-Instrument Air Procedures Criteria

1. The procedures shall be "staged" so that specific operator actions are to be taken at various control room indications (i.e., when the control rods start drifting in, the operator should initiate the described actions).

2. Have a list describing the symptoms associated with the various loss-of-air scenarios.

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.

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

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

    d. Corrections for containment isolation effects.

    e. 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.

OPERATING AND TRAINING
PROCEDURES CRITERIA

6. List and identify all safety-related air-operated valves and dampers and their expected failure position (identifying the effects of bottled air supplies).

7. List all safety-related 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 Criteria

1. Operators and plant personnel are trained for various loss of air scenarios. Attention is 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 are trained on the importance of the instrument air system, and the necessity of immediately reporting air system damage.

3. A "Loss of Instrument Air" simulator scenario is included as a portion of the annual Licensed Operator Requalification Training.

TABLE 8-2

MAINTENANCE/TESTING CRITERIA

Component	Testing	Periodicity (Proposed Industry Practice)
Control Air System Dryer Outlet	Dew point verification in accordance with ANSI/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 and 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 (silicone-based) 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)	Quarterly
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 and Control Air Compressor	General compressor performance trending (vibration, etc.)	Quarterly.
CAS Backup Compressors Startup and Run/Load	Sequencer checkout and general compressor performance for trending (vibration, etc.)	Quarterly.

TABLE 8-2 (con't)

MAINTENANCE/TESTING CRITERIA

Component	Testing	Periodicity (Proposed Industry Practice)
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.
Piping and Drains	Leakage walkdown and inspection. Water accumulation and blowdown.	To be established based on operating history and dryer performance
Safety-Related Receivers, Accumulators and 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 the system and replace in-line filters if required. (Appendix 3)	To be established based on history and delta-P.
Backup Crossconnections to Service Air and Other Air Sources (CAS and CIA)	Verify that all entireties downstream of the dryers are normally closed.	Weekly.

TABLE 8-3

LIST OF REVIEWED AIR SYSTEMS PROCEDURES

SYSTEM OPERATING PROCEDURES

2.3.1 Primary Containment Venting, Purging and Inheriting
2.8.1 Control and Service Air System
2.8.2 Containment Instrument Air System

ABNORMAL CONDITION PROCEDURES

4.8.1.1 Control Air System Failure

SINGLE PAGE ABNORMAL CONDITION PROCEDURES

4.RBHV.A-3.3	Instrument Air Header Pressure Low
4.RBHV.B-2.3	Instrument Air Header Pressure Low
4.SBHV.2-2.2	Panel SBHV-2 Instrument Air Pressure Low
4.TGHV.1A-3.2	TGHV-1 Division A Instrument Air Failure
4.TGHV.1B-3.2	TGHV-1 Division B Instrument Air Failure
4.TGHV.2A-2.4	TGHV-2 Division A Instrument Air Failure
4.TGHV-2B-2.4	TGHV-2 Division B Instrument Air Failure
4.601.A1-5.5	Diesel Air Receiver Pressure Low
4.603.A8-6.3	Scram Valve Pilot Air Header Pressure High
4.603.A8-6.4	Scram Valve Pilot Air Header Pressure Low
4.800.C1-2.1	Diesel Generator 1 Fail To Start
4.800.C5-2.1	Diesel Generator 2 Fail To Start
4.820.B1-3.4	Containment Instrument Air Prefilter B Delta P High
4.820.B1-4.4	Containment Instrument Air After Filter Delta P High
4.820.B1-5.4	CIA Division 2 Pressure High
4.820.B1-10.4	CIA Division 2 Out of Service
4.840.A5-1.4	Air Compressor CAS-C-1A Motor Trip
4.840.A5-1.5	Air Compressor CAS-C-1B Motor Trip
4.840.A5-1.6	Air Compressor CAS-C-1C Motor Trip
4.840.A5-2.4	Air Compressor CAS-C-1A Oil Pressure Low
4.840.A5-2.5	Air Compressor CAS-C-1B Oil Pressure Low
4.840.A5-2.6	Air Compressor CAS-C-1C Oil Pressure Low
4.840.A5-3.4	Air Compressor CAS-C-1A Discharge Temperature High
4.840.A5-3.5	Air Compressor CAS-C-1B Discharge Temperature High
4.840.A5-3.6	Air Compressor CAS-C-1C Discharge Temperature High
4.840.A5-4.3	Containment Instrument Air Receiver Pressure Low
4.840.A5-4.4	Air Compressor CAS-C-1A Cooler Temperature High
4.840.A5-4.5	Air Compressor CAS-C-1B Cooler Temperature High
4.840.A5-4.6	Air Compressor CAS-C-1C Cooler Temperature High
4.840.A5-5.3	Containment Instrument Air Header Pressure Low
4.840.A5-5.4	Air Compressor CAS-C-1A Cooler Level High
4.840.A5-5.5	Air Compressor CAS-C-1B Cooler Level High
4.840.A5-5.6	Air Compressor CAS-C-1C Cooler Level High
4.840.A5-6.4	Air Receiver CAS-AR-1A Pressure Low

SINGLE PAGE ABNORMAL CONDITION PROCEDURES (con't)

4.840.A5-7.4	Control Air Header Pressure Low
4.840.A5-7.5	Service Air Header Pressure Low
4.840.A5-7.6	Service Air Header Isolated
4.840.A5-8.4	Air Pre-Filter 2A Delta P High
4.840.A5-8.5	Air Pre-Filter 2B Delta P High
4.840.A5-9.3	CIA Division 1 Header Pressure High
4.840.A5-9.4	Air After Filter 3A Delta P High
4.840.A5-9.5	Air After Filter 3B Delta P High
4.840.A5-10.3	CIA Division 1 Out of Service
4.840.A5-10.4	Control Air Header Moisture High
4.840.A5-10.5	Air Dryer Trouble

SURVEILLANCE PROCEDURES

7.4.0.5.15	CIA Valve Operability
7.4.0.4.23	CIA Valve Operability-Shutdown
7.4.0.5.53	CIA-V-40 Operability Test
7.4.5.1.21	ADS-Accumulator Backup Low Pressure Alarm-CC
7.4.1.3.5.3	Control Rod Scram Accumulator Check Valve Operability Check
7.4.5.1.20	ADS-Accumulator Backup Low Pressure Alarm-CFT
7.4.6.1.8.2	Wetwell Purge Supply and Exhaust Leak Rate Test
7.4.6.1.8.3	Drywell Purge Supply and Exhaust Leak Rate Test
7.4.6.3.3	CSP and CEP Containment Isolation Valve Operability
7.4.6.4.2.2	Reactor Building-Suppression Chamber Vacuum Breaker Operability
7.4.8.1.1.2.1	Diesel Generator #1-Monthly Operability Test
7.4.8.1.1.2.2	Diesel Generator #1-Semi-annual Operability Test
7.4.8.1.1.2.11	Diesel Generator #2-Monthly Operability Test
7.4.8.1.1.2.12	HPCS Diesel Generator Monthly Operability Test

OPERATING AND ENGINEERING TEST PROCEDURES

8.3.13	Periodic Leak Check of CSP-V-5, 6 & 9 Air Supply Piping (18 Months)
8.3.49	CIA to ADS Valve Air Supply Leak Check
8.3.130	Instrument Air Sampling

MAINTENANCE PROGRAMS AND PROCEDURES

10.1.13	System Cleanliness Control
10.2.40	Installation/Modification of Instrument and Process Tubing
10.2.55	Compressor Testing
10.2.56	Air Operated Valve Testing
10.17.1	Main Steam Relief Valve Removal and Replacement
10.17.6	Main Steam Relief Valve solemoid Replacement and Overhaul
10.17.7	Main Steam S/RV Actuator Rebuild

10.20.3	DSA-Engine-1A2 & 1B2 Maintenance
10.20.4	DSA-Engine-3B Maintenance
10.20.10	Diesel Air Start Motor Maintenance
10.23.5	Heating and Ventilation Damper Testing
10.24.106	PM Cal/Test - Fisher Valve Positioner Model 667
10.24.121	PM Cal/Test - Fisher Model 4160 Controller
10.24.122	PM Cal/Test - Fisher Valve Positioner Model 3580
10.24.159	PM Cal/Test - Fisher Valve Positioner Model 3570

APPENDIX 1

SAFETY-RELATED AIR OPERATED 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-AO-214 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-AO-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-AO-216 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-AO-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-AO-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-AO-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		(10)
02-RCIC-AO-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-AO-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-AO-54	RCIC DRAIN TRAP BYPASS	E-9	CLOSED ND	CLOSED	T	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(2),(3)
02-RCIC-AO-65	OUTBOARD RCIC HEAD SPRAY VALVE	H-6	---	---	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
02-RCIC-AO-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	NA	---	---	---	---	---	(17)
SYSTEM: HPCS AND LPCS				FLOW DIAGRAM: M520, REVISION 60							
02-HPCS-AO-5	HPCS INJECTION TO RPV	H-10	---	---	NA	---	---	---	---	---	(17)
02-LPCS-AO-6	LPCS INJECTION TO RPV	H-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 1, REVISION 63							
02-RHR-AO-41A	LPCI PATH TO RPV	G-6	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 2, REVISION 64							
02-RHR-AO-41B	LPCI PATH TO RPV	H-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-41C	LPCI PATH TO RPV	D-11	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-89	SERVICE WTR INTERTIE	J-10	---	---	NA	---	---	---	---	---	(17)
SYSTEM: FUEL POOL COOLING & CLEANUP				FLOW DIAGRAM: M526, REVISION 48							
02-FPC-AO-1	FUEL POOL FLOW CONTROL	C-9	MODLT'D ND	OPEN	C	CLEAN	DRY	OIL FREE	F130	---	(10)
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)

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
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	
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	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-3A * (B22-F013B)	STEAM LINE A MSRV	F-9	CLOSED ND	CLOSED	M	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	M	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-F013N)	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	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
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)

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
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 49							
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	H	CLEAN	DRY	NA	B350		(7)
02-EDR-AO-395	RB SUMP DSCHG ISOL	C-15	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
SYSTEM: FLOOR DRAINS-REACTOR BLDG.				FLOW DIAGRAM: M539, REVISION 58							
02-FDR-AO-3	DRYWELL FLOOR DRAIN	E-6	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	OIL FREE	K-125		(8)
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	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
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: M543 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	02-68-00-30, 1	(3)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-5	WETWELL VACUUM RELIEF VALVE	C-5	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-6	WETWELL VACUUM RELIEF VALVE	B-15	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-7	WETWELL VAC BREAKER	C-5	----	----	NA	----	----	----			(17), (18)
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	02-68-00-30, 1	(3)
02-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	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
SYSTEM: PRIMARY CONT. COOLING & PURGING				FLOW DIAGRAM: M543 SHEET 1, REVISION 61							
02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CEP-AO-1B	DRYWELL PURGE EXHST BYPASS 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	02-68-00-30, 1	(3)
02-CEP-AO-2B	DRYWELL PURGE EXHST BYPASS 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	02-68-00-30, 1	(3)
02-CEP-AO-3B	WETWELL PURGE EXHST BYPASS 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	02-68-00-30, 1	(3)
02-CEP-AO-4B	WETWELL PURGE EXHST BYPASS VLV	J-13	CLOSED ND	CLOSED	A	FILTERED	NO SPCFD LIMITS	NO SPCFD LIMITS	I-208		(9)
02-CVB-AO-1AB (TYP. OF 18)	WETWELL DOWNCOMER VACUUM BREAKERS	B7-13	----	----	NA	----	----	----			(17),(18)
SYSTEM: STANDBY GAS TREATMENT				FLOW DIAGRAM: M544, REVISION 41							
02-SGT-AO-2A	SGT UNIT REACT BUILDING INTAKE	H-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-SGT-AO-2B	SGT UNIT REACT BUILDING INTAKE	D-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-SGT-AO-F16	SGT UNIT FLTR DELUGE VALVE	F-12	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)

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
02-SGT-AO-F26	SGT UNIT FLTR DELUGE VALVE	F-11	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F36	SGT UNIT FLTR DELUGE VALVE	F-10	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F46	SGT UNIT FLTR DELUGE VALVE	B-12	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F56	SGT UNIT FLTR DELUGE VALVE	B-11	CLOSED ND	CLOSED	L	CLEAN	DRY	CLEAN	B-237	02-586-00-2, 1	(4),(5)
02-SGT-AO-F66	SGT UNIT FLTR DELUGE 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)
02-ROA-AO-10	HVAC DAMPER TO DIV. II MCC 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 MCC 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.MCC 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)

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
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 *	CIA ISOLATION	J-11	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)
02-CIA-AO-39B *	CIA ISOLATION	E-10	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)

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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 nonsafety-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 (nonsafety-related) pneumatic power 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 a safety-related air supply 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 implode the containment, the actuator is designed to allow containment vacuum protection.

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. <u>Comments</u>

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 : "Provide 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 lines 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, dried 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, which confirms that the actuator were supplied by Miller Fluid Power Company. Thus their standard air quality requirements given in telephone call between M.R./A.T. Osborne (BPC) and Bob Frane (Miller) in December 1988 are applicable.

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 Group 2 and are nonsafety-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. The operators are only used for periodic testing. In an emergency, the valve operators are not capable of overcoming the differential pressure across the valve and preventing the valve from performing its safety-related functions (i.e., to relieve a postulated vacuum condition and isolate in the reverse flow direction).

APPENDIX 2

SAFETY-RELATED AIR USER SOLENOID VALVE
AND IN-LINE COMPONENT DATABASE

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 1, REVISION 7						
02-DSA-V-80	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213		(1)
02-DSA-SPV-5C1/1	NONE	SEE NOTE 11	E-9	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	02-E22-07, 54,1	(1)
02-DSA-SPV-5C1/2	NONE	SEE NOTE 11	F-9	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	02-E22-07, 54,1	(1)
SYSTEM: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 2, REVISION 5						
02-DSA-SPV-5A1/4	NONE	SEE NOTE 11	E-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5A1/2	NONE	SEE NOTE 11	F-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5A2/4	NONE	SEE NOTE 11	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5A2/2	NONE	SEE NOTE 11	F-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V-79A1	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1)
02-DSA-V-79A2	NONE	SEE NOTE 10	F-6	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1)
02-DSA-SPV-40A1	02-SW-V-214	AIR SUPPLY TO SW ADMISSION VLV	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-40A2	02-SW-V-215	AIR SUPPLY TO SW ADMISSION VLV	E-7	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V-31A1/1	NONE	SEE NOTE 12	F-8	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-DSA-V-31A2/1	NONE	SEE NOTE 12	F-5	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3)
02-DSA-M-6A2/1 (TYP OF 8)	NONE	SEE NOTE 13	G-6	NO SPCFD LIMITS	DRY	CLEAN	E147		
SYSTEM: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 3, REVISION 4						
02-DSA-SPV-5B1/4	NONE	SEE NOTE 11	E-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5B1/2	NONE	SEE NOTE 11	F-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5B2/4	NONE	SEE NOTE 11	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-5B2/2	NONE	SEE NOTE 11	F-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V-79B1	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1)
02-DSA-V-79B2	NONE	SEE NOTE 10	F-6	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1)
02-DSA-SPV-40B1	02-SW-V-216	AIR SUPPLY TO SW ADMISSION VLV	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-40B2	02-SW-V-217	AIR SUPPLY TO SW ADMISSION VLV	E-7	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V-31B1/1	NONE	SEE NOTE 12	F-8	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3)
02-DSA-V-31B2/1	NONE	SEE NOTE 12	F-5	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3)
02-DSA-M-6B2/1 (TYP OF 8)	NONE	SEE NOTE 13	G-6	NO SPCFD LIMITS	DRY	CLEAN	E147		(14)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM:RCIC			FLOW DIAGRAM: M519, REVISION 57						
02-RCIC-SPV-4	02-RCIC-AO-4	RCIC COND PUMP DISCH TO DRN	B-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-5	02-RCIC-AO-5	RCIC COND PUMP DISCH TO DRN	B-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-25	02-RCIC-AO-25	RCIC TURB STM SUP TO MN COND	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-26	02-RCIC-AO-26	RCIC TURB STM SUP TO MN COND	D-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-54	02-RCIC-AO-54	RCIC TURB STM SUP TO MN COND	E-9	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-65	02-RCIC-AO-65	PUMP DISCH TO HEAD SPRAY	H-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-66	02-RCIC-AO-66	PUMP DISCH TO HEAD SPRAY	H-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: HPCS AND LPCS			FLOW DIAGRAM: M520, REVISION 60						
02-HPCS-SPV-5	02-HPCS-AO-5	HPCS INJECTION TO RPV	H-7	------	------	------	------	------	(4)
02-HPCS-SPV-6	02-HPCS-AO-6	HPCS INJECTION TO RPV	H-10	------	------	------	------	------	(4)
SYSTEM: RHR			FLOW DIAGRAM: M521 SHEET 1, REVISION 63						
02-RHR-SPV-41A	02-RHR-AO-41A	LPCI PATH TO RPV	H-6	------	------	------	------	------	(4)
02-RHR-SPV-50A	02-RHR-AO-50A	LPCI PATH TO RPV	F-7	------	------	------	------	------	(4)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM: RHR			FLOW DIAGRAM: M521 SHEET 2, REVISION 64						
02-RHR-SPV-41B	02-RHR-AO-41B	LPCI PATH TO RPV	H-12	------	------	------	------	------	(4)
02-RHR-SPV-41C	02-RHR-AO-41C	LPCI PATH TO RPV	D-11	------	------	------	------	------	(4)
02-RHR-SPV-50B	02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	------	------	------	------	------	(4)
02-RHR-SPV-89	02-RHR-AO-89	SERVICE WATER INTERTIE	J-10	------	------	------	------	------	(4)
SYSTEM:STANDBY SERVICE WATER SYSTEM			FLOW DIAGRAM: M524 SHEET 1, REVISION 64						
02-SW-SPV-38A	02-SW-AO-38A	SW TO COOLING TOWER	J-3	50	35 DEG F @ 100PSIG	1ppm	A610	2-42-01,16	(15),(2)
SYSTEM:STANDBY SERVICE WATER SYSTEM			FLOW DIAGRAM: M524 SHEET 2, REVISION 62						
02-SW-SPV-38B	02-SW-AO-38B	SW TO COOLING TOWER	H-3	50	35 DEG F @ 100PSIG	1ppm	A610	2-42-01,16	(15),(2)
SYSTEM: FUEL POOL COOLING & CLEANUP			FLOW DIAGRAM: M526, REVISION 48						
02-FPC-SPV-1	02-FPC-AO-1	FUEL POOL FLOW CONTROL	C-9	------	------	------	------	------	(4)
SYSTEM:CONTROL ROD DRIVE			FLOW DIAGRAM: M528 , REVISION 48						
02-CRD-V-9	02-CRD-AO-10 02-CRD-AO-11	SDV VENT	D-11	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	02C12-07,7	(5)
02-CRD-V-182	02-CRD-AO-10 02-CRD-AO-180 02-CRD-AO-181	SDV VENT	D-10	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	02C12-07,7	(5)
02-CRD-V-186	02-CRD-AO-11	SDV VENT	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-CRD-V-110A	NONE	SEE NOTE 9	D-13	50	35 DEG F @ 100PSIG	1ppm	A610	02C12-07,4	(2)
02-CRD-V-110B	NONE	SEE NOTE 9	D-13	50	35 DEG F @ 100PSIG	1ppm	A610	02C12-07,5	(2)
02-CRD-V-24A	NONE	CRD SCRAM DSCHRGE VENT	G-12	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	541-00,3,1	(5)
02-CRD-V-24B	NONE	CRD SCRAM DSCHRGE VENT	G-12	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5)
02-CRD-V-25A	NONE	CRD SCRAM DSCHRGE VENT	K-4	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5)
02-CRD-V-25B	NONE	CRD SCRAM DSCHRGE VENT	K-4	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5)
02-CRD-SPV-117	02-CRD-V-126,-127	SCRAM PILOT AIR VLV	D-2	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CRD-SPV-118	02-CRD-V-126,-127	SCRAM PILOT AIR VLV	D-2	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: NUCLEAR BOILER - MAIN STEAM				FLOW DIAGRAM: M529, REVISION 57					
02-MS-SPV-1A-A	02-MS-AO-1A	STEAM LINE A MSRV	F-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1A-B	02-MS-AO-1A	STEAM LINE A MSRV	F-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1A-C	02-MS-AO-1A	STEAM LINE A MSRV	F-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1B-A	02-MS-AO-1B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1B-B	02-MS-AO-1B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-1B-C	02-MS-AO-1B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1C-A	02-MS-AO-1C	STEAM LINE C MSRV	F-6	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1C-B	02-MS-AO-1C	STEAM LINE C MSRV	F-6	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1C-C	02-MS-AO-1C	STEAM LINE C MSRV	F-6	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1D-A	02-MS-AO-1D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1D-B	02-MS-AO-1D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-1D-C	02-MS-AO-1D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2A-A	02-MS-AO-2A	STEAM LINE A MSRV	F-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2A-B	02-MS-AO-2A	STEAM LINE A MSRV	F-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2A-C	02-MS-AO-2A	STEAM LINE A MSRV	F-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2B-A	02-MS-AO-2B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2B-B	02-MS-AO-2B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2B-C	02-MS-AO-2B	STEAM LINE B MSRV	D-11	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2C-A	02-MS-AO-2C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-2C-B	02-MS-AO-2C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2C-C	02-MS-AO-2C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2D-A	02-MS-AO-2D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2D-B	02-MS-AO-2D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-2D-C	02-MS-AO-2D	STEAM LINE D MSRV	D-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3A-A	02-MS-AO-3A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3A-B	02-MS-AO-3A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3A-C	02-MS-AO-3A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3B-A	02-MS-AO-3B	STEAM LINE B MSRV	D-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3B-B	02-MS-AO-3B	STEAM LINE B MSRV	D-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3B-C	02-MS-AO-3B	STEAM LINE B MSRV	D-10	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3C-A	02-MS-AO-3C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3C-B	02-MS-AO-3C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3C-C	02-MS-AO-3C	STEAM LINE C MSRV	F-7	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-3D-A	02-MS-AO-3D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3D-B	02-MS-AO-3D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-3D-C	02-MS-AO-3D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4A-A	02-MS-AO-4A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4A-B	02-MS-AO-4A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4A-C	02-MS-AO-4A	STEAM LINE A MSRV	F-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4B-A	02-MS-AO-4B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4B-B	02-MS-AO-4B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4B-C	02-MS-AO-4B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4C-A	02-MS-AO-4C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4C-B	02-MS-AO-4C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4C-C	02-MS-AO-4C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4D-A	02-MS-AO-4D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-4D-B	02-MS-AO-4D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-4D-C	02-MS-AO-4D	STEAM LINE D MSRV	D-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5B-A	02-MS-AO-5B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5B-B	02-MS-AO-5B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5B-C	02-MS-AO-5B	STEAM LINE B MSRV	D-9	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5C-A	02-MS-AO-5C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5C-B	02-MS-AO-5C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-5C-C	02-MS-AO-5C	STEAM LINE C MSRV	F-8	50	-24 DEG. F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	(6)
02-MS-SPV-22A-P1	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-P2	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-P3	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C1	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C2	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C3	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-P1	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-22B-P2	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-P3	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C1	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C2	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C3	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P1	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P2	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P3	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C1	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C2	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C3	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P1	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P2	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P3	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-22D-C1	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-C2	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-C3	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P1	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P2	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P3	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C1	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C2	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C3	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P1	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P2	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P3	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-C1	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-C2	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-28B-C3	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P1	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P2	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P3	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C1	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C2	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C3	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P1	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P2	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P3	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C1	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C2	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C3	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32A-1	02-MS-AO-32A	STEAM LINE A SUPPLY VLV	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-RFW-SPV-32A-2	02-MS-AO-32A	STEAM LINE A SUPPLY VLV	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32B-1	02-MS-AO-32B	STEAM LINE B SUPPLY VLV	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32B-2	02-MS-AO-32B	STEAM LINE B SUPPLY VLV	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM EQUIPMENT DRAINS			FLOW DIAGRAM: M537, REVISION 49						
02-EDR-SPV-19	02-EDR-AO-19	DRYWELL DRN SUMP VENT VALVE	D-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,247	(2)
02-EDR-SPV-20	02-EDR-AO-20	DRYWELL DRN SUMP VENT VALVE	D-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,490	(2)
02-EDR-SPV-394	02-EDR-AO-394	REACTOR BLDG DRN SUMP TO WASTE COL TK IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-EDR-SPV-395	02-EDR-AO-395	REACTOR BLDG DRN SUMP TO WASTE COL TK IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM FLOOR DRAINS-REACTOR BLDG.			FLOW DIAGRAM: M539, REVISION 58						
02-FDR-SPV-3	02-FDR-AO-3	DRYWELL FLOOR DRN VLV	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,241	(2)
02-FDR-SPV-4	02-FDR-AO-4	DRYWELL FLOOR DRN VLV	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,490	(2)
02-FDR-SPV-219	02-FDR-AO-219	REACTOR BLDG DRN SUMP IN-LINE VLV	D-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-FDR-SPV-220	02-FDR-AO-220	REACTOR BLDG DRN SUMP IN-LINE VLV	D-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-FDR-SPV-221	02-FDR-AO-221	REACTOR BLDG DRN SUMP IN-LINE VLV	C-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-FDR-SPV-222	02-FDR-AO-222	REACTOR BLDG DRN SUMP IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM:PRIMARY CONT. COOLING & PURGING		FLOW DIAGRAM: M543 SHEET 1, REVISION 61							
02-CSP-SPV-1	02-CSP-AO-1	DRYWELL PURGE SUPPLY VLV	D-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-2	02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-3	02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-4	02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-5	02-CSP-AO-5	VAC RELIEF TO SUPP CHAMB.VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-6	02-CSP-AO-6	VAC RELIEF TO SUPP CHAMB.VLV	B-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-7AB	02-CSP-AO-7	WETWELL VAC BREAKER	C-5	-------	-----------	-------	-------	-------	(4),(7)
02-CSP-SPV-8AB	02-CSP-AO-8	WETWELL VAC BREAKER	B-15	-------	-----------	-------	-------	-------	(4),(7)
02-CSP-SPV-9	02-CSP-AO-9	VAC RELIEF TO SUPP CHAMB.VLV	B-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-10AB	02-CSP-AO-10	WETWELL VAC BREAKER	C-6	-------	-----------	-------	-------	-------	(4),(7)
02-CEP-SPV-1A	02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-1B	02-CEP-AO-1B	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-CEP-SPV-2A	02-CEP-AO-2A	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-2B	02-CEP-AO-2B	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-3A	02-CEP-AO-3A	WETWELL EXHAUST VALVE	C-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-3B	02-CEP-AO-3B	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-4A	02-CEP-AO-4A	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-4B	02-CEP-AO-4B	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CVB-SPV-1AB (TYP 18)	02-CVB-AO-1AB	WETWELL DOWNCOMER VACUUM BREAKERS	B7-13	-------	-----------	-------	-------	-------	(4),(7)
SYSTEM: STANDBY GAS TREATMENT			FLOW DIAGRAM: M544, REVISION 41						
02-SGT-SPV-2A	02-SGT-AO-2A	SGT OIL SUPPLY VALVE	J-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-2B	02-SGT-AO-2B	SGT OIL SUPPLY VALVE	D-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F16	02-SGT-AO-F16	SGT CHARCOAL DELUGE VALVE	F-12	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F26	02-SGT-AO-F26	SGT CHARCOAL DELUGE VALVE	F-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F36	02-SGT-AO-F36	SGT CHARCOAL DELUGE VALVE	F-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F46	02-SGT-AO-F46	SGT CHARCOAL DELUGE VALVE	B-12	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-SGT-SPV-F56	02-SGT-AO-F56	SGT CHARCOAL DELUGE VALVE	B-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F66	02-SGT-AO-F66	SGT CHARCOAL DELUGE VALVE	B-9	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: HVAC REACTOR BLDG		FLOW DIAGRAM: M545, REVISION 61							
02-REA-SPV-1	02-REA-AO-1	HVAC REACTOR BLDG ISOLATION VLV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-REA-SPV-2	02-REA-AO-2	HVAC REACTOR BLDG ISOLATION VLV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-100	02-ROA-AO-1	HVAC DAMPER IN UNIT-ROA-HV-1	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-200	02-ROA-AO-2	HVAC DAMPER IN UNIT-ROA-HV-1	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-10	02-ROA-AO-10	HVAC DAMPER TO DIV. II MCC RM	E-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-11	02-ROA-AO-11	HVAC DAMPER TO DIV. I MCC RM	D-7	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-12	02-ROA-AO-12	HVAC DAMPER TO D.C.MCC RM(DIV I)	C-7	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-13	02-ROA-AO-13	HVAC DAMPER TO H2 RECOMB MCC RM DIV. I	E-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-14	02-ROA-AO-14	HVAC DAMPER TO H2 RECOMB MCC RM DIV. II	G-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-15	02-ROA-AO-15	HVAC DAMPER TO SAMPLING ANALYZER RM IA	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-ROA-SPV-17	02-ROA-AO-17	HVAC DAMPER TO SAMPLING ANALYZER RM IB	G-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: CONTAINMENT INSTRUMENT AIR		FLOW DIAGRAM: M556 SHEET 1, REVISION 38							
02-CIA-SPV-39A	02-CIA-AO-39A	CIA ISOLATION	J-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CIA-SPV-39B	02-CIA-AO-39B	CIA ISOLATION	E-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

APPENDIX 2 NOTES

1. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative R. Caudill of Graham-White on March 6, 1989.

2. Air supply requirements are based on a letter from ASCO to K. Larssen of BPC dated March 20, 1989.

3. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative D. Prawl of Circle Seals Controls on March 7, 1989. Additional requirements are based on guidelines provided in "Air Quality Federal Standard BB-A-1034A, Amendment 1, Grade C"

4. The actuator is designated Quality Class II and is non-safety related. Therefore, air quality specifications are not required for these valves. The testable check valves associated with these solenoid 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 valve opens on forward flow when the upstream pressure exceeds the downstream pressure.

5. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative D. Heilman of Valcor Engineering on March 2, 1989.

6. Air supply requirements were comfirmed by telephone call between P. Martinelli of BPC and supplier representative A. Rollo of Crosby Valve and Gage on July 18, 1989.

7. The actuator is designated Quality Class II and is non-safety related. Therefore, air quality specifications are not required for these valves. The swing check valves have opening and closing air operators for testing purposes only. The valves operate independently of the air operators. The operators are only used for periodic testing. In an emergency, the valve operators are not capable of overcoming the differential pressure across the valve and preventing the valve from performing its safety-related functions (i.e., to relieve a postulated vacuum condition and isolate in the reverse flow direction).

8. The following matrix identifies the suppliers associated with the listed code numbers:

Code Number	Supplier
A610	ASCO
V030	Valcor Engineering Co.
G213	Graham-White Mfg Co.
C339	Circle Seals Controls
F130	Fisher Controls
C710	Crosby Valve and Gage
E147	Electromotive (General Motors)

9. Scram backup valve.

10. Shuttle valve admitting air to governor booster.

11. Governs start motor pinion gear engagement.

12. Shuttle valve admitting air to service water inlet valve.

13. Engine start motor.

14. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative H. Falter of Morrison-Knudson on March 15,1989.

15. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative K. Goudy of Fisher Controls on March 3,1989. Ms. Goudy stated that ASCO supplies their solenoid valves.

APPENDIX 3

SAFETY-RELATED AIR USER

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	NO F/R		(2)
02-SW-AO-215	DIESEL COOLING WTR SUPPLY	H-2	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	NO F/R		(2)
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	NO F/R		(2)
02-SW-AO-217	DIESEL COOLING WTR SUPPLY	H-1	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	NO F/R		(2)
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), (5)
02-RCIC-AO-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	---	FISHER 67FR	40	(1), (5)

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-AO-5	HPCS INJECTION TO RPV	H-10	---	---	---	FISHER 67FR		(5)
02-LPCS-AO-6	LPCS INJECTION TO RPV	H-7	---	---	---	FISHER 67FR		(5)
SYSTEM: RHR			FLOW DIAGRAM: M521 SHEET 1, REVISION 63					
02-RHR-AO-41A	LPCI PATH TO RPV	G-6	---	---	---	FISHER 67FR		(5)
02-RHR-AO-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	---	FISHER 67FR		(5)
SYSTEM: RHR			FLOW DIAGRAM: M521 SHEET 2, REVISION 64					
02-RHR-AO-41B	LPCI PATH TO RPV	H-12	---	---	---	FISHER 67FR		(5)
02-RHR-AO-41C	LPCI PATH TO RPV	D-11	---	---	---	FISHER 67FR		(5)
02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	---	FISHER 67FR		(5)
02-RHR-AO-89	SERVICE WTR INTERTIE	J-10	---	---	---	FISHER 67FR		(5)
SYSTEM: FUEL POOL COOLING & CLEANUP			FLOW DIAGRAM: M526, REVISION 48					
02-FPC-AO-1	FUEL POOL FLOW CONTORL	C-9	CLEAN	DRY	OIL FREE	NO F/R		(2)
SYSTEM: CONTROL ROD DRIVE			FLOW DIAGRAM: M528, REVISION 48					
02-CRD-AO-10	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)

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-AO-11	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-AO-180	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-AO-181	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-V-126	SCRAM DSCHG VLV (HCU TYP OF 185)	C-4	10	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-V-127	SCRAM DSCHG VLV (HCU TYP OF 185)	C-3	10	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
SYSTEM: NUCLEAR BOILER - MAIN STEAM			FLOW DIAGRAM: M529, REVISION 57					
02-MS-AO-1A (B22-F013J)	STEAM LINE A MSRV	F-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1B (B22-F013E)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1C (B22-F013L)	STEAM LINE C MSRV	F-6	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1D (B22-F013K)	STEAM LINE D MSRV	D-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2A (B22-F013A)	STEAM LINE A MSRV	F-10	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2B (B22-F013F)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2C (B22-F013D)	STEAM LINE C MSRV	F-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-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: M529, REVISION 57 (Con't)								
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-F013V)	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-F013M)	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)

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	(3)
02-EDR-AO-20	DRYWELL SUMP DRAIN	D-9	35	FREE OF LIQ WTR	OIL FREE	FISHER 67FR	40	(3)
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	(3)
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	35	FREE OF LIQ WTR	OIL FREE	FISHER 67F	40	(3)

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	(4)	(2)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(2)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(2)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(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	(5)
02-CSP-AO-8	WETWELL VAC BREAKER	B-15	----	----	----	FISHER 67F	40	(5)
02-CSP-AO-9	WETWELL VACUUM RELIEF VALVE	B-6	40	NO SPCFD LIMITS	NA	NO F/R	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-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	----	FISHER 67F	40	(5)
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	(4)	(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	(4)	(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	(4)	(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	(4)	(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-1 (TYP. OF 18)	WETWELL DOWNCOMER VACUUM BREAKERS	C-6	----	----	----			(5)
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	(4)	(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	(4)	(2)
02-SGT-AO-F36	SGT CHRCOAL FLTR DELUDGE VALVE	F-10	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F46	SGT CHRCOAL FLTR DELUDGE VALVE	B-12	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F56	SGT CHRCOAL FLTR DELUDGE VALVE	B-11	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F66	SGT CHRCOAL FLTR DELUDGE VALVE	B-9	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(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 MCC RM	E-15	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-11	HVAC DAMPER TO DIV. I MCC 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.MCC 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	CIA ISOLATION	J-11	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)
02-CIA-AO-39B	CIA ISOLATION	E-10	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)

APPENDIX 3 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, but is provided for additional assurance of proper air quality.

3. 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. See Section 5.1.3 for resolution.

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

5. Actuators are not safety-related. See Appendix 1 notes 17 and 18 for explanation.

6. The Control Rod Drive (CRD) System actuators are protected by a common filter CRD-F-6 which has a rating of 10 microns. General Electric technical document GEK-71317A requires a filter rated for 5 microns in the CRD instrument air header servicing the hydraulic control units.

APPENDIX 4

SAFETY-RELATED AIR ACCUMULATORS

APPENDIX 4

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
SYSTEM: Control Air System:				Flow Diagram : M510, Revision 65						
02-MS-TK-2A	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29A	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2B	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29B	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2C	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29C	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2D	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29D	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 1, Rev. 7						
02-DSA-AR-1C	HPCS Diesel Gen. Air Receiver	J-6	35 ft3	Note 6	DSA-V-75	3/4	SOFT SEAT	ANCO	NA	
02-DSA-AR-2C	HPCS Diesel Gen. Air Receiver	J-8	35 ft3	Note 6	DSA-V-76	3/4	SOFT SEAT	ANCO	NA	
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 2, Rev 5						
02-DSA-TK-1A Through 02-DSA-TK-8A	Div. 1 Diesel Starting Air Receiver	J-6 - J-10	32 ft3 each	Note 7	DSA-V-16A & DSA-V-15A	3/4 3/4	SOFT SEAT	KINGSTON	NA	(5)
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 3, Rev. 4						
02-DSA-TK-1B Through 02-DSA-TK-8B	Div. 2 Diesel Starting Air Receiver	J-6 - J-10	32 ft3 each	Note 7	DSA-V-16B & DSA-V-15A	3/4 3/4	SOFT SEAT	KINGSTON	NA	(5)

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
SYSTEM : Primary Containment Cooling & Purging				Flow Diagram : M543, Sheet 1, Revision 61 (I & C Dwg. No. : M619, Sheet 161, Revision 11)						
02-CSP-TK-51	CONTAINMENT VACUUM BREAK TANK	---	137		CSP-V-65	1 1/2	SPRING RETURN SOFT SEAT	VOGT	1	(1)
02-CSP-TK-1 thru 02-CSP-TK-10	BACKUP NITROGEN CYLINDERS	---	223 SCF (each)	SEE NOTE 3	CSP-V-65	1 1/2	SPRING RETURN SOFT SEAT	VOGT	1	(3)
SYSTEM : Heating, Ventilation & Air Conditioning System				Flow Diagram : M545, Revision 61						
02-ROA-ACC-1	OUTBOARD ROA ACCUMULATOR	F-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-ROA-ACC-2	INBOARD ROA ACCUMULATOR	F-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-REA-ACC-1	INBOARD REA ACCUMULATOR	J-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-REA-ACC-2	OUTBOARD REA ACCUMULATOR	J-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
SYSTEM : Containment Instrument Air System				Flow Diagram : M556 Sheet 1, Revision 38						
02-MS-TK-1A	INBOARD MSIV ACCUMULATOR	J-4	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24A	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-1B	INBOARD MSIV ACCUMULATOR	J-3	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24B	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-1C	INBOARD MSIV ACCUMULATOR	K-4	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24C	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-1D	INBOARD MSIV ACCUMULATOR	K-3	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24D	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4A	MSRV ACCUMULATOR	F-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36A	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4B	MSRV ACCUMULATOR	F-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36B	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4C	MSRV ACCUMULATOR	D-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36C	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4D	MSRV ACCUMULATOR	C-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36D	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4E	MSRV ACCUMULATOR	F-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36E	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4F	MSRV ACCUMULATOR	G-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36F	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4G	MSRV ACCUMULATOR	C-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36G	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4H	MSRV ACCUMULATOR	H-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36H	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4J	MSRV ACCUMULATOR	E-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36J	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-4K	MSRV ACCUMULATOR	E-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36K	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4L	MSRV ACCUMULATOR	E-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36L	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4M	MSRV ACCUMULATOR	B-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36M	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4N	MSRV ACCUMULATOR	B-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36N	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4P	MSRV ACCUMULATOR	C-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36P	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4R	MSRV ACCUMULATOR	H-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36R	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4S	MSRV ACCUMULATOR	G-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36S	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4U	MSRV ACCUMULATOR	H-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36U	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4V	MSRV ACCUMULATOR	D-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36V	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3M	ADS ACCUMULATOR	C-3	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40M	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-3N	ADS ACCUMULATOR	B-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40N	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3P	ADS ACCUMULATOR	D-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40P	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3R	ADS ACCUMULATOR	J-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40R	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3S	ADS ACCUMULATOR	G-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40S	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3U	ADS ACCUMULATOR	J-5	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40U	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3V	ADS ACCUMULATOR	D-3	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40V	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-CIA-TK-1A thru 02-CIA-TK-15A	BACKUP NITROGEN CYLINDERS	F-11	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-52A THRU CIA-V-66A	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-1B thru 02-CIA-TK-19B	BACKUP NITROGEN CYLINDERS	A-11	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-52B THRU CIA-V-70B	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-20A	REMOTE NITROGEN BOTTLES	H-13	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-103A	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-20B	REMOTE NITROGEN BOTTLES	D-13	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-103B	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)

APPENDIX 4 NOTES

1. The size of the accumulator is based on the dimensions given on Supply System drawing CVI No. 2-220-01-55-1, Rev. 0

2. The size of the accumulator is based on the dimensions given on the following Drawings:

   CVI No. 2-220-01-60-5, Rev. 0
   CVI No. 2-220-01-58-3, Rev. 0
   CVI No. 2-220-01-57-2, Rev. 0

3. Each nitrogen bottle is a standard model Department of Transportation (DOT) 3AA3600 rated at 3600 psig with 10 percent overpressure. Capacity is 223 SCF at the minimum pressure of 2200 psig. Normal pressure is 3000 psig.

4. The accumulator is provided to prevent pressure fluctuations and does not serve a safety-related function.

5. Check valve DSA-V-16A(B) is associated with receivers DSA-TK-1A(B), 2A(B), 5A(B) and 6A(B); Check valve DSA-V-15A(B) is associated with receivers DSA-TK-3A(B), 4A(B), 7A(B) and 8A(B).

6. The size of the receivers is based on General Electric NEDO-10905-2, dated April of 1976.

7. The size of the receivers is based on a Stewart & Stevenson Services letter dated Sept. 16, 1974.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ON GENERIC LETTER 88-01

Generic Items

Item 1 Positions on NRC Staff Positions

A summary of Supply System's response on the Staff positions included in Generic Letter 88-01 is presented in Table 1. As noted in the table additional information is contained in the Supply System's original submittal.

Item 2 Inservice Inspection Program

The additional information requested is summarized in Tables 2 and 3. ISI diagrams showing locations of the welds are included in Appendix A. It should be noted that no flaws have been found within the Generic Letter examination scope welds through outage R4 (April 1989), thus the O.L. (overlay) column in Table 2 has been omitted. Information on the Induction Heating Stress Improvement program was submitted with the original response to GL 88-01.

Item 3 Welds covered in Licensee Submittal

The Supply System did not exclude any welds that are within the scope of Generic Letter 88-01 from examination.

Item 4 Welds that are not UT Inspectable

All welds within the Generic Letter scope are UT inspectable.

Item 5 Leakage Detection

The response to this item is summarized in Table 4.

Plant Specific Item

Item 1 Staff Position on Crack Evaluation and Repair Criteria

The Supply System has adopted the method suggested in the Generic Letter 88-01 for determining the crack growth rate.

Table 1
Responses to NRC Staff Positions

Staff Position	Licensee Response: Accept	Licensee Response: Accept with Provisions	Licensee Response: Requests Alternate Position	Licensee Has/Will: Applied in Past	Licensee Has/Will: Consider for Future Use
1. Material	Y			Y	Y
2. Processes	Y			Y	Y
3. Water Chemistry			Y[1]	N	Y[1]
4. Weld Overlay	Y			N	Y
5. Partial Replacement	Y			N	Y
6. Stress Improvement of Cracked Weldments	Y			Y	Y
7. Clamping Devices	Y			N	Y
8. Crack Evaluation and Repair Criteria	Y			N	Y
9. Inspection Method and Personnel	Y			Y	Y
10. Inspection Schedule	Y[2]			Y	Y
11. Sample Expansion	Y			Y	Y
12. Leak Detection	Y[3]			Y[3]	Y[3]
13. Reporting Requirements	Y			Y	Y

Y=yes N=no

NOTES

1 The Water Chemistry guidelines of EPRI NP-4946-SR have been adopted and the potential use of hydrogen water chemistry continues to be reviewed. See page three of original response.

2 The inspection schedule for the 148 category B welds and the 54 category A welds comply with the staff position. The exception is the welds which received a stress improvement (IHSI) prior to operation were not UT examined because the joints were not subjected to conditions conducive to IGSCC. See page three of the original response.

3 See Table 4.

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING				TREATMENT	
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHI	CRC	SI
7	A	4JP(NZ)A-1	RPV-115	N9 NZ-SE @ 105	Conforming (2)			
8	A	4JP(NZ)A-2	RPV-115	N9 SE-PN SL @ 105	Conforming (3)			
9	A	4JP(NZ)B-1	RPV-115	N9 NZ-SE @ 285	Conforming (2)			
10	A	4JP(NZ)B-2	RPV-115	N9 SE-PN SL @ 285	Conforming (3)			
11	B	20RHR(2)-1	RHR-104	VALVE TO SE	Non-conforming			IHSI 9/83
12	B	20RHR(2)-2	RHR-104	SE TO VALVE	Non-conforming (4)			IHSI 9/83
13	B	12RHR(1)A-14	RHR-105	VALVE TO SE	Non-conforming (4)			IHSI 9/83
14	B	12RHR(1)A-15	RHR-105	SE TO PIPE	Non-conforming			IHSI 9/83
15	B	12RHR(1)A-16	RHR-105	PIPE TO EL	Non-conforming			IHSI 9/83
16	B	12RHR(1)A-17	RHR-105	EL TO PIPE	Non-conforming			IHSI 9/83
17	B	12RHR(1)A-18	RHR-105	PIPE TO VALVE	Non-conforming			IHSI 9/83
18	B	12RHR(1)B-10	RHR-106	VALVE TO SE	Non-conforming (4)			IHSI 9/83
19	B	12RHR(1)B-11	RHR-106	SE TO EL	Non-conforming			IHSI 9/83
20	B	12RHR(1)B-12	RHR-106	EL TO PIPE	Non-conforming			IHSI 9/83
21	B	12RHR(1)B-13	RHR-106	PIPE TO VALVE	Non-conforming			IHSI 9/83
22	A	24RRC(2)A-1	RRC-101	NOZ TO SE	Conforming (5)			
23	B	24RRC(2)A-2	RRC-101	SE TO PIPE	Non-conforming			IHSI 9/83
24	B	24RRC(2)A-3	RRC-101	PIPE TO EL	Non-conforming			IHSI 9/83
25	B	24RRC(2)A-4	RRC-101	EL TO PIPE	Non-conforming			IHSI 9/83
26	B	24RRC(2)A-5	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
27	B	24RRC(2)A-6	RRC-101	PIPE TO TEE	Non-conforming			IHSI 9/83
28	B	24RRC(2)A-7	RRC-101	TEE TO PIPE	Non-conforming			IHSI 9/83
29	B	24RRC(2)A-8	RRC-101	PIPE TO EL	Non-conforming			IHSI 9/83
30	B	24RRC(2)A-9	RRC-101	EL TO VALVE	Non-conforming			IHSI 9/83
31	B	24RRC(2)A-10	RRC-101	VALVE TO PIPE	Non-conforming			IHSI 9/83
32	B	24RRC(2)A-10/4RRC(8)-4S	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86
33	B	4RRC(8)2A-1	RRC-101	SWL TO PIPE	Non-conforming			IHSI 9/83
34	B	4RRC(8)2A-2	RRC-101	PIPE TO FLANGE	Non-conforming			IHSI 9/83
35	B	24RRC(2)A-10/4RRC(4)-4S	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CRC	SI
36	B	24RRC(2)A-11	RRC-101	PIPE TO EL	Non-conforming			IHSI 9/83
37	B	24RRC(2)A-12	RRC-101	EL TO PUMP	Non-conforming			IHSI 9/83
38	B	24RRC(1)A-13	RRC-101	PUMP TO PIPE	Non-conforming			IHSI 9/83
39	B	24RRC(1)A-13/8CAP	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86
40	B	24RRC(1)A-13/8CAP-1	RRC-101	SWL TO PIPE	Non-conforming (6)		X	IHSI 9/83
41	B	24RRC(1)A-13/4RRC(8)-4S	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86
42	B	4RRC(8)1A-1	RRC-101	SWL TO PIPE	Non-conforming			IHSI 9/83
43	B	4RRC(8)1A-2	RRC-101	PIPE TO FLANGE	Non-conforming			IHSI 9/83
44	B	24RRC(1)A-14	RRC-101	PIPE TO VALVE	Non-conforming			IHSI 9/83
45	B	24RRC(1)A-15	RRC-101	VALVE TO PIPE	Non-conforming			IHSI 9/83
46	B	24RRC(1)A-16	RRC-101	PIPE TO EL	Non-conforming			IHSI 9/83
47	B	24RRC(1)A-17	RRC-101	EL TO PIPE	Non-conforming			IHSI 9/83
48	B	24RRC(1)A-18	RRC-101	PIPE TO VALVE	Non-conforming			IHSI 9/83
49	B	24RRC(1)A-19	RRC-101	VALVE TO EL	Non-conforming			IHSI 9/83
50	B	24RRC(1)A-20	RRC-101	EL TO PIPE	Non-conforming			IHSI 9/83
51	B	24RRC(1)A-20/12RRC(7)-4S	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86
52	B	24RRC(1)A-20/12CAP	RRC-101	PIPE TO SWL	Non-conforming			IHSI 5/86
53	B	24RRC(1)A-20/12CAP-1	RRC-101	SWL TO CAP	Non-conforming (6)		X	IHSI 9/83
54	B	24RRC(1)A-21	RRC-101	PIPE TO CROSS	Non-conforming			IHSI 9/83
55	B	24RRC(1)A-22	RRC-101	CROSS-REDUCER	Non-conforming			IHSI 9/83
56	B	16RRC(1)A-1	RRC-101	CROSS TO PIPE	Non-conforming			IHSI 9/83
57	A	16RRC(1)A-1/11RRC(1)-N2D	RRC-101	PIPE TO SWL	Conforming (7)	X		
58	A	16RRC(1)A-1/11RRC(1)-N2E	RRC-101	PIPE TO SWL	Conforming (7)	X		
59	B	16RRC(1)A-2	RRC-101	PIPE TO CAP	Non-conforming			IHSI 9/83
60	B	16RRC(1)A-3	RRC-101	CROSS TO PIPE	Non-conforming			IHSI 9/83
61	A	16RRC(1)A-3/11RRC(1)-N2B	RRC-101	PIPE TO SWL	Conforming (7)	X		
62	A	16RRC(1)A-3/11RRC(1)-N2A	RRC-101	PIPE TO SWL	Conforming (7)	X		
63	B	16RRC(1)A-4	RRC-101	PIPE TO CAP	Non-conforming			IHSI 9/83
64	B	12RRC(1)-N2A-1	RRC-101	SWL TO PIPE	Non-conforming (8)			IHSI 9/83

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHI	CRC	SI
65	B	12RRC(1)-N2A-1A	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
66	A	12RRC(1)-N2A-2	RRC-101	PIPE TO EL	Conforming (7)	X		
67	A	12RRC(1)-N2A-3	RRC-101	EL TO PIPE	Conforming (7)	X		
68	A	12RRC(1)-N2A-4	RRC-101	PIPE TO SE	Conforming (9)	X	X	
69	A	12RRC(1)-N2A-6	RRC-101	SE TO NOZ	Conforming (10)			
70	B	12RRC(1)-N2B-1	RRC-101	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
71	B	12RRC(1)-N2B-1A	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
72	A	12RRC(1)-N2B-2	RRC-101	PIPE TO EL	Conforming (7)	X		
73	A	12RRC(1)-N2B-3	RRC-101	EL TO PIPE	Conforming (7)	X		
74	A	12RRC(1)-N2B-4	RRC-101	PIPE TO SE	Conforming (9)	X	X	
75	A	12RRC(1)-N2B-6	RRC-101	SE TO NOZ	Conforming (10)			
76	B	12RRC(1)-N2C-1	RRC-101	REDUCER TO PIPE	Non-conforming (8)	X	X	IHSI 9/83
77	B	12RRC(1)-N2C-1A	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
78	A	12RRC(1)-N2C-2	RRC-101	PIPE TO EL	Conforming (7)	X		
79	A	12RRC(1)-N2C-3	RRC-101	EL TO PIPE	Conforming (7)	X		
80	A	12RRC(1)-N2C-4	RRC-101	PIPE TO SE	Conforming (9)	X	X	
81	A	12RRC(1)-N2C-6	RRC-101	SE TO NOZ	Conforming (10)			
82	B	12RRC(1)-N2D-1	RRC-101	SWL TO PIPE	Non-conforming (8)	X	X	IHSI 9/83
83	B	12RRC(1)-N2D-1A	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
84	A	12RRC(1)-N2D-2	RRC-101	PIPE TO EL	Conforming (7)	X		
85	A	12RRC(1)-N2D-3	RRC-101	EL TO PIPE	Conforming (7)	X		
86	A	12RRC(1)-N2D-4	RRC-101	PIPE TO SE	Conforming (9)	X	X	
87	A	12RRC(1)-N2D-6	RRC-101	SE TO NOZ	Conforming (10)			
88	B	12RRC(1)-N2E-1	RRC-101	SWL TO PIPE	Non-conforming (8)	X	X	IHSI 9/83
89	B	12RRC(1)-N2E-1A	RRC-101	PIPE TO PIPE	Non-conforming			IHSI 9/83
90	A	12RRC(1)-N2E-2	RRC-101	PIPE TO EL	Conforming (7)	X		
91	A	12RRC(1)-N2E-3	RRC-101	EL TO PIPE	Conforming (7)	X		
92	A	12RRC(1)-N2E-4	RRC-101	PIPE TO SE	Conforming (9)	X	X	
93	A	12RRC(1)-N2E-6	RRC-101	SE TO NOZ	Conforming (10)			

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CRC	SI
94	A	24RRC(2)B-1	RRC-102	NOZ TO SE	Conforming (5)			
95	B	24RRC(2)B-2	RRC-102	SE TO PIPE	Non-conforming			IHSI 9/83
96	B	24RRC(2)B-3	RRC-102	PIPE TO EL	Non-conforming			IHSI 9/83
97	B	24RRC(2)B-4	RRC-102	EL TO PIPE	Non-conforming			IHSI 9/83
98	B	24RRC(2)B-5	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
99	B	24RRC(2)B-6	RRC-102	PIPE TO EL	Non-conforming			IHSI 9/83
100	B	24RRC(2)B-7	RRC-102	EL TO VALVE	Non-conforming			IHSI 9/83
101	B	24RRC(2)B-8	RRC-102	VALVE TO PIPE	Non-conforming			IHSI 9/83
102	B	24RRC(2)B-8/4RRC(8)-4S	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86
103	B	4RRC(8)2B-1	RRC-102	SWL TO PIPE	Non-conforming			IHSI 9/83
104	B	4RRC(8)2B-2	RRC-102	PIPE TO FLANGE	Non-conforming			IHSI 9/83
105	B	24RRC(2)B-8/4RRC(4)-4S	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86
106	B	24RRC(2)B-9	RRC-102	PIPE TO EL	Non-conforming			IHSI 9/83
107	B	24RRC(2)B-10	RRC-102	EL TO PUMP	Non-conforming			IHSI 9/83
108	B	24RRC(1)B-11	RRC-102	PUMP TO PIPE	Non-conforming			IHSI 9/83
109	B	24RRC(1)B-11/8CAP	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86
110	B	24RRC(1)B-11/8CAP-1	RRC-102	SWL TO CAP	Non-conforming (6)		X	IHSI 9/83
111	B	24RRC(1)B-11/4RRC(8)-4S	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86
112	B	4RRC(8)1B-1	RRC-102	SWL TO PIPE	Non-conforming			IHSI 9/83
113	B	4RRC(8)1B-2	RRC-102	PIPE TO FLANGE	Non-conforming			IHSI 9/83
114	B	24RRC(1)B-12	RRC-102	PIPE TO VALVE	Non-conforming			IHSI 9/83
115	B	24RRC(1)B-13	RRC-102	VALVE TO PIPE	Non-conforming			IHSI 9/83
116	B	24RRC(1)B-14	RRC-102	PIPE TO EL	Non-conforming			IHSI 9/83
117	B	24RRC(1)B-15	RRC-102	EL TO PIPE	Non-conforming			IHSI 9/83
118	B	24RRC(1)B-16	RRC-102	PIPE TO VALVE	Non-conforming			IHSI 9/83
119	B	24RRC(1)B-17	RRC-102	VALVE TO EL	Non-conforming			IHSI 9/83
120	B	24RRC(1)B-18	RRC-102	EL TO PIPE	Non-conforming			IHSI 9/83
121	B	24RRC(1)B-18/12RRC(7)-4S	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86
122	B	24RRC(1)B-18/12CAP	RRC-102	PIPE TO SWL	Non-conforming			IHSI 5/86

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CRC	SI
123	B	24RRC(1)B-18/12CAP-1	RRC-102	SWL TO PIPE	Non-conforming (6)		X	IHSI 9/83
124	B	24RRC(1)B-19	RRC-102	PIPE TO CROSS	Non-conforming			IHSI 9/83
125	B	24RRC(1)B-20	RRC-102	CROSS-REDUCER	Non-conforming			IHSI 9/83
126	B	16RRC(1)B-1	RRC-102	CROSS TO PIPE	Non-conforming			IHSI 9/83
127	A	16RRC(1)B-1/12RRC(1)-N2G	RRC-102	PIPE TO SWL	Conforming (7)	X		
128	A	16RRC(1)B-1/12RRC(1)-N2F	RRC-102	PIPE TO SWL	Conforming (7)	X		
129	B	16RRC(1)B-2	RRC-102	PIPE TO CAP	Non-conforming			IHSI 9/83
130	B	16RRC(1)B-3	RRC-102	CROSS TO PIPE	Non-conforming			IHSI 9/83
131	A	16RRC(1)B-3/12RRC(1)-N2J	RRC-102	PIPE TO SWL	Conforming (7)	X		
132	A	16RRC(1)B-3/12RRC(1)-N2K	RRC-102	PIPE TO SWL	Conforming (7)	X		
133	B	16RRC(1)B-4	RRC-102	PIPE TO CAP	Non-conforming			IHSI 9/83
134	B	12RRC(1)-N2F-1	RRC-102	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
135	B	12RRC(1)-N2F-1A	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
136	A	12RRC(1)-N2F-2	RRC-102	PIPE TO EL	Conforming (7)	X		
137	A	12RRC(1)-N2F-3	RRC-102	EL TO PIPE	Conforming (7)	X		
138	A	12RRC(1)-N2F-4	RRC-102	PIPE TO SE	Conforming (9)	X	X	
139	A	12RRC(1)-N2F-6	RRC-102	SE TO NOZ	Conforming (10)			
140	B	12RRC(1)-N2G-1	RRC-102	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
141	B	12RRC(1)-N2G-1A	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
142	A	12RRC(1)-N2G-2	RRC-102	PIPE TO EL	Conforming (7)	X		
143	A	12RRC(1)-N2G-3	RRC-102	EL TO PIPE	Conforming (7)	X		
144	A	12RRC(1)-N2G-4	RRC-102	PIPE TO SE	Conforming (9)	X	X	
145	A	12RRC(1)-N2G-6	RRC-102	SE TO NOZ	Conforming (10)			
146	B	12RRC(1)-N2H-1	RRC-102	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
147	B	12RRC(1)-N2H-1A	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
148	A	12RRC(1)-N2H-2	RRC-102	PIPE TO EL	Conforming (7)	X		
149	A	12RRC(1)-N2H-3	RRC-102	EL TO PIPE	Conforming (7)	X		
150	A	12RRC(1)-N2H-4	RRC-102	PIPE TO SE	Conforming (9)	X	X	
151	A	12RRC(1)-N2H-6	RRC-102	SE TO NOZ	Conforming (10)			

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CHC	SI
152	B	12RRC(1)-N2J-1	RRC-102	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
153	B	12RRC(1)-N2J-1A	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
154	A	12RRC(1)-N2J-2	RRC-102	PIPE TO EL	Conforming (7)	X		
155	A	12RRC(1)-N2J-3	RRC-102	EL TO PIPE	Conforming (7)	X		
156	A	12RRC(1)-N2J-4	RRC-102	PIPE TO SE	Conforming (9)	X	X	
157	A	12RRC(1)-N2J-6	RRC-102	SE TO NOZ	Conforming (10)			
158	B	12RRC(1)-N2K-1	RRC-102	SWL TO PIPE	Non-conforming (8)			IHSI 9/83
159	B	12RRC(1)-N2K-1A	RRC-102	PIPE TO PIPE	Non-conforming			IHSI 9/83
160	A	12RRC(1)-N2K-2	RRC-102	PIPE TO EL	Conforming (7)	X		
161	A	12RRC(1)-N2K-3	RRC-102	EL TO PIPE	Conforming (7)	X		
162	A	12RRC(1)-N2K-4	RRC-102	PIPE TO SE	Conforming (9)	X	X	
163	A	12RRC(1)-N2K-6	RRC-102	SE TO NOZ	Conforming (10)			
164	B	20RRC(6)-1	RRC-105	PIPE TO RED TEE	Non-conforming			IHSI 9/83
165	B	20RRC(6)-2	RRC-105	PIPE TO EL	Non-conforming			IHSI 9/83
166	B	20RRC(6)-3	RRC-105	EL TO PIPE	Non-conforming			IHSI 9/83
167	B	20RRC(6)-4	RRC-105	PIPE TO EL	Non-conforming			IHSI 9/83
168	B	20RRC(6)-5	RRC-105	EL TO PIPE	Non-conforming			IHSI 9/83
169	B	20RRC(6)-6	RRC-105	PIPE TO EL	Non-conforming			IHSI 9/83
170	B	20RRC(6)-7	RRC-105	EL TO PIPE	Non-conforming			IHSI 9/83
171	B	20RRC(6)-7A	RRC-105	PIPE TO PIPE	Non-conforming			IHSI 9/83
172	B	20RRC(6)-8	RRC-105	PIPE TO VALVE	Non-conforming			IHSI 9/83
173	B	12RRC(7)A-1	RRC-106	VALVE TO PIPE	Non-conforming			IHSI 9/83
174	B	12RRC(7)A-2	RRC-106	PIPE TO EL	Non-conforming			IHSI 9/83
175	B	12RRC(7)A-3	RRC-106	EL TO PIPE	Non-conforming			IHSI 9/83
176	B	12RRC(7)A-4	RRC-106	PIPE TO EL	Non-conforming			IHSI 9/83
177	B	12RRC(7)A-5	RRC-106	EL TO PIPE	Non-conforming			IHSI 9/83
178	B	12RRC(7)A-6	RRC-106	PIPE TO SWL	Non-conforming			IHSI 9/83
179	B	12RRC(7)B-1	RRC-107	VALVE TO PIPE	Non-conforming			IHSI 9/83
180	B	12RRC(7)B-2A	RRC-107	PIPE TO PIPE	Non-conforming			IHSI 9/83

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING			TREATMENT		
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CRC	SI
181	B	12RRC(7)B-2	RRC-107	PIPE TO EL	Non-conforming			IHSI 9/83
182	B	12RRC(7)B-3	RRC-107	EL TO PIPE	Non-conforming			IHSI 9/83
183	B	12RRC(7)B-4	RRC-107	PIPE TO EL	Non-conforming			IHSI 9/83
184	B	12RRC(7)B-5	RRC-107	EL TO PIPE	Non-conforming			IHSI 9/83
185	B	12RRC(7)B-6	RRC-107	PIPE TO SWL	Non-conforming			IHSI 9/83
186	B	4RRC(4)A-1	RRC-108	SWL TO PIPE	Non-conforming			IHSI 5/86
187	B	4RRC(4)A-2	RRC-108	PIPE TO TEE	Non-conforming			IHSI 5/86
188	B	4RRC(4)A-3	RRC-108	PIPE TO REDUCER	Non-conforming			IHSI 5/86
189	B	4RRC(4)A-4	RRC-108	PIPE TO TEE	Non-conforming			IHSI 5/86
190	B	4RRC(4)A-5	RRC-108	TEE TO PIPE	Non-conforming			IHSI 5/86
191	B	4RRC(4)A-6	RRC-108	PIPE TO EL	Non-conforming			IHSI 5/86
192	B	4RRC(4)A-7	RRC-108	EL TO PIPE	Non-conforming			IHSI 5/86
193	B	4RRC(4)A-8	RRC-108	PIPE TO EL	Non-conforming			IHSI 5/86
194	B	4RRC(4)A-9	RRC-108	EL TO PIPE	Non-conforming			IHSI 5/86
195	B	4RRC(4)A-10	RRC-108	PIPE TO VALVE SE	Non-conforming			IHSI 5/86
196	B	4RRC(4)A-11	RRC-108	SE TO VALVE	Non-conforming			IHSI 5/86
197	B	4RRC(4)B-1	RRC-109	SWL TO PIPE	Non-conforming			IHSI 5/86
198	B	4RRC(4)B-2	RRC-109	PIPE TO TEE	Non-conforming			IHSI 5/86
199	B	4RRC(4)B-3	RRC-109	PIPE TO REDUCER	Non-conforming			IHSI 5/86
200	B	4RRC(4)B-4	RRC-109	PIPE TO TEE	Non-conforming			IHSI 5/86
201	B	4RRC(4)B-5	RRC-109	TEE TO PIPE	Non-conforming			IHSI 5/86
202	B	4RRC(4)B-6	RRC-109	PIPE TO EL	Non-conforming			IHSI 5/86
203	B	4RRC(4)B-7	RRC-109	EL TO PIPE	Non-conforming			IHSI 5/86
204	B	4RRC(4)B-8	RRC-109	PIPE TO PIPE	Non-conforming			IHSI 5/86
205	B	4RRC(4)B-9	RRC-109	PIPE TO EL	Non-conforming			IHSI 5/86
206	B	4RRC(4)B-10	RRC-109	EL TO PIPE	Non-conforming			IHSI 5/86
207	B	4RRC(4)B-11	RRC-109	PIPE TO VALVE SE	Non-conforming			IHSI 5/86
208	B	4RRC(4)B-12	RRC-109	SE TO VALVE	Non-conforming			IHSI 5/86
209								

	A	B	C	D	E	F	G	H
1				TABLE 2				
2				WELD HISTORY				
3								
4	IGSCC	WELD	DRAWING				TREATMENT	
5	CATEGORY	NUMBER	NO.	CONFIGURATION	MATERIAL(1)	SHT	CRC	SI
210	NOTES							
211	1	Unless otherwise noted, all material is regular grade type 304 or 316.						
212	2	SA 508 Cl 2 nozzle, buttered with Inconel, welded to 336 F8 (0.025 C) Safe end with Inconel weld metal.						
213	3	SA 336 F8 Safe end with 0.025 % carbon						
214	4	Value is carbon steel						
215	5	SA 508 Cl 2 nozzle, buttered with Inconel. Post weld heat treated. Welded to SA 336 F8 Safe end						
216		(with 0.020 carbon content) with Inconel weld metal.						
217	6	CRC on cap side only						
218	7	Regular grade type 304. Weld was SHT after welding						
219	8	Nozzle side non-conforming. Pipe side solution heat treatment after corrosion resistent cladding.						
220	9	Pipe side SHT after CRC. Safe end Type 316L (<0.025 Carbon)						
221	10	SA 508 Cl 2 nozzle, buttered with Inconel. Welded to 316L safe end with Inconel weld metal.						
222	ABBREVIATIONS							
223	SHT	Solution heat treated						
224	CRC	Corrosion resistant cladding						
225	IHSI	Induction heating stress improvemnet						
226	SE	safe-end						
227	EL	elbow						
228	NOZ, NZ	nozzle						
229	SWL	sweep-o-let						
230	WELD							
231	NUMBER							
232	KEY							
233	24RRC(2)A-6	unique ISI weld number						
234	24	pipe size (nominal inches)						
235	RRC(2)	system name and number						
236	A	loop of multi-loop system						
237	-6	weld sequence number						
238								

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
7	A	4JP(NZ)A-1							X							
8	A	4JP(NZ)A-2							X							
9	A	4JP(NZ)B-1							X							
10	A	4JP(NZ)B-2							X							
11	B	20RHR(2)-1								X						
12	B	20RHR(2)-2								X						
13	B	12RHR(1)A-14									X					
14	B	12RHR(1)A-15														
15	B	12RHR(1)A-16		X										X		
16	B	12RHR(1)A-17		X										X		
17	B	12RHR(1)A-18		X										X		
18	B	12RHR(1)B-10								X						
19	B	12RHR(1)B-11								X						
20	B	12RHR(1)B-12								X						
21	B	12RHR(1)B-13								X						
22	A	24RRC(2)A-1							X							
23	B	24RRC(2)A-2							X							
24	B	24RRC(2)A-3							X							
25	B	24RRC(2)A-4														
26	B	24RRC(2)A-5														
27	B	24RRC(2)A-6														
28	B	24RRC(2)A-7														
29	B	24RRC(2)A-8														
30	B	24RRC(2)A-9														
31	B	24RRC(2)A-10														
32	B	24RRC(2)A-10/4RRC(8)-4S	X			X										X
33	B	4RRC(8)2A-1				X										X
34	B	4RRC(8)2A-2				X										X

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
35	I	24RRC(2)A-10/4RRC(4)-4S	X			X										X
36	I	24RRC(2)A-11														
37	I	24RRC(2)A-12														
38	I	24RRC(1)A-13														
39	I	24RRC(1)A-13/8CAP	X			X										X
40	I	24RRC(1)A-13/8CAP-1				X										X
41	I	24RRC(1)A-13/4RRC(8)-4S	X										X			
42	I	4RRC(8)1A-1				X										X
43	I	4RRC(8)1A-2				X										X
44	I	24RRC(1)A-14														
45	I	24RRC(1)A-15														
46	I	24RRC(1)A-16														
47	I	24RRC(1)A-17														
48	I	24RRC(1)A-18														
49	I	24RRC(1)A-19														
50	I	24RRC(1)A-20														
51	I	24RRC(1)A-20/12RRC(7)-4S	X						X							
52	I	24RRC(1)A-20/12CAP	X										X			
53	I	24RRC(1)A-20/12CAP-1														
54	I	24RRC(1)A-21														
55	I	24RRC(1)A-22														
56	I	16RRC(1)A-1														
57	I	16RRC(1)A-1/12RRC(1)-N2D						X								
58	I	16RRC(1)A-1/12RRC(1)-N2E						X								
59	I	16RRC(1)A-2						X								
60	I	16RRC(1)A-3						X								
61	I	16RRC(1)A-3/12RRC(1)-N2B						X								
62	I	16RRC(1)A-3/12RRC(1)-N2A						X								

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
63	B	16RRC(1)A-4						X								
64	B	12RRC(1)-N2A-1						X								
65	B	12RRC(1)-N2A-1A														
66	A	12RRC(1)-N2A-2														
67	A	12RRC(1)-N2A-3						X								
68	A	12RRC(1)-N2A-4														
69	A	12RRC(1)-N2A-6								X						
70	B	12RRC(1)-N2B-1														
71	B	12RRC(1)-N2B-1A														
72	A	12RRC(1)-N2B-2														
73	A	12RRC(1)-N2B-3								X						
74	A	12RRC(1)-N2B-4														
75	A	12RRC(1)-N2B-6								X						
76	B	12RRC(1)-N2C-1						X								
77	B	12RRC(1)-N2C-1A						X								
78	A	12RRC(1)-N2C-2														
79	A	12RRC(1)-N2C-3						X								
80	A	12RRC(1)-N2C-4								X						
81	A	12RRC(1)-N2C-6								X						
82	B	12RRC(1)-N2D-1						X								
83	B	12RRC(1)-N2D-1A														
84	A	12RRC(1)-N2D-2														
85	A	12RRC(1)-N2D-3														
86	A	12RRC(1)-N2D-4														
87	A	12RRC(1)-N2D-6								X						
88	B	12RRC(1)-N2E-1														
89	B	12RRC(1)-N2E-1A														
90	A	12RRC(1)-N2E-2														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
91	A	12RRC(1)-N2E-3														
92	A	12RRC(1)-N2E-4														
93	A	12RRC(1)-N2E-6								X						
94	A	24RRC(2)B-1							X							
95	B	24RRC(2)B-2														
96	B	24RRC(2)B-3														
97	B	24RRC(2)B-4														
98	B	24RRC(2)B-5														
99	B	24RRC(2)B-6														
100	B	24RRC(2)B-7														
101	B	24RRC(2)B-8														
102	B	24RRC(2)B-8/4RRC(8)-4S	X							X						
103	B	4RRC(8)2B-1								X						
104	B	4RRC(8)2B-2								X						
105	B	24RRC(2)B-8/4RRC(4)-4S	X							X						
106	B	24RRC(2)B-9								X						
107	B	24RRC(2)B-10								X						
108	B	24RRC(1)B-11								X						
109	B	24RRC(1)B-11/8CAP	X													
110	B	24RRC(1)B-11/8CAP-1								X						
111	B	24RRC(1)B-11/4RRC(8)-4S	X													
112	B	4RRC(8)1B-1									X					
113	B	4RRC(8)1B-2									X					
114	B	24RRC(1)B-12														
115	B	24RRC(1)B-13														
116	B	24RRC(1)B-14														
117	B	24RRC(1)B-15														
118	B	24RRC(1)B-16														

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
119	B	24RRC(1)B-17														
120	B	24RRC(1)B-18														
121	B	24RRC(1)B-18/12RRC(7)-4S	X								X					
122	B	24RRC(1)B-18/12CAP	X													
123	B	24RRC(1)B-18/12CAP-1														
124	B	24RRC(1)B-19														
125	B	24RRC(1)B-20														
126	B	16RRC(1)B-1									X					
127	A	16RRC(1)B-1/12RRC(1)-N2G									X					
128	A	16RRC(1)B-1/12RRC(1)-N2F									X					
129	B	16RRC(1)B-2														
130	B	16RRC(1)B-3														
131	A	16RRC(1)B-3/12RRC(1)-N2J									X					
132	A	16RRC(1)B-3/12RRC(1)-N2K									X					
133	B	16RRC(1)B-4														
134	B	12RRC(1)-N2F-1														
135	B	12RRC(1)-N2F-1A														
136	A	12RRC(1)-N2F-2														
137	A	12RRC(1)-N2F-3														
138	A	12RRC(1)-N2F-4														
139	A	12RRC(1)-N2F-6								X						
140	B	12RRC(1)-N2G-1														
141	B	12RRC(1)-N2G-1A														
142	A	12RRC(1)-N2G-2														
143	A	12RRC(1)-N2G-3								X						
144	A	12RRC(1)-N2G-4														
145	A	12RRC(1)-N2G-6								X						
146	B	12RRC(1)-N2H-1								X						

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1							TABLE 3									
2							INSPECTION HISTORY									
3																
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
147	B	12RRC(1)-N2H-1A								X						
148	A	12RRC(1)-N2H-2														
149	A	12RRC(1)-N2H-3								X						
150	A	12RRC(1)-N2H-4								X						
151	A	12RRC(1)-N2H-6								X						
152	B	12RRC(1)-N2J-1														
153	B	12RRC(1)-N2J-1A														
154	A	12RRC(1)-N2J-2														
155	A	12RRC(1)-N2J-3														
156	A	12RRC(1)-N2J-4														
157	A	12RRC(1)-N2J-6								X						
158	B	12RRC(1)-N2K-1														
159	B	12RRC(1)-N2K-1A														
160	A	12RRC(1)-N2K-2														
161	A	12RRC(1)-N2K-3														
162	A	12RRC(1)-N2K-4														
163	A	12RRC(1)-N2K-6								X						
164	B	20RRC(6)-1														
165	B	20RRC(6)-2						X								
166	B	20RRC(6)-3		X										X		
167	B	20RRC(6)-4		X										X		
168	B	20RRC(6)-5		X										X		
169	B	20RRC(6)-6		X										X		
170	B	20RRC(6)-7						X								
171	B	20RRC(6)-7A						X								
172	B	20RRC(6)-8						X								
173	B	12RRC(7)A-1		X										X		
174	B	12RRC(7)A-2		X										X		

TABLE 3
INSPECTION HISTORY

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
4	IGSCC	WELD		PAST OUTAGES			FLAW				FUTURE OUTAGES (3)					
5	CATEGORY	NUMBER(1)	R1	R2	R3	R4	FOUND(2)	R5	R6	R7	R8	R9	R10	R11	R12	R13
6																
175	B	12RRC(7)A-3		X										X		
176	B	12RRC(7)A-4		X		X										X
177	B	12RRC(7)A-5				X										X
178	B	12RRC(7)A-6				X										X
179	B	12RRC(7)B-1								X						
180	B	12RRC(7)B-2A								X						
181	B	12RRC(7)B-2								X						
182	B	12RRC(7)B-3								X						
183	B	12RRC(7)B-4		X										X		
184	B	12RRC(7)B-5		X										X		
185	B	12RRC(7)B-6		X										X		
186	B	4RRC(4)A-1	X										X			
187	B	4RRC(4)A-2	X			X										X
188	B	4RRC(4)A-3	X													
189	B	4RRC(4)A-4	X													
190	B	4RRC(4)A-5	X										X			
191	B	4RRC(4)A-6	X			X										X
192	B	4RRC(4)A-7	X			X										X
193	B	4RRC(4)A-8	X													
194	B	4RRC(4)A-9	X													
195	B	4RRC(4)A-10	X													
196	B	4RRC(4)A-11	X		X										X	
197	B	4RRC(4)B-1	X													
198	B	4RRC(4)B-2	X													
199	B	4RRC(4)B-3	X													
200	B	4RRC(4)B-4	X							X						
201	B	4RRC(4)B-5	X							X						
202	B	4RRC(4)B-6	X													

TABLE 3

INSPECTION HISTORY

IGSCC CATEGORY	WELD NUMBER(1)	PAST OUTAGES R1	R2	R3	R4	FLAW FOUND(2)	FUTURE OUTAGES (3) R5	R6	R7	R8	R9	R10	R11	R12	R13
B	4RRC(4)B-7	X													
B	4RRC(4)B-8	X													
B	4RRC(4)B-9	X										X			
B	4RRC(4)B-10	X								X					
B	4RRC(4)B-11	X										X			
B	4RRC(4)B-12	X										X			

NOTES

(1). See Table 2 for configuration and location

(2). No flaws have been found in the welds within the scope of Generic Letter 88-01

(3). The Supply System may modify this schedule by substituding welds or changing the outage in which they are examined

Outage	Date	Inspection period	Inspection Interval
R1	4/1986	1	1
R2	4/1987	1	
R3	4/1988	1	
R4	4/1989	2	
R5	4/1990	2	
R6	4/1991	2	
R7	4/1992	3	
R8	4/1993	3	
R9	4/1994	3	
R10	4/1995	1	2
R11	4/1996	1	
R12	4/1997	1	
R13	4/1998	2	

Table 4
WNP-2 Positions on Leakage Detection

Position	Already Contained in TS[1]	TS will be Changed to Include	Alternate Position Proposed
1. Conforms with "Position C of Regulatory Guide 1.45	X		
2. Plant shutdown should be initiated when:			
(a) within any period of 24 hours or less, an increase is indicated in the rate of unidentified leakage in excess of 2 gpm, or	X[2]		
(b) the total unidentified leakage attains a rate of 5 gpm.	X		
3. Leakage monitored at four hour intervals or less	X[3]		
4. Unidentified leakage includes all except:			
(a) leakage into closed systems, or	X		
(b) Leakage into the containment atmosphere from sources that are located, do not interfere with monitoring systems, or not from throughwall crack.	X		
5. Provisions for shutdown within 24 hours due to inoperable measurement instruments in plants with Category D,E,F, or G welds.	Not applicable. WNP-2 does not have Category D,E,F, or G welds.		

NOTES:
1. WNP-2 is a NUREG-0123 Standard Technical Specification Plant
2. The interval used to limit leakage to less than 2 gpm is based on a 4 hour interval and part of NUREG-0123, LCO 3.4.3.2
3. WNP-2 continuously records the leak rate and performs a channel check on a 12 hour interval

APPENDIX A
ISI WELD AND COMPONENT DIAGRAMS

<u>Diagram Number</u>

RPV-115	RRC-102-1
RHR-104	RRC-102-2
RHR-105	RRC-102-3
RHR-106	RRC-102-4
RRC-101-1	RRC-102-5
RRC-101-2	RRC-102-6
RRC-101-3	RRC-102-7
RRC-101-4	RRC-102-8
RRC-101-5	RRC-105
RRC-101-6	RRC-106
RRC-101-7	RRC-107
RRC-101-8	RRC-108
	RRC-109

WELDS

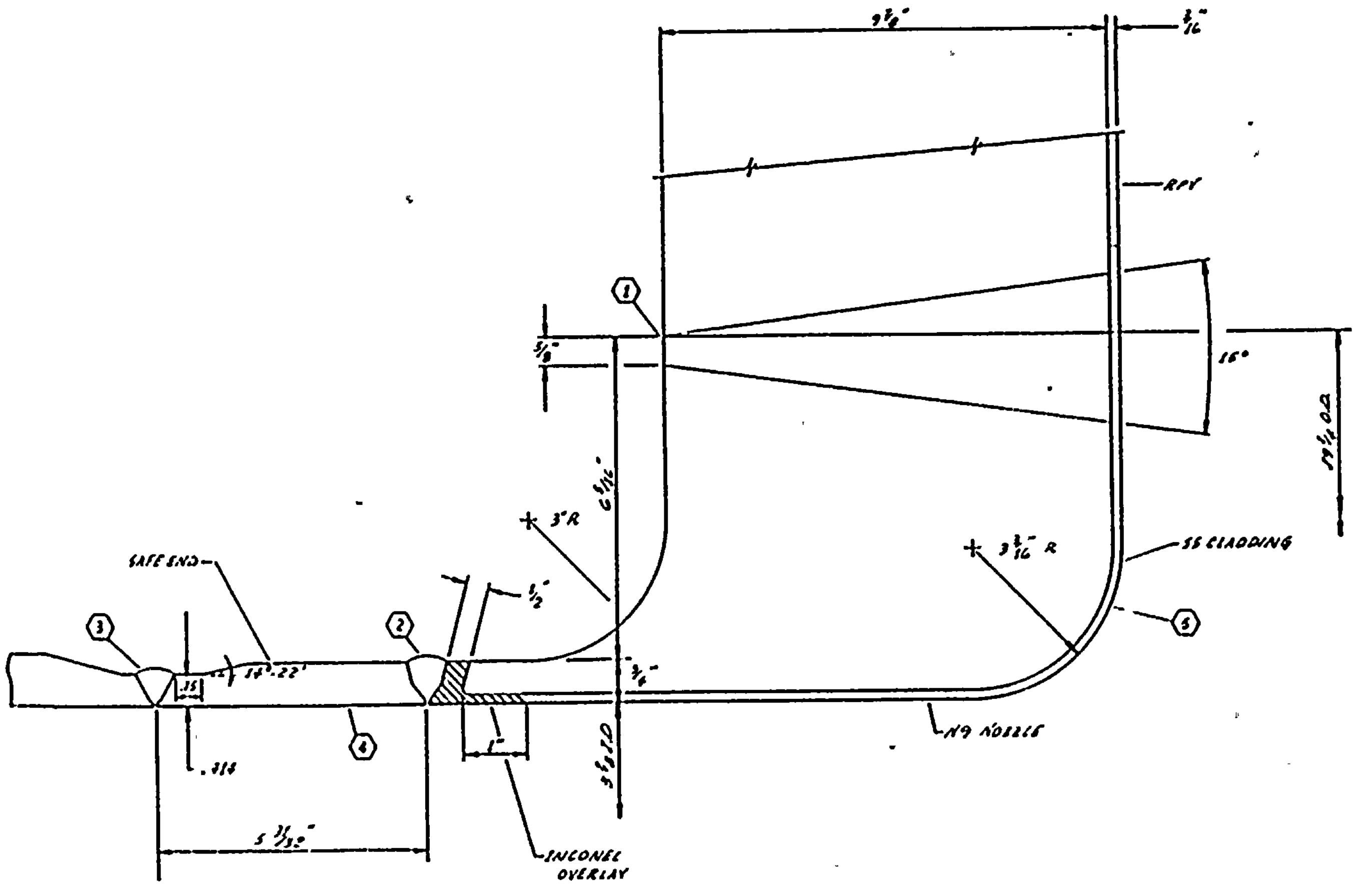
① N9A 105°
N9B 285°

② 4JP(NZ)A-1
4JP(NZ) B-1

③ 4JP(NZ)A-2
4JP(NZ) B-2

NOTES:

CAL BLOCK		EXAMINATION
①	UT-119	NOZZLE TO SHELL WELD
②	UT-109	NOZZLE TO SAFE-END WELD
③	UT-29	SAFE-END TO FITTING WELD
④	UT-109	SAFE-END FORGING (IF EXAMINED)
⑤	UT-	NOZZLE INNER RADIUS



REFERENCES:

CBI NUCLEAR CO. 105 AE 033
SHT 72, REV 2 N9 NOZZLE FORGING
SHT 73, REV 2 N9 SAFE-END FORGING
SHT 74, REV 2 N9 NOZZLE ASSEMBLY

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
SAFE-END	4	—	3/4	SA 336 F8	SS	SEE NOTES
N9 NOZZLE	—	—	—	SA 508 CL II	CS	SEE NOTES
RPV	—	—	9 3/16	SA 533 GR B	CS	SEE NOTES

NO	DATE	REVISION	BY	CHKD	APPVD
0	11-5-80	ISSUED FOR USE	[illegible]	[illegible]	[illegible]

QUALITY CLASS: 1 | ASME CODE CLASS: 1

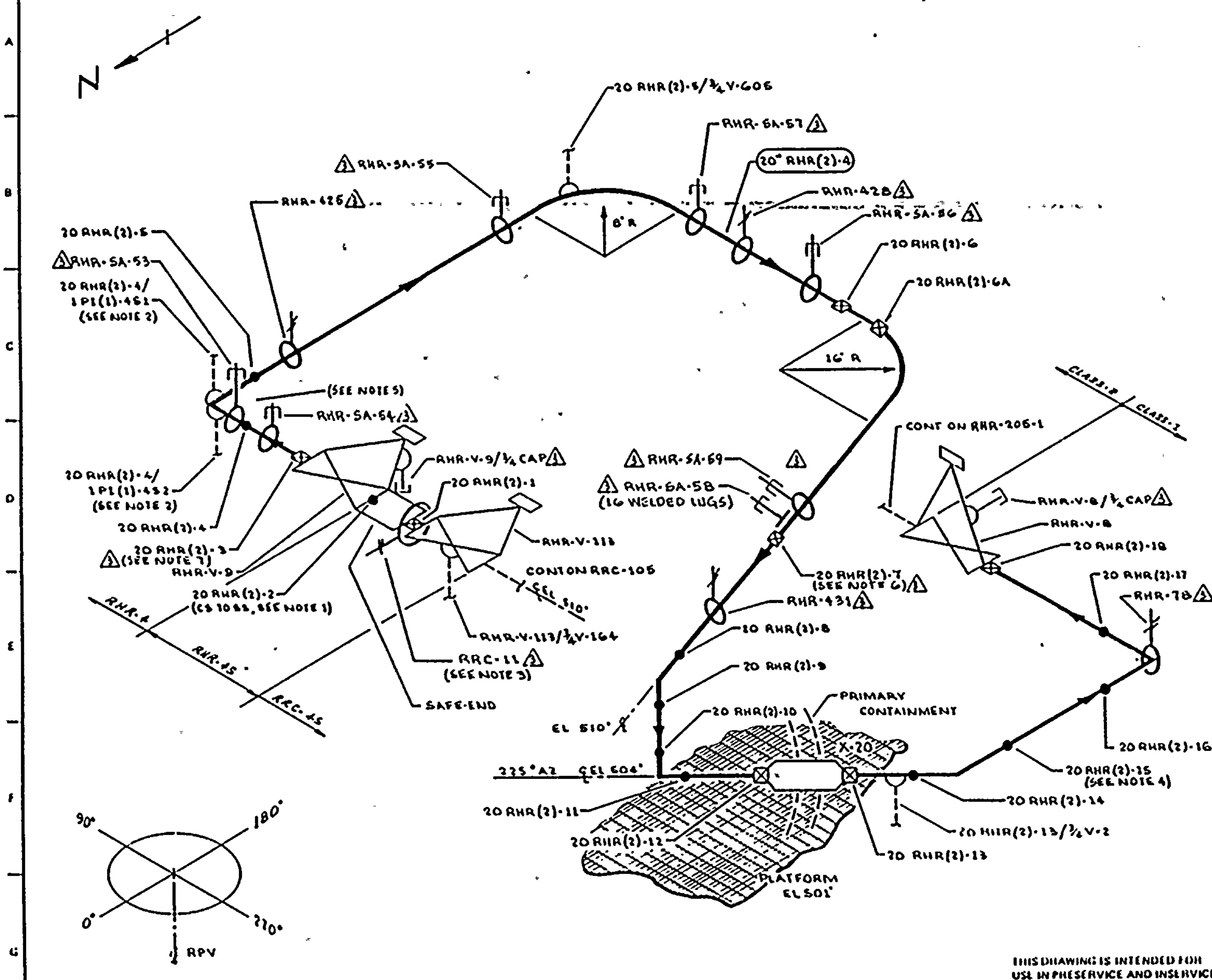
ENGR: T HOYLE | DRAWN: KMcA | DATE: 10-8-79

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352

WNP- 2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: JET PUMP INSTRUMENTATION NOZZLE N9 AT 105° & 285°

DWG NO: RPV-115 | REV 0

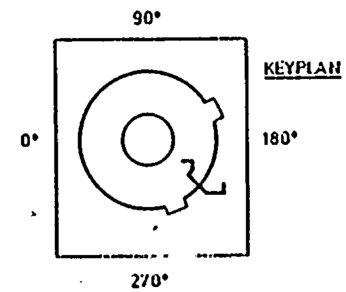


NOTES

1. DISSIMILAR METAL WELD, CS TO SS USE CAL BLOCK UT-9
2. EXTEND VISUAL LEAKAGE EXAM THROUGH CONTAINMENT (X-37 e & f) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
3. ACCESS TO WELDS 20 RHR(2)-1 & 20 RHR(2)-2 REQUIRES REMOVAL OF RRC-11
4. DISTANCE BETWEEN WELDS 20RHR(2)-15 & 20 RHR(2)-16 IS 4".
5. AN ELECTRICAL JUNCTION BOX IS ABOVE PIPE WITH 4" CLEARANCE.
6. ACCESS TO WELD 20RHR(2)-7 REQUIRES REMOVAL OF RHR-SA-58.
7. ACCESS TO WELD 20RHR(2)-3 REQUIRES REMOVAL OF RHR-SA-54.

REFERENCES:

BOVEE & CRAIL ISOMETRICS:
RHR-874-1,3 REV 10
RHR-874-6 REV 10



QUALITY CLASS: 1	ASME CODE CLASS: 1
ENGR: D PORTER	DRAWN: K McA
DATE: 12-13-77	

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

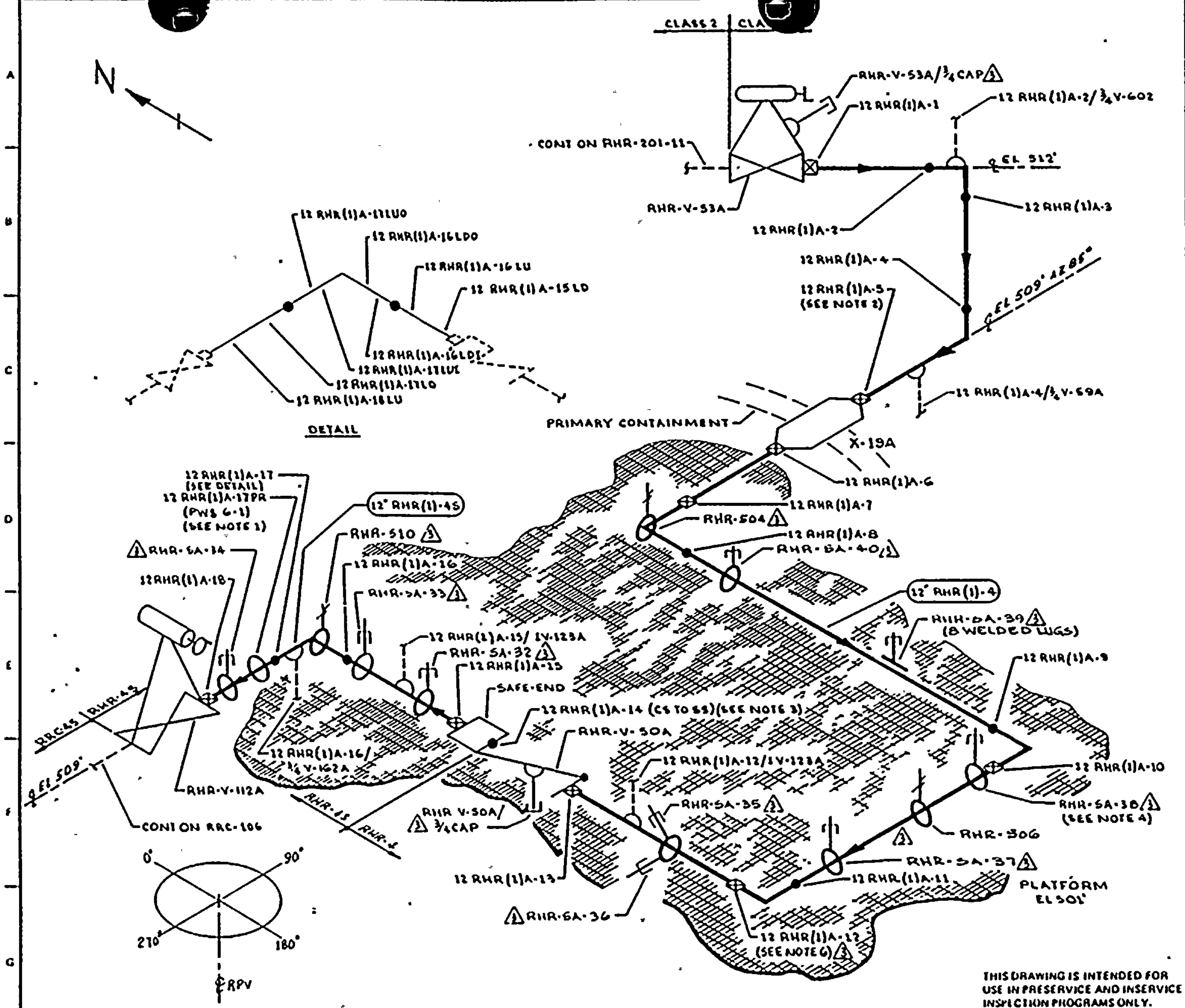
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
20" RHR(2)-4	20	80	1.031	SA 106 GR B	CS	UT-10
20" RHR(2)-45	20	80	1.031	SA 376 TP 304	SS	UT-9
LUGS	NA	NA	NA	SA 516 GR 70	CS	UT-46
LUGS	NA	NA	NA	SA 240 TP 304	SS	UT-47

NO	DATE	REVISION	BY	CHKD	APPVD
3	9-2-83	REVISED AS NOTED. ADDED KEYPLAN, LUGS	[illegible]	[illegible]	[illegible]
2	12-2-81	REVISED AS NOTED	[illegible]	-	[illegible]
1	1-13-79	ADDED FIELD WELD 20 RHR(2) 6A PER AS BUILT, ZN C-6	[illegible]	[illegible]	[illegible]
0	11-27-78	ISSUED FOR USE	[illegible]	[illegible]	[illegible]
A	3-15-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]

WNP 2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: RHR SHUTDOWN COOLING SUCTION

DWG NO: RHR-104 | REV 3



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

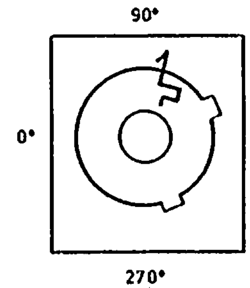
NOTES

1. ACCESS TO WELD 12 RHR(1)A-18 REQUIRES REMOVAL OF 12 RHR(1)A-17PR.
2. WELD 12 RHR(1)A-5 IS FITTING TO FITTING
3. DISSIMILAR METAL WELD, CS TO SS, - USE CAL BLOCK
4. ACCESS TO WELD 12 RHR(1)A-10 REQUIRES REMOVAL OF RHR-SA-38.
5. DELETED
6. CONDUIT 2½" ABOVE WELD 12 RHR(1)A-12.

REFERENCES

BOVEE & CRAIL ISOMETRICS:

RHR-851-14 REV 8
RHR-851-15,16 REV 7
RHR-851-17 REV 8



KEYPLAN

QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D PORTER | DRAWN: K. McA | DATE 12-14-77

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352

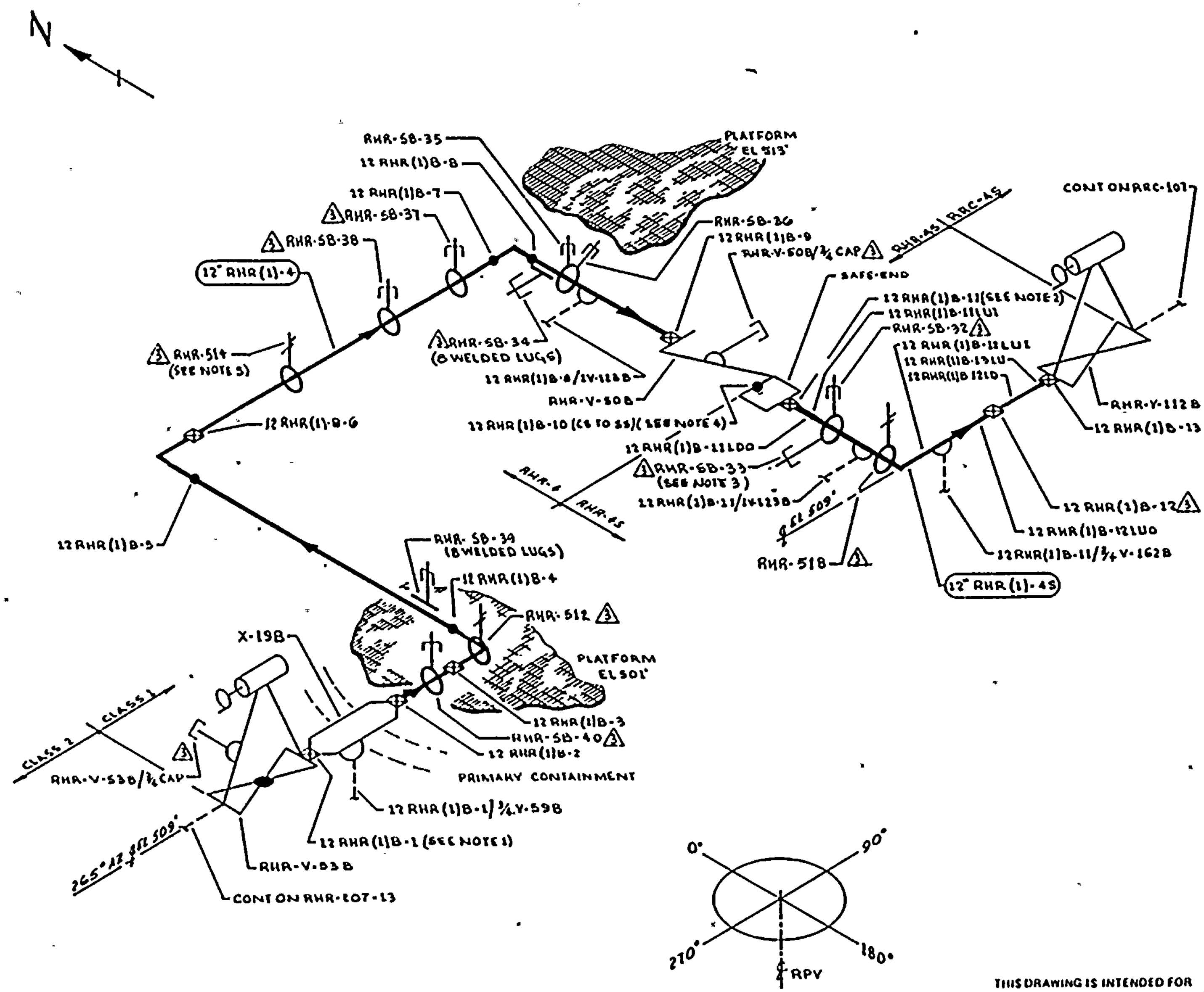
WNP 2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE
SHUTDOWN COOLING RETURN LOOP "A"

DWG NO: RHR-105 | REV 3

NO	DATE	REVISION	BY	CHKD	APPVD
3	9.26.85	REVISED AS NOTED ADDED KEYPLAN	[illegible]	[illegible]	[illegible]
2	12.2.81	REVISED AS NOTED	KMA	[illegible]	[illegible]
1	8.30.79	ADDED LONG SEAM DOWNSTREAM FROM WELDS 12RHR(1)A15,16 & 17 PER AS BUILT. ADDED DETAIL FOR CLARITY. [illegible]	KMA	[illegible]	[illegible]
0	11.21.78	ISSUED FOR USE	KMA	[illegible]	[illegible]
A	3.15.78	ISSUED FOR INFORMATION ONLY	KMA	[illegible]	[illegible]

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RHR(1)-4	12	100	0.844	SA 106 GR B	CS	UT-16
12" RHR(1)-45	12	80	0.688	SA 312 GR B	SS	UT-19



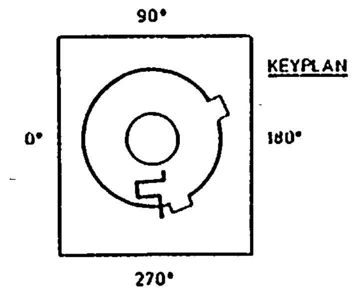
NOTES:

1. WELD Nº 12 RHR(1)B-1 IS FITTING TO FITTING.
2. WELD Nº 12 RHR(1)B-11 IS FITTING TO FITTING.
3. ⚠3 ACCESS TO WELD Nº 12 RHR(1)B-11 REQUIRES REMOVAL OF RHR-SB-32 & RHR-SB-33.
4. DISSIMILAR METAL WELD, CS TO SS, USE CAL BLOCK UT-19.
5. ⚠3 ACCESS TO WELD Nº 12 RHR(1)B-6 REQUIRES REMOVAL OF RHR-514.

REFERENCES

BOVEE & CRAIL ISOMETRICS:

RHR-899-46.47 REV 8
RHR-899-48 REV 8



QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR: D PORTER	DRAWN: K.McA	DATE: 12-15-77

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

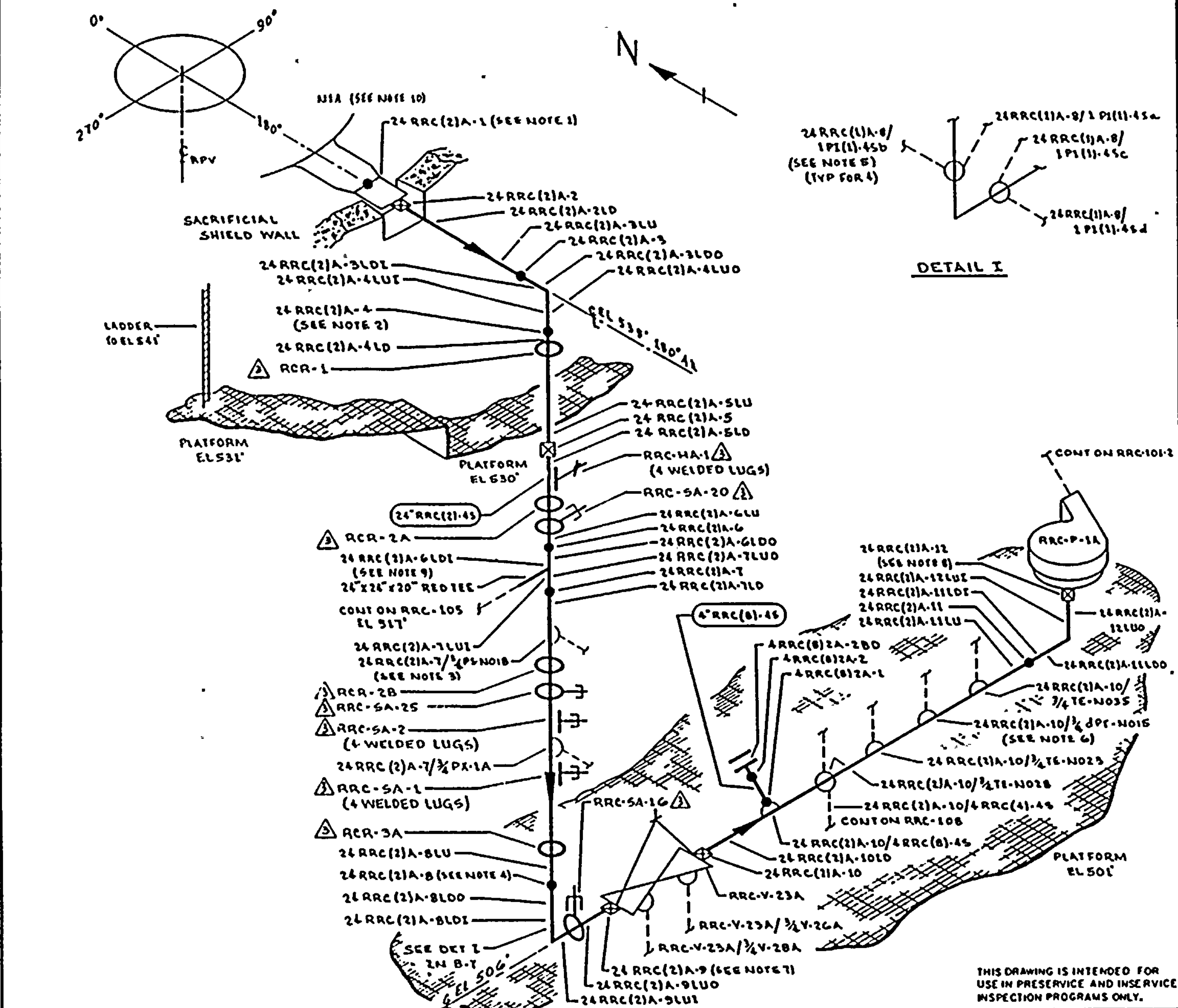
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RHR(1)-4	12	100	0.844	SA 106 GR B	CS	UT-16
12" RHR(1)-45	12	80	0.688	SA 312 TP 304	SS	UT-19
LUGS	NA	NA	NA	SA 516 GR 70	CS	UT-46
LUGS	NA	NA	NA	SA 240 TP 304	SS	UT-47

NO	DATE	REVISION	BY	CHKD	APPVD
3	9.26.83	REVISED AS NOTED ADDED KEYPLAN, LUGS	KMcA	GR	[illegible]
2	12.2.81	REVISED AS NOTED	KMcA		[illegible]
1	11.17.79	ADDED LONG SEAM DOWN STREAM FROM WELD 12 RHR(1)B-12 PER AS-BUILT [illegible]	KMcA	[illegible]	[illegible]
0	11.21.78	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	3.15.78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	

WNP 2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: SHUTDOWN COOLING RETURN LOOP "B"

DWG NO: RHR-106 | REV 3



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

NOTES:

1. WELD 24RRC(2)A-1 UTILIZES CAL BLOCK UT-101.
2. ACCESS TO WELD 24 RRC(2)A-4 REQUIRES REMOVAL OF RCR-1. (Δ1)
3. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-78F) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
4. ACCESS TO WELD 24 RRC(2)A-8 REQUIRES REMOVAL OF RCR-3A. (Δ1)
5. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATIONS (X-40c, X-40d, X-61a, & X-61b) THROUGH EXCESS FLOW CHECK VALVES TO INSTRUMENT TUBING CONNECTIONS.
6. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-70F) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
7. WELD 24 RRC(2)A-9 IS FITTING TO FITTING.
8. WELD 24 RRC(2)A-12 IS FITTING TO FITTING.
9. LONGITUDINAL WELDS LOCATED INBOARD & OUTBOARD ON THE RED TEE, WITH RESPECT TO THE RPV, ARE 90° FROM THE BRANCH CONNECTION.
10. FOR NOZZLE ASSY DET SEE RPV-105.
11. PIPING PURCHASED TO MIN WALL SPEC – C.910". (Δ1)

REFERENCES:

GENERAL ELECTRIC DRAWINGS

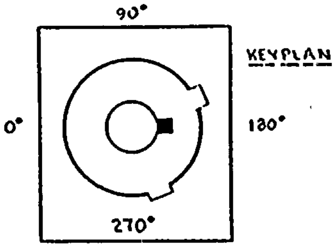
761 E 424	REV 2	161 E 735	REV 6
762 E 538 SH 1	REV 3	131 C 7587	REV 3
762 E 538 SH 2	REV 3	131 C 7586	REV 4

CBI NUCLEAR CO.

48, REV 4, N1 NOZZLE ASSEMBLY

BOVEE CRAIL/GERI

BC/G-215 REV 7



QUALITY CLASS: 1 | ASME CODE CLASS 1

ENGR D TIMMINS | DRAWN K.McA | DATE 4-5-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND, WASHINGTON 99352

WPP-2

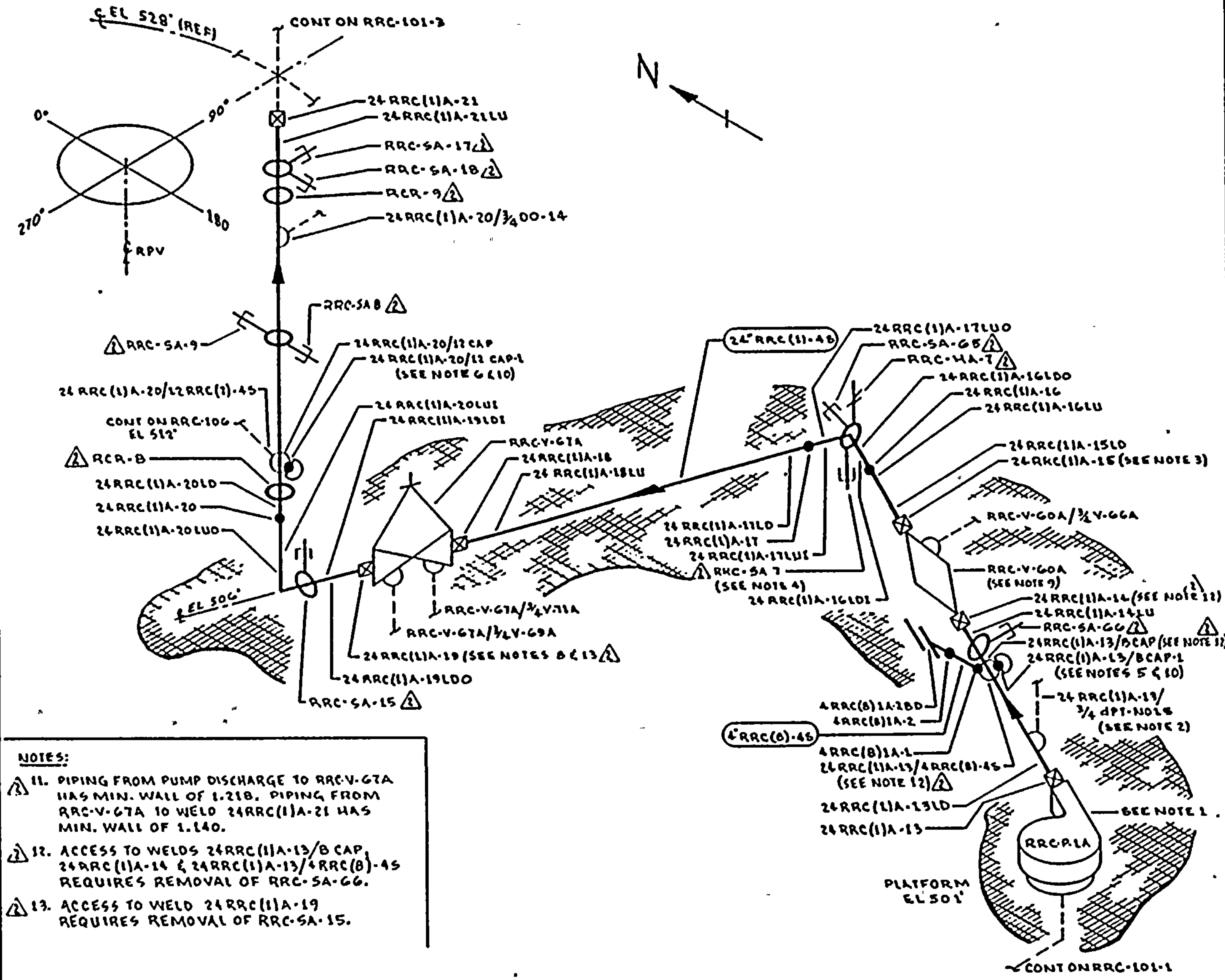
WELD & COMPONENT IDENTIFICATION DIAGRAM

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
24" RRC(2)-45	24	XXX	SEE NOTE 11	SA 358 GR 304 CL 1	SS	UT-7
4" RRC(8)-45	4	80	0.237	SA 376 TP 304	SS	UT-31
LUGS	NA	NA	NA	SA 240 TP 304	SS	UT-47

NO	DATE	REVISION	BY	CHKD	APPVD
3	12-1-83	REVISED AS NOTED ADDED KEYPLAN & LUGS	K.McA	[illegible]	FFH
2	11-5-80	ADDED NOTE 10, REVISED AS NOTED	K.McA	[illegible]	[illegible]
1	[illegible]	CORRECTED TEE TO WELDED TEE, ZN D-4	K.McA	[illegible]	[illegible]
0	11-21-78	ISSUED FOR USE	K.McA	[illegible]	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	K.McA	[illegible]	[illegible]

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO RRC-101-1 | REV 3



NOTES:

1. SEE RRC-P-1A DETAIL DWG RRC-103 FOR PUMP SUPPORT DETAILS.
2. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-70a) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
3. DELETED
4. SPECIAL CLAMP WITH HA7 & SA7 ATTACHMENTS.
5. WELD 24RRC(1)A-13/8CAP1 IS FITTING TO FITTING.
6. WELD 24RRC(1)A-20/10 CAP1 IS FITTING TO FITTING.
7. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-69d) THROUGH VALVE RRC-V-20.
8. WELD 24RRC(1)A-18 IS FITTING TO FITTING.
9. RRC-V-60A HAS TWELVE (12) 2¾" X 15" BODY TO BONNET STUDS.
10. CAP TO NOZZLE WELDS ARE CLAD ON THE ID IN THE WELD AREAS. SEE REF. DWGS. 131 C 1588 & 131 C 1589.

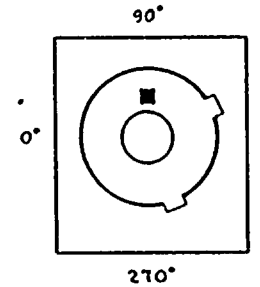
REFERENCES:

GENERAL ELECTRIC DRAWINGS:

761 E 424	REV 2	131 C 1588	REV 3
162 E 538 SH 1	REV 1	131 C 1589	REV 5
162 E 538 SH 2	REV 1	131 C 1382	REV 3
761 E 735	REV 6		

BOVEE CRAIL/GERL

BC/G-216 REV B



NOTES:

11. PIPING FROM PUMP DISCHARGE TO RRC-V-67A HAS MIN. WALL OF 1.218. PIPING FROM RRC-V-67A TO WELD 24RRC(1)A-21 HAS MIN. WALL OF 1.140.
12. ACCESS TO WELDS 24RRC(1)A-13/8 CAP, 24RRC(1)A-14 & 24RRC(1)A-13/4RRC(8)-45 REQUIRES REMOVAL OF RRC-SA-66.
13. ACCESS TO WELD 24RRC(1)A-19 REQUIRES REMOVAL OF RRC-SA-15.

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR D TIMMINS	DRAWN: V. McA	DATE: 4-6-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

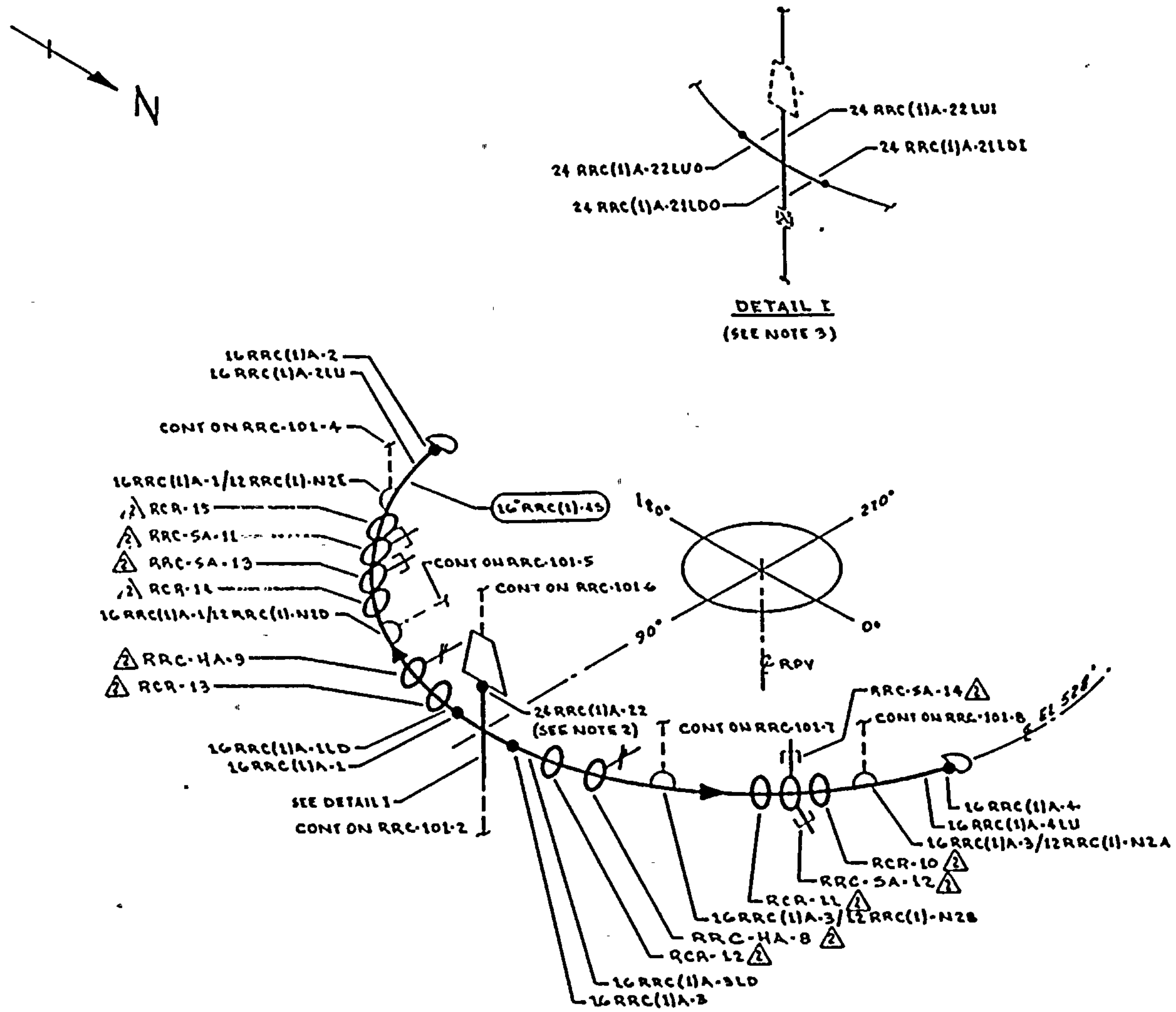
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
24" RRC(1)-45	24	XXX	SEE NOTE 11	SA 358 GR304 CL I	SS	UT-7
4" RRC(8)-45	4	80	0.337	SA 376 TP 304	SS	UT-31
CAP	12	80	0.688	SA 403 GR WP 304	-	UT-19
CAP	8	-	0.500	- - - - -	-	UT-26

NO	DATE	REVISION	BY	CHKD	APPVD
2	10-1-83	REVISED AS NOTED ADDED KEYPLAN	KMcA	JHH	
1	11-5-80	REVISED AS NOTED	KMcA	HR	
0	11-21-78	ISSUED FOR USE	KMcA		
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcA		

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-2 REV 2



NOTES:

1. ACCESS TO WELDS 16RRC(1)A-1 THRU 4 & 24RRC(1)A-22 REQUIRES TEMPORARY SCAFFOLDING.
2. WELD 24RRC(1)A-22 IS FITTING TO FITTING.
3. LONGITUDINAL WELDS ON CROSS LOCATED INBOARD & OUTBOARD, WITH RESPECT TO RPV, ARE 90° FROM THE HEADER CONN.
4. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.758". (2)

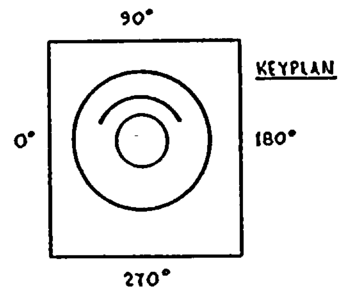
REFERENCES:

GENERAL ELECTRIC DRAWINGS

761 E 424 REV 2
762 E 538 SH 1 REV 3
762 E 538 SH 2 REV 3
761 E 735 REV 6
131 C 7590 REV 1

BOVEE CRAIL/GERF

BC/G-216 REV 8



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR D TIMMINS | DRAWN: K.McA | DATE: 4-6-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

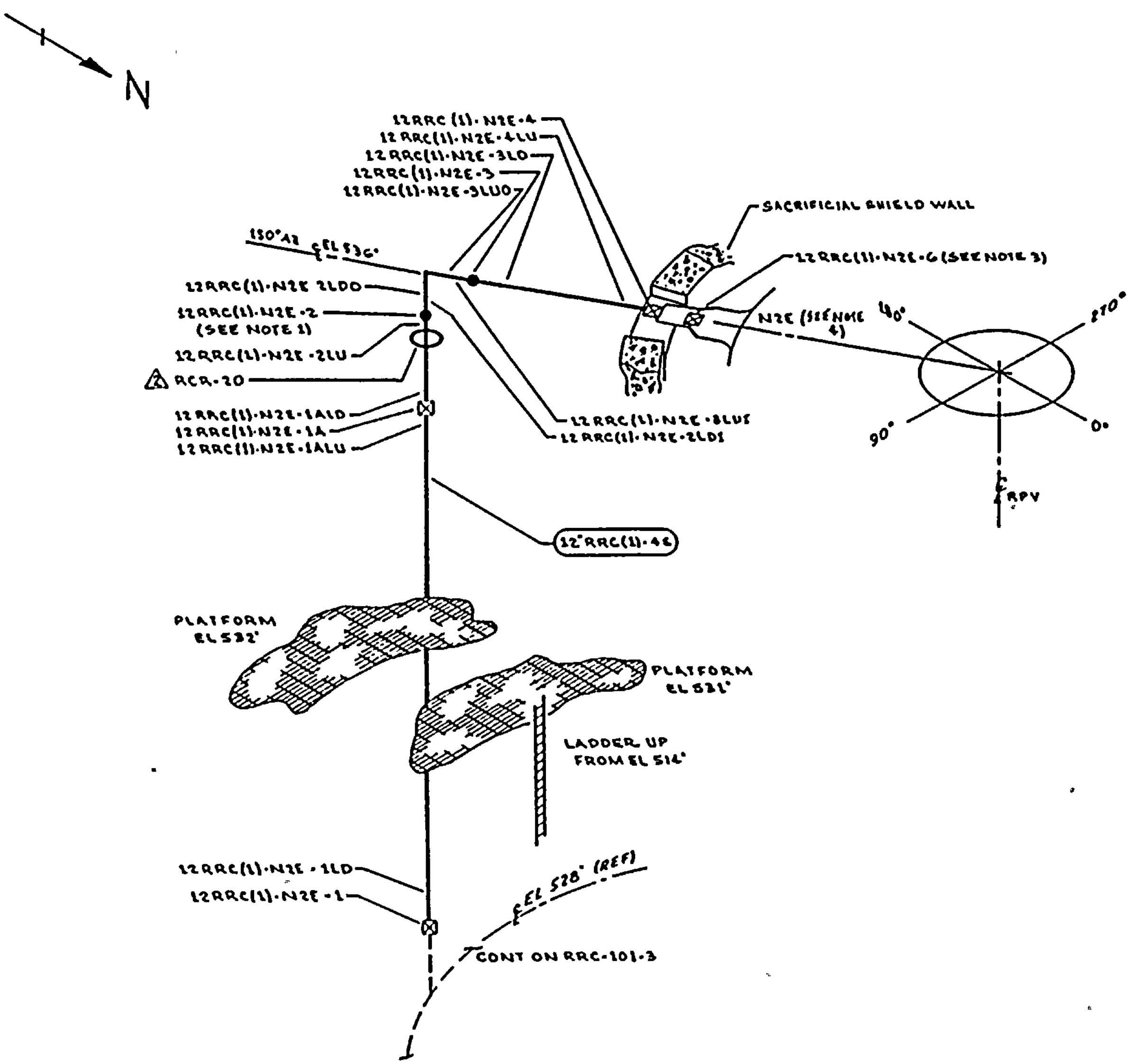
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
16" RRC(1)-45	16	XXX	SEE NOTE 4	SA 358 GR 304 CL I	55	UI-13

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE:
REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-3 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10-11-83	REVISED AS NOTED ADDED KEYPLAN	K.McA		
1	7-11-79	REVISED RISER LETTERING TO REFLECT AS BUILT, REVISED CROSS TO WELDED CROSS, ADDED DETAIL FOR CLARITY	K.McA		
0	11-2-78	ISSUED FOR USE	K.McA		
A	5-19-78	ISSUED FOR INFORMATION ONLY	K.McA		



NOTES:

1. ACCESS TO WELD 12 RRC(1)-N2E-2 REQUIRES REMOVAL OF RCR-20.
2. DELETED
3. WELD 12 RRC(1)-N2E-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

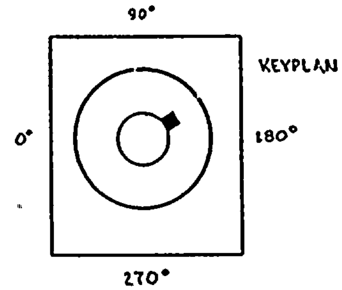
761 E 424 REV 2
762 E 538, SH 1 REV 3
762 E 538 SH 2 REV 3
761 E 735 REV 6

CBI NUCLEAR CO.

52, REV 12, N2 NOZZLE ASSEMBLY

BOVEE CRAIL / GERI

BC/G-216 REV B



QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR D TIMMINS	DRAWN: K. McA	DATE: 4-4-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-45	12	XXX	SEE NOTE 5	SA 358 GR 304 CL I	SS	UT-19

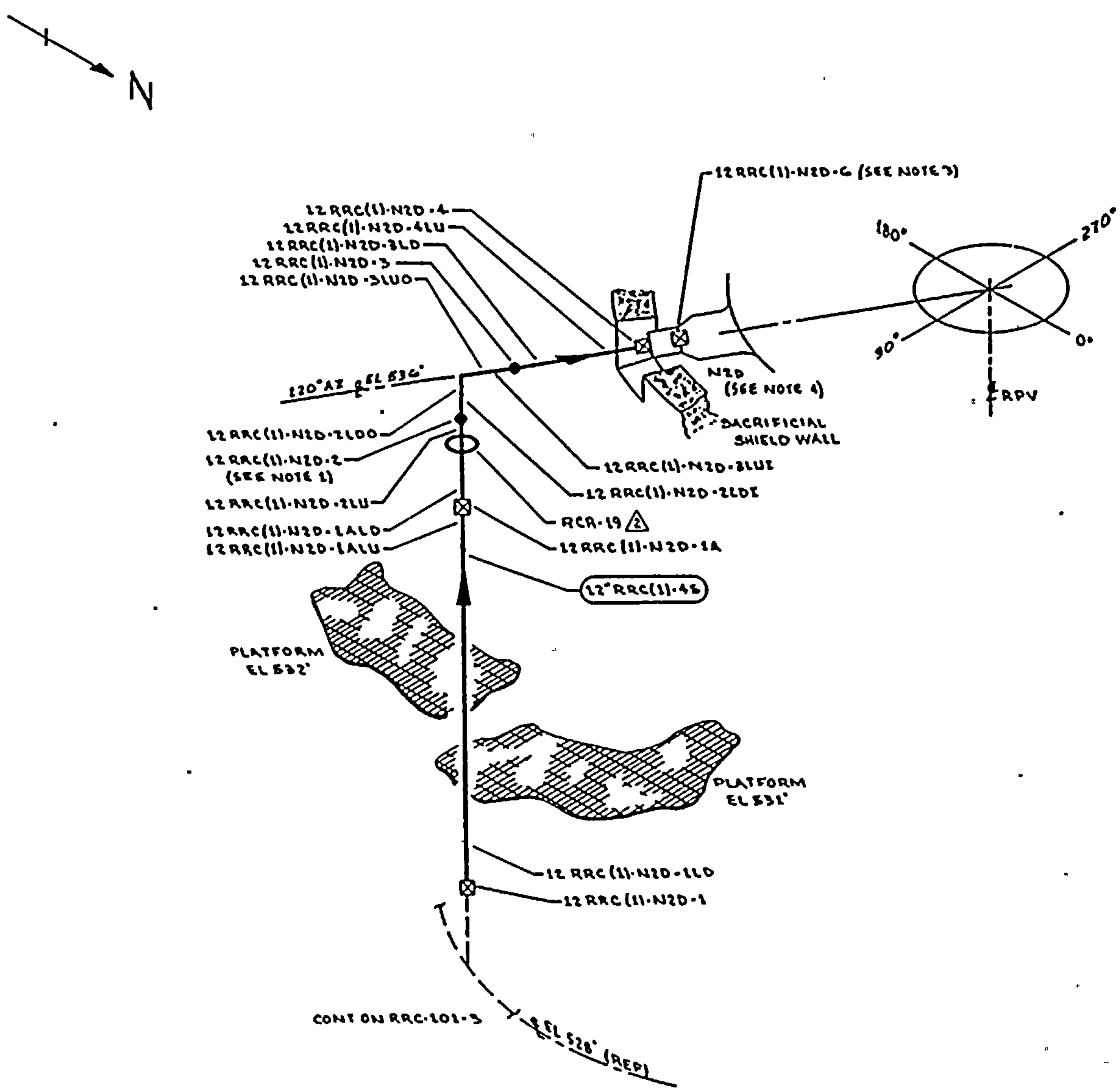
WNP-2

WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-4 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10-13-83	REVISED AS NOTED ADDED KEYPLAN	K.McA	DR	TFR
1	7-12-79	REVISED RISER LETTERING FROM A TO E, DELETED NOTE 2, WELD S. ADDED WELDS 1ALU, 1ALD, (FW 13, PER AS BUILT.	K.McA	[illegible]	[illegible]
0	11-27-78	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]



NOTES:

1. ACCESS TO WELD 12RRC(1)-N2D-2 REQUIRES REMOVAL OF RCR-19.
2. DELETED
3. WELD 12 RRC(1)-N2D-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

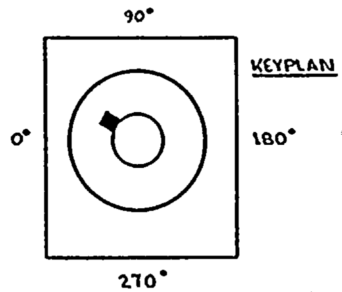
761 E REV 2
762 E SH 1 REV 3
762 E SH 2 REV 3
761 E REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL / GERI

BC/G-216 REV 8



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D TIMMINS | DRAWN: K.McA | DATE: 4-4-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

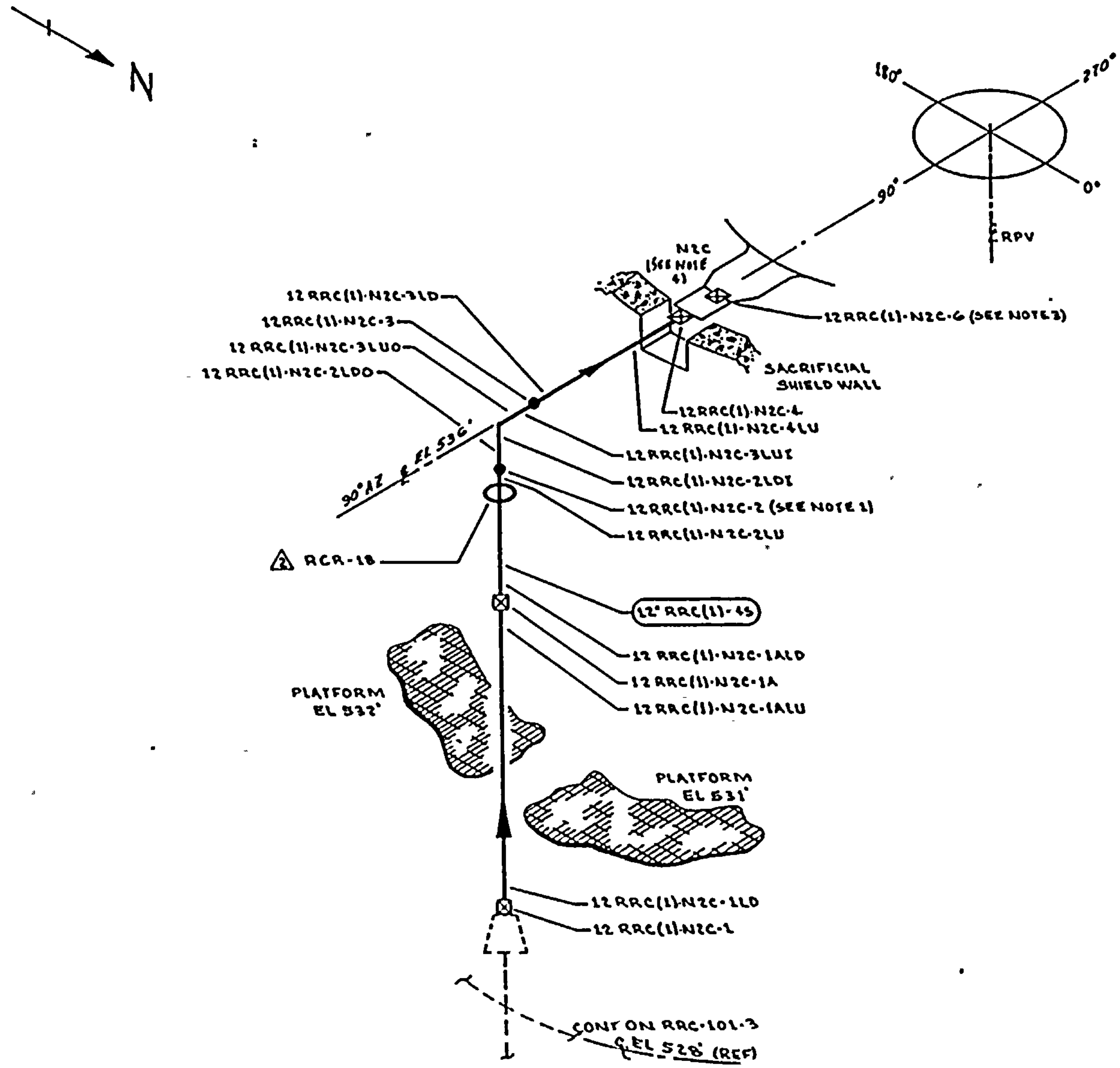
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-46	12	XXX	SEE NOTE 5	SA358 GR304 CL1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-5 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10 13 83	REVISED AS NOTED ADDED KEYPLAN	K.McA	DP	TH
1	7-11-79	REVISED RISER LETTERING FROM B TO D, DELETED NOTE 2, & WELD 3. ADDED FW 1A & WELDS 1ALU & 1ALD, PER AS BUILT.	K.McA	[illegible]	[illegible]
0	11-21-78	ISSUED FOR USE	K.McA	DCJ	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	K.McA	[illegible]	[illegible]



NOTES:

1. ACCESS TO WELD 12 RRC(1)-N2C-2 REQUIRES REMOVAL OF RCR-18.
2. DELETED
3. WELD 12 RRC(1)-N2C-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

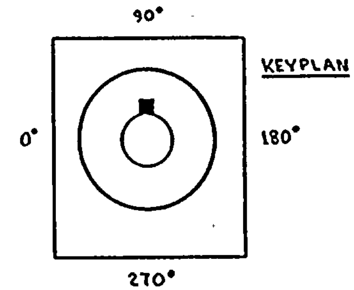
761 E REV 2
762 E SH 1 REV 3
762 E SH 2 REV 3
761 E REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL/GERI

BC/G-216 REV 8



QUALITY CLASS: 1 | ASME CODE CLASS: 1
ENGR D TIMMINS | DRAWN K. McA | DATE 4-4-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

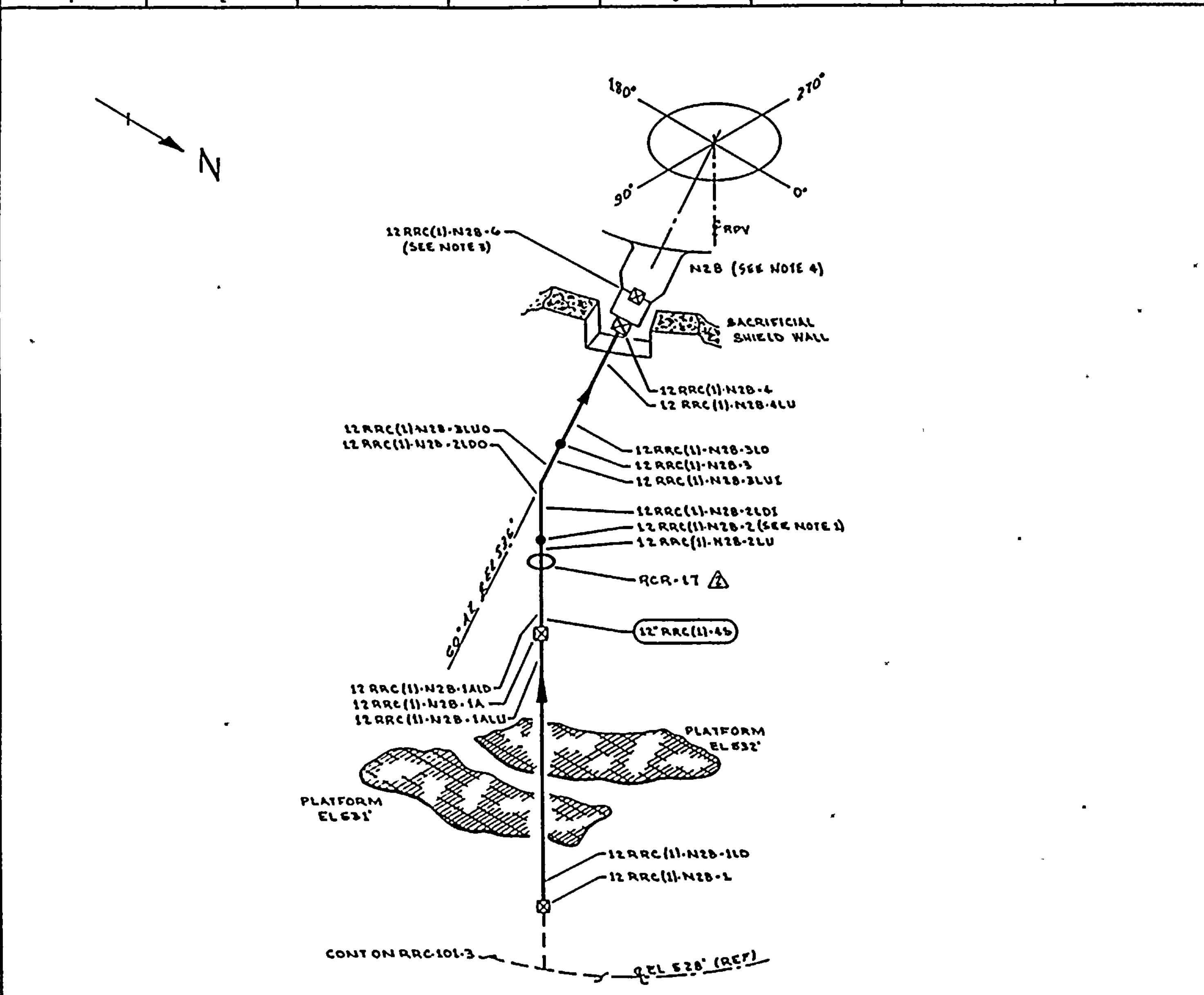
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-45	12	XXX	SEE NOTES	SB 358 GR 304 CL1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-6 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10/1/83	REVISED AS NOTED. ADDED KEYPLAN			
1	1-17-79	DELETED NOTE #2 & WELDS, ADDED FW #1A & WELDS 1ALU & 1ALD PER AS BUILT.			
0	11-11-78	ISSUED FOR USE			
A	5-19-78	ISSUED FOR INFORMATION ONLY			

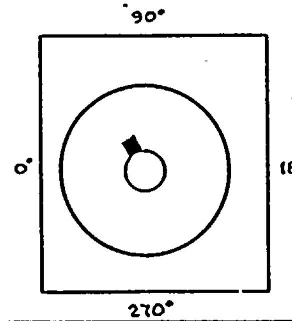


NOTES:

1. ACCESS TO WELD 12 RRC(1)-N2B-2 REQUIRES REMOVAL OF 12 RRC(1)-N2B-1PR.
2. DELETED
3. WELD 12 RRC(1)-N2B-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.

REFERENCES:

GENERAL ELECTRIC DRAWINGS
761 E 424 REV 2
762 E 538 SH1 REV 3
762 E 538 SH2 REV 3
761 E 735 REV 6
CBI NUCLEAR CO.
52, REV 10, N2 NOZZLE ASSEMBLY
BOVEE & CRAIL/GERI
BC/G-216 REV 9



KEYPLAN

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-4S	12	XXX	0.604	SA 358 GR 304 CL1	SS	UT-19

NO	DATE	REVISION	BY	CHKD	APPVD
2	12-2-83	REVISED AS NOTED ADDED KEYPLAN			
1	7-27-79	REVISED RISER LETTERING FROM D10 B, DELETED NOTE 2 & WELD -3 ADDED SW-1A & WELDS 1ALU & 1ALD PER AS BUILT			
0	11-21-78	ISSUED FOR USE			
A	5-19-78	ISSUED FOR INFORMATION ONLY			

QUALITY CLASS: 1 | ASME CODE CLASS: 1

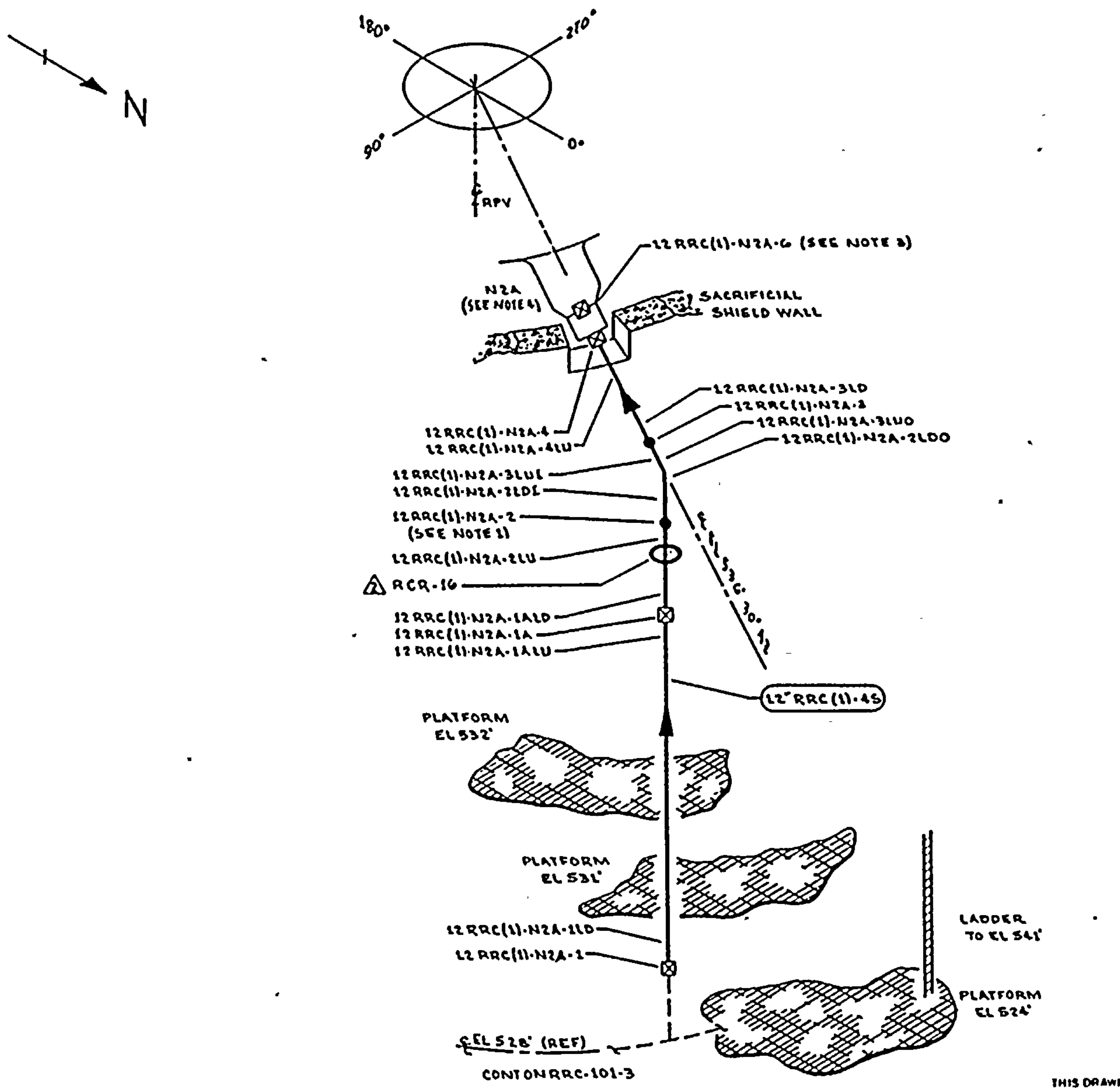
ENGR D TIMMINS | DRAWN: K. McA | DATE: 4-4-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-7 | REV 2



NOTES:

1. ACCESS TO WELD 12RRC(1)-N2A-2 REQUIRES REMOVAL OF RCR-16.
2. DELETED
3. WELD 12RRC(1)-N2A-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

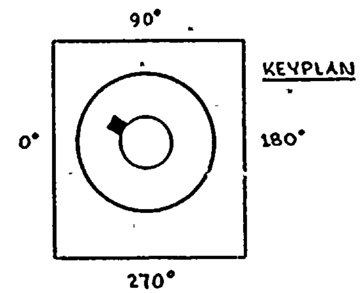
721 E 424		REV 2
762 E 538	SH 1	REV 3
762 E 538	SH 2	REV 3
761 E 735		REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL / GERI

BC/G-216 REV B



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR D TIMMINS | DRAWN K.McL | DATE: 4-4-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

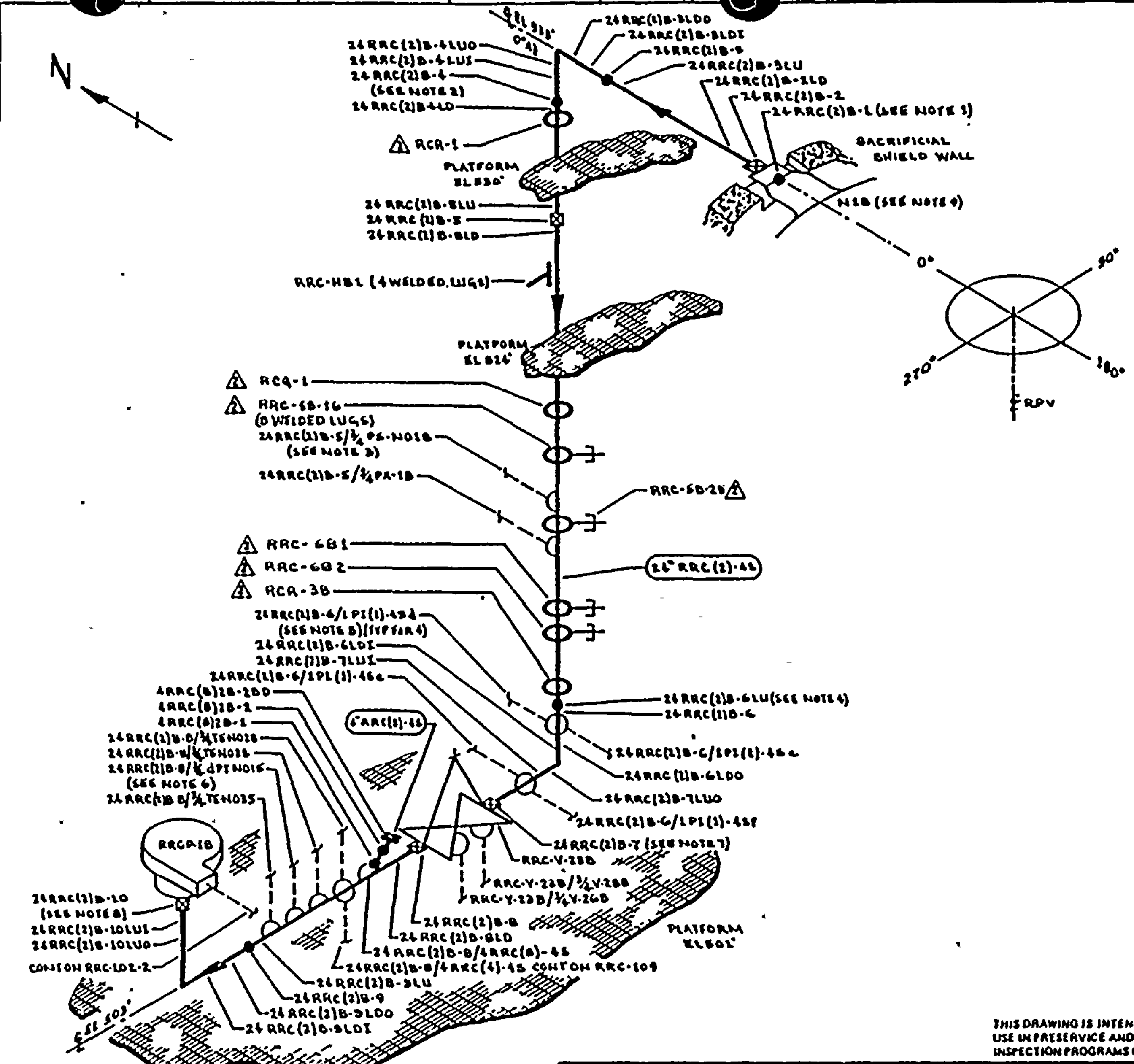
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MAT'L TYPE	CAL BLOCK NO
12" RRC(1)-4S	12	XXX	SEE NOTE 5	SA 358 GR 304 CL 1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP A

DWG NO: RRC-101-8 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10-13-81	REVISED AS NOTED ADDED KEYPLAN	K.McL	[illegible]	[illegible]
1	2-11-79	REVISED RISER LETTERING FROM E TO A. DELETED NOTE #2 & WELD ... ADDED FW ... WELDS ... PER AS BUILT	K.McL	[illegible]	[illegible]
0	11-27-78	ISSUED FOR USE	K.McL	DCS	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	K.McL	[illegible]	[illegible]



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

NOTES:

1. WELD 24RRC(2)B-1 UTILIZES CAL BLOCK UT-101 (2)
2. ACCESS TO WELD 24 RRC(2)B-4 REQUIRES REMOVAL OF RCR-1.
3. EXTEND LEAKAGE EXAM THROUGH PENETRATION (X-62a) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
4. (2) ACCESS TO WELD 24 RRC(2)B-6 REQUIRES REMOVAL OF RRC-3B.
5. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-75c, X-75d, X-75e & X-75f) THROUGH EXCESS FLOW CHECK VALVES TO INSTRUMENT TUBING CONNECTIONS.
6. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-41c) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
7. WELD 24RRC(1)B-7 IS FITTING TO FITTING.
8. WELD 24RRC(1)B-10 IS FITTING TO FITTING.
9. FOR NOZZLE ASSY. DET. SEE RPV-105.
10. (2) PIPING PURCHASED TO MIN. WALL SPEC — 0.910".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

761 E 424	REV 2
762 E 338 SH 1	REV 3
762 E 338 SH 2	REV 3
761 E 785	REV 6
131 C 7586	REV 4
131 C 7587	REV 3

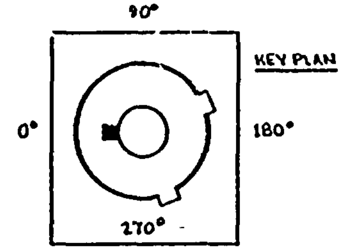
CBI NUCLEAR CO.

48, REV 4 N1 NOZZLE ASSEMBLY

BOVEE CRAIL/GERI

BC/G-217 REV 7

KEY PLAN



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D TIMMINS | DRAWN: K.M.A. | DATE: 3-29-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND WASHINGTON 99352

WNP-2

WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

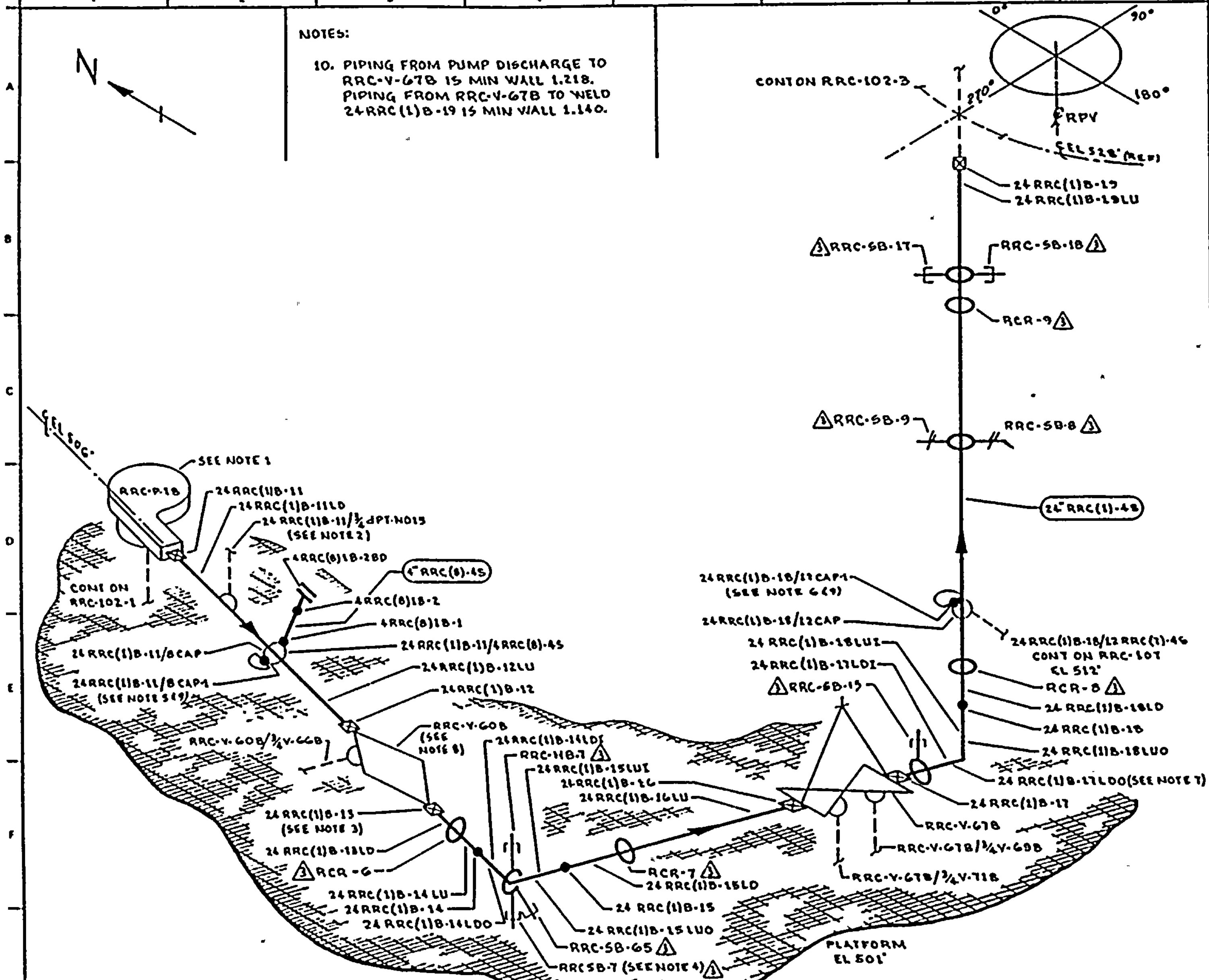
DWG NO: RRC-102-1 | REV 2

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
24" RRC(2)-4S	24	XXX	SEE NOTE 10	SA 358 GR 304 CL 1	88	UT-7
4" RRC(8)-4S	4	80	0.237	SA 376 TP 304	88	UT-31
LUGS	NA	NA	NA	SA 240 TP 304	66	UT-47

NO	DATE	REVISION	BY	CHKD	APPVD
2	12-11-81	REVISED AS NOTED ADDED KEYPLAN & LUGS	K.M.A.	[illegible]	TTK
1	11-5-80	ADDED NOTE 9	K.M.A.	[illegible]	[illegible]
0	11-17-78	ISSUED FOR USE	K.M.A.	[illegible]	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	K.M.A.	[illegible]	[illegible]

NOTES:

10. PIPING FROM PUMP DISCHARGE TO RRC-V-67B IS MIN WALL 1.218. PIPING FROM RRC-V-67B TO WELD 24RRC(1)B-19 IS MIN WALL 1.140.



NOTES:

1. SEE RRC-P-1B DETAIL DWG RRC-103 FOR PUMP SUPPORT DETAILS.
2. EXTEND LEAKAGE EXA'M THROUGH CONTAINMENT PENETRATION (X-41 d) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
3. (3) ACCESS TO WELD 24RRC(1)B-13 REQUIRES REMOVAL OF RCR-6.
4. SPECIAL CLAMP WITH HBT & SBT ATTACHMENTS.
5. WELD 24RRC(1)B-11/8CAP1 IS FITTING TO FITTING.
6. WELD 24RRC(1)B-18/12CAP1 IS FITTING TO FITTING.
7. WELD 24RRC(1)B-17 IS FITTING TO FITTING.
8. RRC-V-60B HAS TWELVE (12) 2¾" X 15" BODY TO BONNET STUDS.
9. CAP TO NOZZLE WELDS ARE CLAD ON THE ID IN THE WELD AREAS. SEE REF. DWGS 131 C 7588 & 131 C 7589.

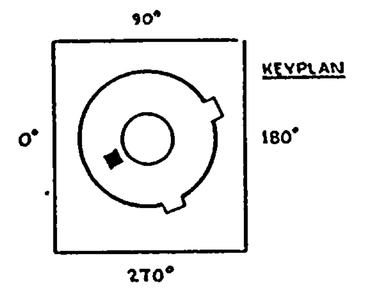
REFERENCES:

GENERAL ELECTRIC DRAWINGS

761 E 424	REV 2
762 E 538 SH 1	REV 3
762 E 538 SH 2	REV 3
761 E 135	REV 6
131 C 7588	REV 7
131 C 7589	REV 5
131 C 7592	REV 3

BOVEE CRAIL/GERT

BC/G-218 REV 7



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D TIMMINS | DRAWN: KMcL | DATE: 3-30-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
24" RRC(1)-45	24	XXX	SEE NOTE 10	SA 358 GR 304 CL 1	66	UT-7
4" RRC(8)-45	4	40	0.237	SA 376 TP 304	53	UT-31
(A) CAP	12	80	0.688	SA 403 GR WP 304	66	UT-19
(A) CAP	8	-	0.500	- - - - -	56	UT-26

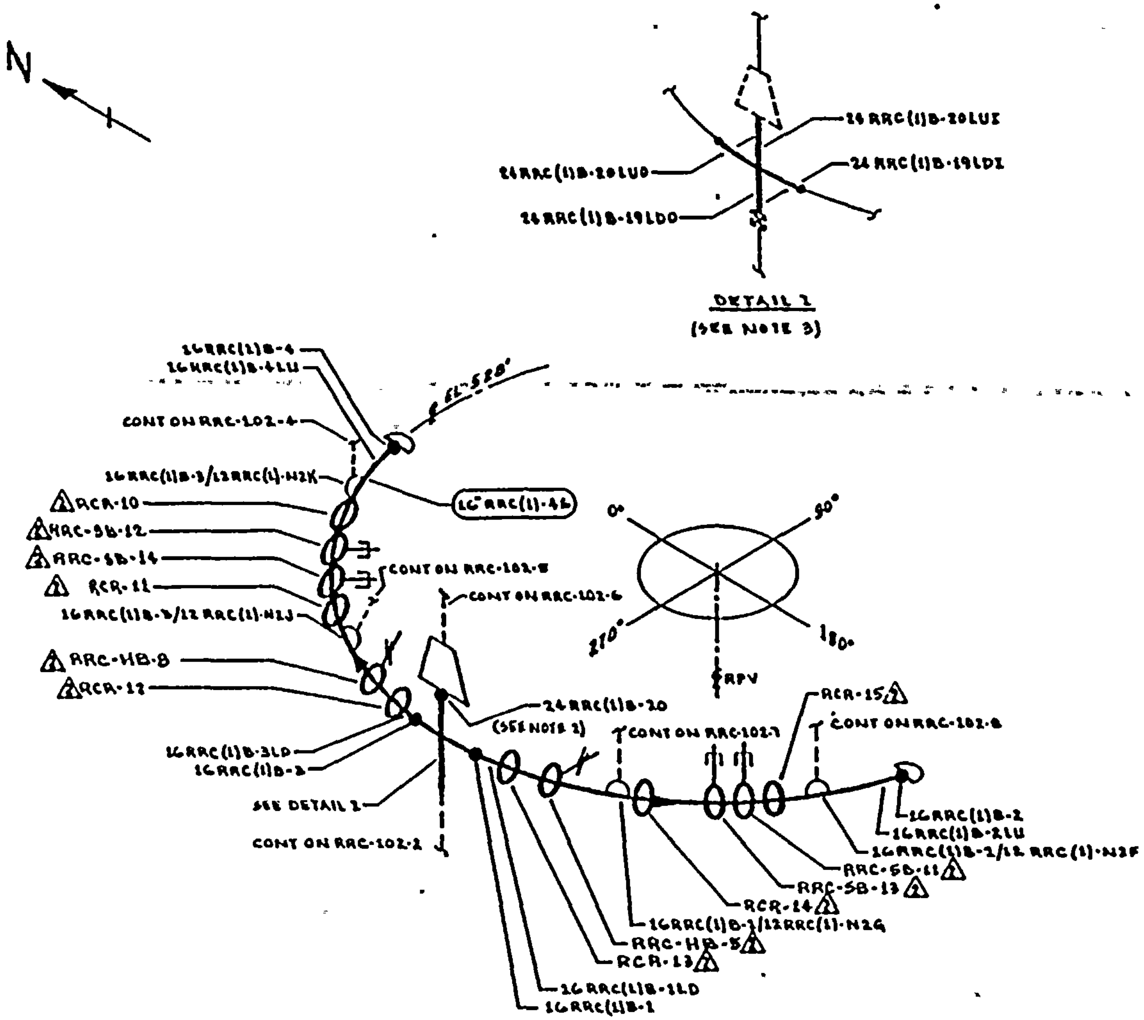
NO	DATE	REVISION	BY	CHKD	APPVD
3	10.13.83	REVISED AS NOTED ADDED KEYPLAN	KMcL		
2	11.5.80	REVISED AS NOTED	KMcL		
1	7.27.79	RELOCATED AZIMUTH ORIENTATION FOR CLARITY, IN A-7	KMcL		
0	11.27.78	ISSUED FOR USE	KMcL	DCJ	
A	5.19.78	ISSUED FOR INFORMATION ONLY	KMcL	DCJ	

WNP-2

WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-2 | REV 3



NOTES:

1. ACCESS TO WELDS 16RRC(1)B-1 THRU 4 & 24 RRC(1)B-20 REQUIRES TEMPORARY SCAFFOLDING.
2. WELD 24RRC(1)B-20 IS FITTING TO FITTING.
3. LONGITUDINAL WELDS ON CROSS LOCATED INBOARD & OUTBOARD, IN RESPECT TO THE RPV, ARE 90° FROM HEADER CONNECTIONS.

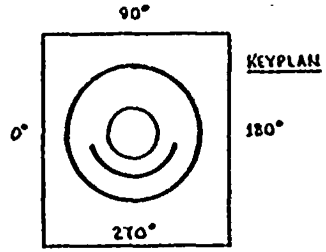
REFERENCES:

GENERAL ELECTRIC DRAWINGS

761 E 424	REV 2
762 E 838 SH 1	REV 3
762 E 838 SH 2	REV 3
761 E 785	REV 6
131 C 7850	REV 1

BOYES CRAIL/GERE

BC/G-21B REV B



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D TIMMINS | DRAWN: K.McA | DATE: 3-30-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

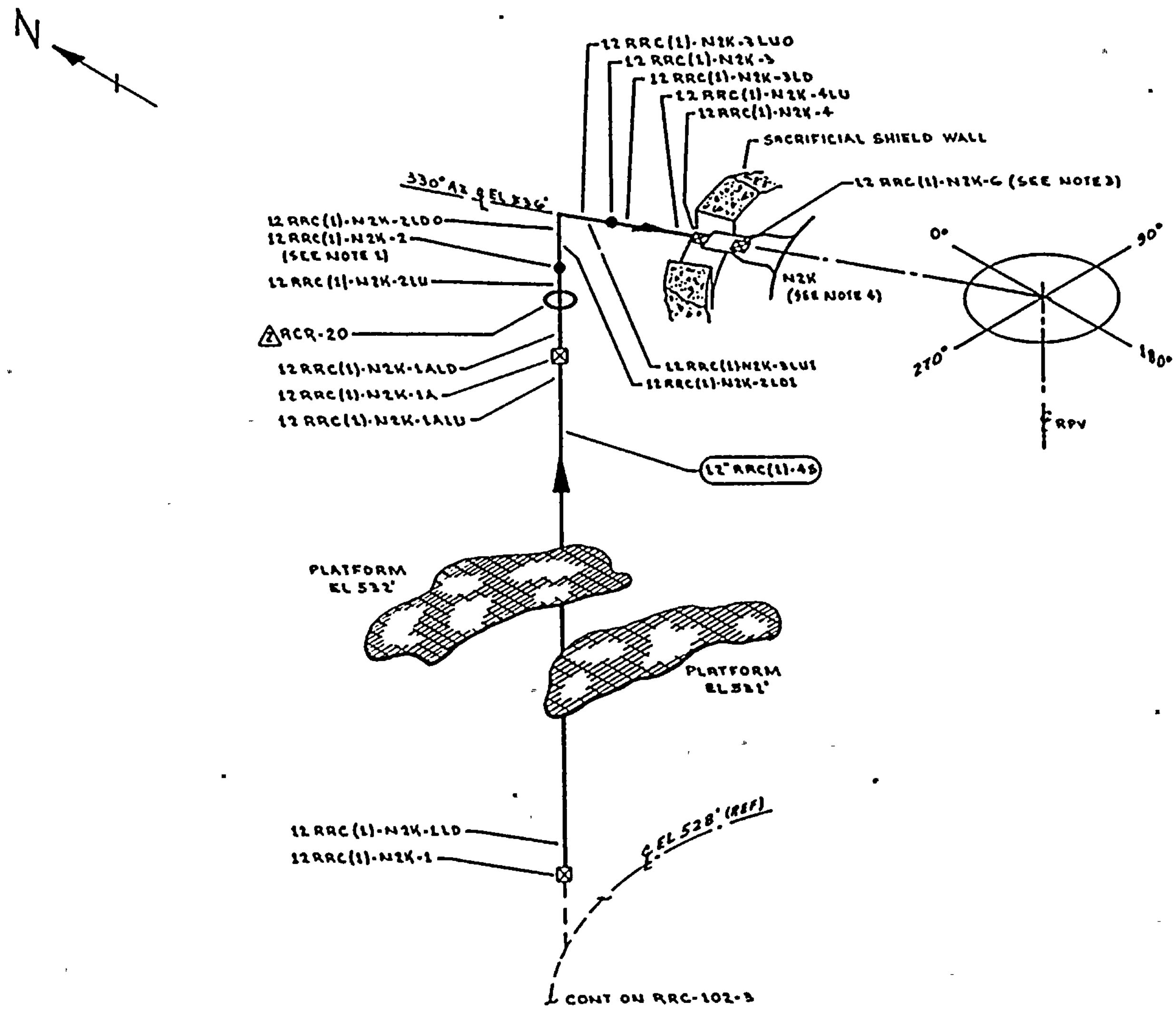
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
24" RRC(1)-46	24	XXX	1.140	SA 358 GR 304 CL1	SS	UT-7
16" RRC(1)-46	16	XXX	0.758	SA 358 GR 304 CL1	SS	UT-13

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-3 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	4/4/83	REVISED AS NOTED ADDED KEYPLAN	KMA	[illegible]	TFH
1	7/13/79	[illegible]	KMA	[illegible]	[illegible]
0	11/2/78	ISSUED FOR USE	KMA	DJ	[illegible]
A	5/19/78	ISSUED FOR INFORMATION ONLY	KMA	DCJ	[illegible]



NOTES:

1. ACCESS TO WELD 12 RRC(1)-N2K-2 REQUIRES REMOVAL OF RCR-20.
2. DELETED
3. WELD 12 RRC(1)-N2K-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

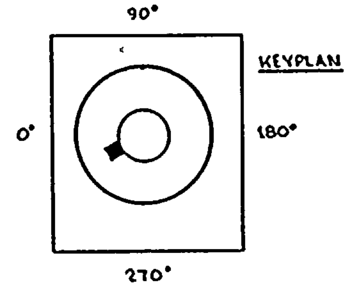
761 E 424 REV 2
761 E 538 SH 1 REV 3
761 E 538 SH 2 REV 3
761 E 735 REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL/GERI

BC/G-218 REV 7



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR D TIMMINS | DRAWN: K. McA | DATE: 3-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

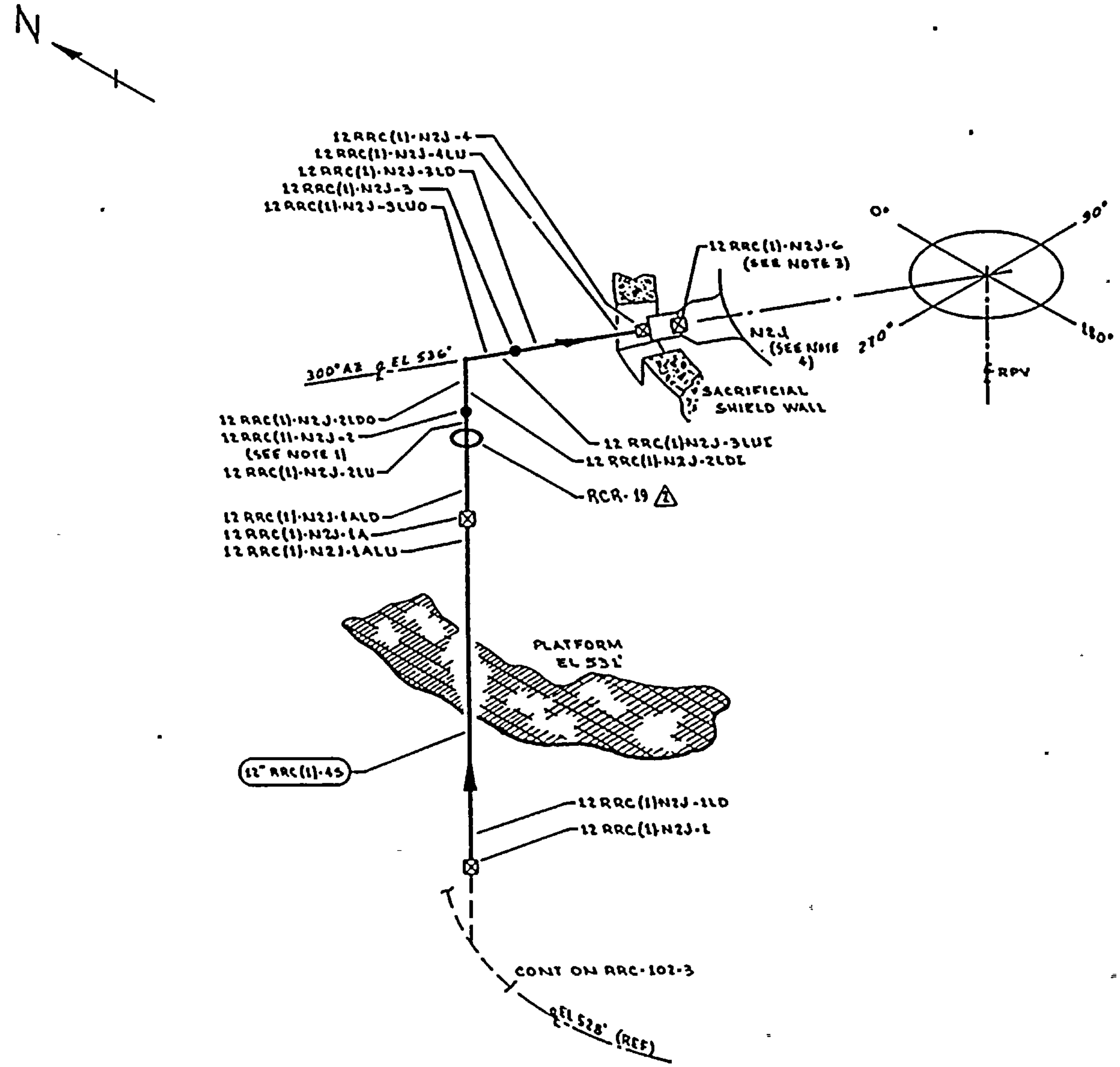
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-45	12	XXX	SEE NOTE 5	SA 358 GR 304 CL 1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-4 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	10-13-83	REVISED AS NOTED ADDED KEYPLAN	KMcA		
1	7-12-79	REVISED RISER LETTERING FROM 5 TO K, DELETED NOTE #2 & WELD #5, ADDED FW 1A & WELDS 1ALU & 1ALD PER AS BUILT	KMcA		
0	11-27-78	ISSUED FOR USE	KMcA		
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcA		



NOTES:

1. ACCESS TO WELD 12 RRC(1)-N2J-2 REQUIRES REMOVAL OF RCR-19. ⚠2
2. DELETED
3. WELD 12 RRC(1)-N2J-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604". ⚠2

REFERENCES:

GENERAL ELECTRIC DRAWINGS

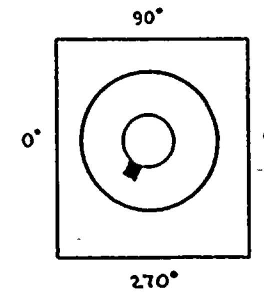
761 E 424		REV 2
762 E 538	SH 1	REV 3
762 E 538	SH 2	REV 3
761 E 735		REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL / GERI

BC/G-218 REV 7



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-45	12	XXX	SEE NOTE 5	SA 358 GR 304 CL 1	SS	UT-19

NO	DATE	REVISION	BY	CHKD	APPVD
2	9-26-83	REVISED AS NOTED ADDED KEYPLAN	KMcA	[illegible]	[illegible]
1	1-27-79	REVISED RISER LETTERING FROM C TO J, DELETED NOTE #2, WELD #5, ADDED FW 1A & WELDS [illegible]	KMcA	[illegible]	[illegible]
0	11-21-78	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]

QUALITY CLASS: 1 | ASME CODE CLASS: 1

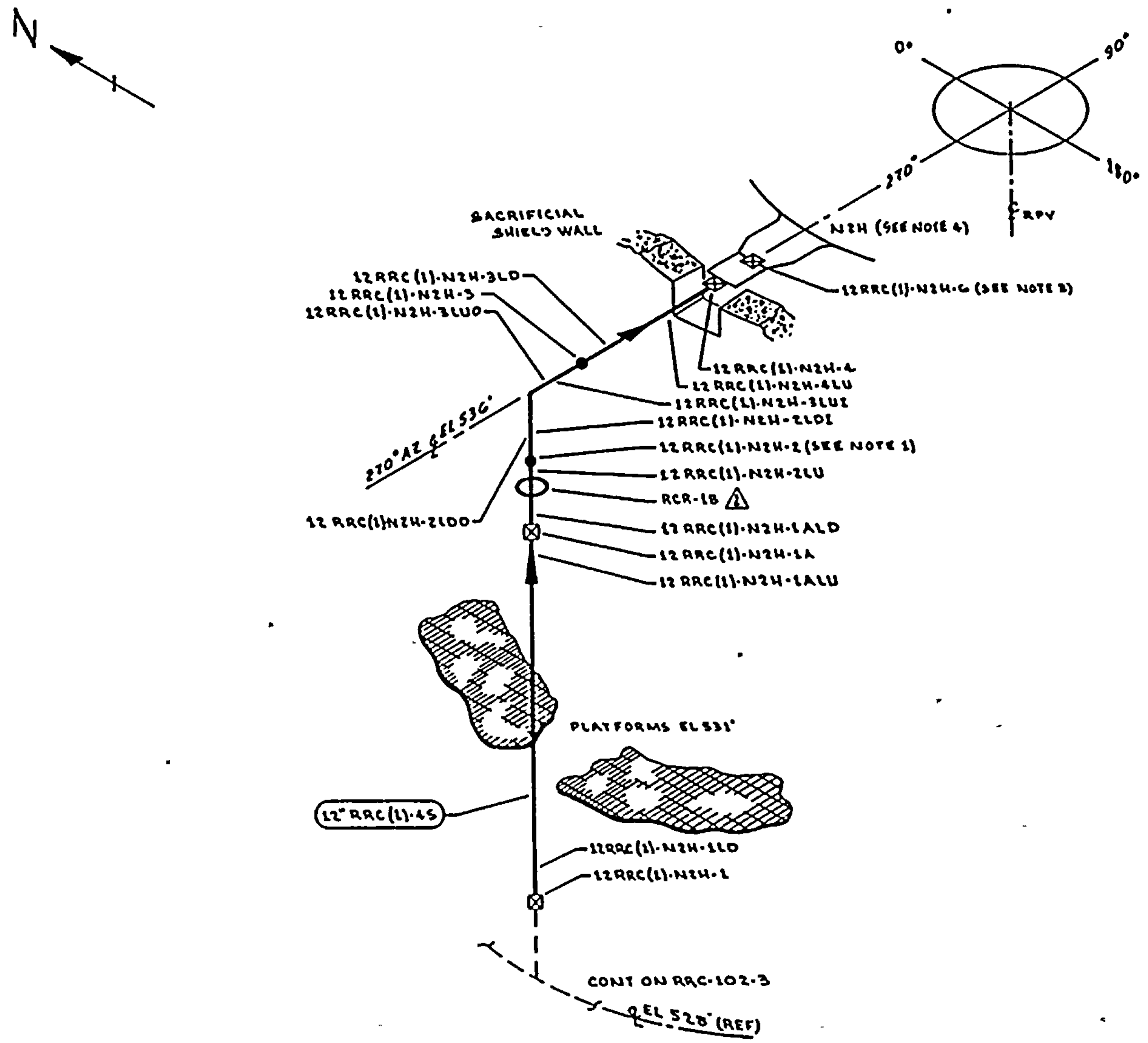
ENGR: D TIMMINS | DRAWN: K McA | DATE: 3-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-5 | REV 2



NOTES:

1. ACCESS TO WELD 12RRC(1)-N2H-2 REQUIRES REMOVAL OF RCR-1B.
2. DELETED
3. WELD 12 RRC(1)-N2H-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

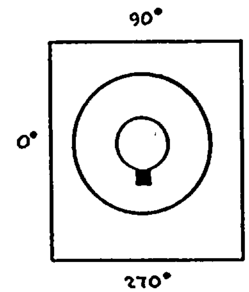
761 E 424 REV 2
762 E 538 SH 1 REV 3
762 E 538 SH 2 REV 3
761 E 735 REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL/GERI

BC/G-218 REV 7



QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR: D TIMMINS	DRAWN: K.McL	DATE: 3-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

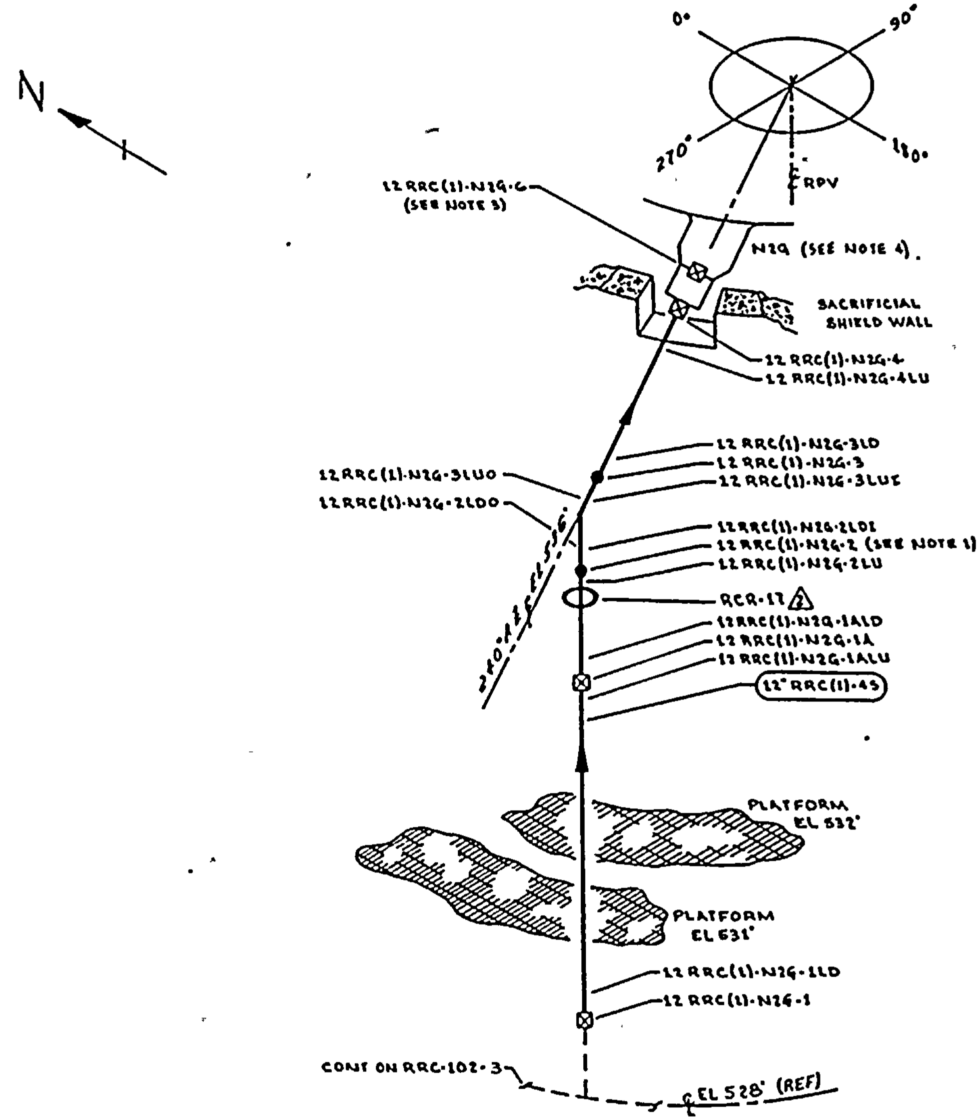
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MAT'L TYPE	CAL BLOCK NO
12" RRC(1)-4S	12	XXX	SEE NOTE 5	SA 358 GR 304 CL 1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-6 | REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	9-26-83	REVISED AS NOTED ADDED KEYPLAN	KMcL		
1	7-17-79	DELETED NOTE #2 & WELD #5. ADDED FW #1A & WELDS 1ALU & 1ALD, PER AS-BUILT. ADDED NOTE 1.	KMcL		
0	11-21-78	ISSUED FOR USE	KMcL		
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcL		



NOTES:

1. ACCESS TO WELD 12RRC(1)-N2G-2 REQUIRES REMOVAL OF RCR-17.
2. DELETED
3. WELD 12RRC(1)-N2G-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604".

REFERENCES:

GENERAL ELECTRIC DRAWINGS

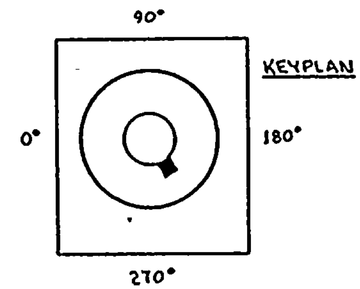
- 761 E 424 REV 2
- 762 E 538 SH 1 REV 3
- 762 E 538 SH 2 REV 3
- 761 E 735 REV 6

CBI NUCLEAR CO.

- 52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL / GERE

- BC/G-218 REV 7



QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR: D TIMMINS	DRAWN: K. McA	DATE: 3-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

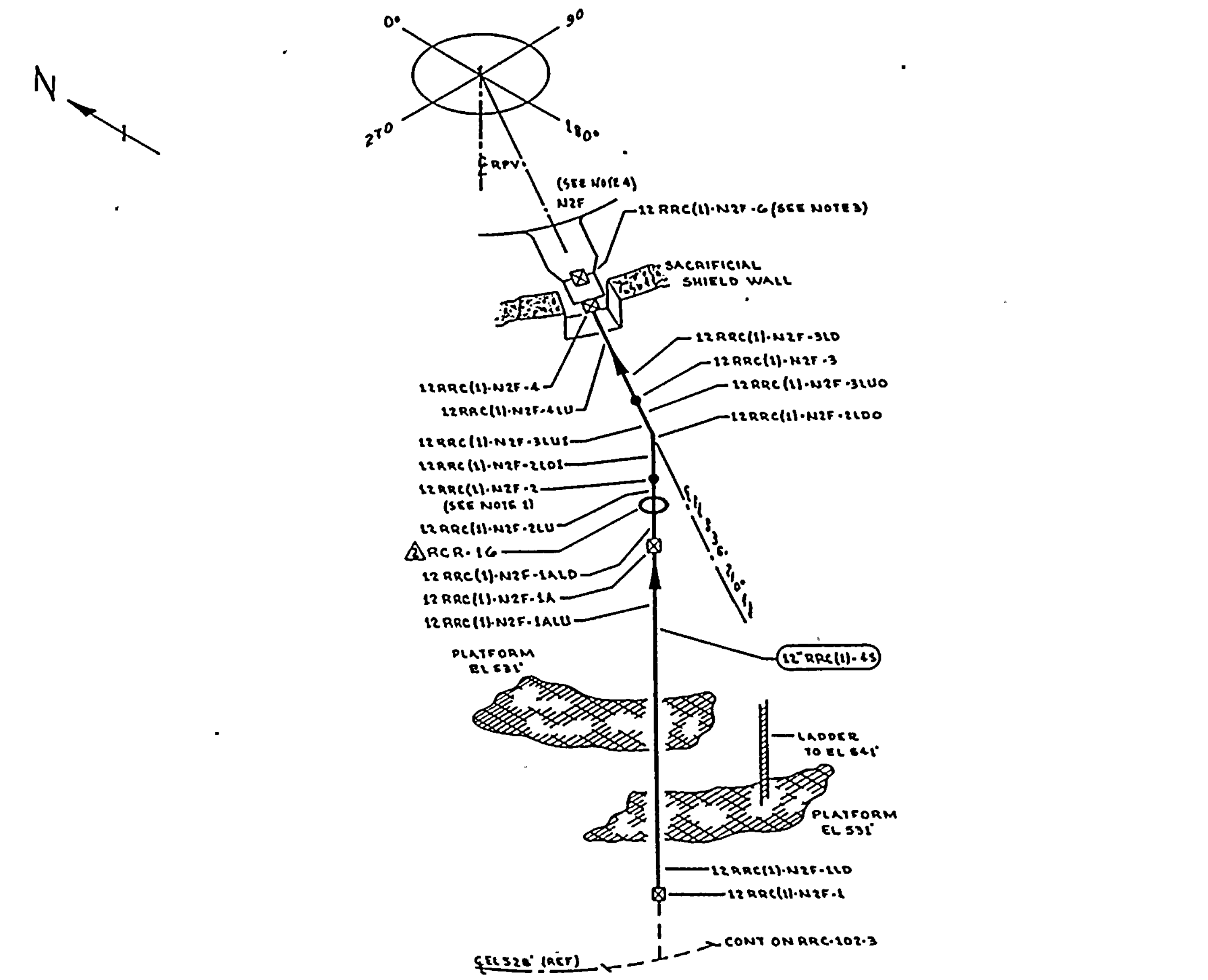
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-45	12	XXX	SEE NOTES	SA 358 GR 304 CL 1	SS	UT-19

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: REACTOR RECIRCULATION LOOP B

DWG NO. RRC-102-2 REV 2

NO	DATE	REVISION	BY	CHKD	APPVD
2	9-26-83	REVISED AS NOTED ADDED KEYPLAN	KMcA	FAR	[illegible]
1	1-12-79	REVISED RISER LETTERING FROM 10 TO G, DELETED WELD'S, & NOTE #2, ADDED FW-35A & WELDS ... TO AS BUILT	KMcA	[illegible]	[illegible]
0	11-21-18	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	5-19-18	ISSUED FOR INFORMATION ONLY	KMcA	DCJ	[illegible]



NOTES:

1. ACCESS TO WELD 12RRC(1)-N2F-2 REQUIRES REMOVAL OF RCR-16. (2)
2. DELETED
3. WELD 12RRC(1)-N2F-6 UTILIZES CAL BLOCK UT-111.
4. FOR NOZZLE ASSEMBLY DETAILS SEE RPV-106.
5. PIPING PURCHASED TO MIN WALL SPECIFICATION. MIN WALL 0.604". (2)

REFERENCES:

GENERAL ELECTRIC DRAWINGS

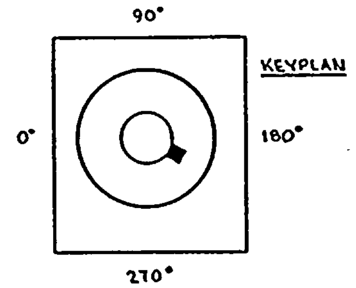
761 E 424 REV 2
762 E 538 SH 1 REV 3
762 E 538 SH 2 REV 3
761 E 735 REV 6

CBI NUCLEAR CO.

52, REV 10, N2 NOZZLE ASSEMBLY

BOVEE CRAIL/GERE

BC/G-218 REV 7



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(1)-4S	12	XXX	SEE NOTE 5	SA 358 GR 304 CL 1	6S	UT-19

NO	DATE	REVISION	BY	CHKD	APPVD
2	4-16-83	REVISED AS NOTED ADDED KEYPLAN	KMcA	[illegible]	[illegible]
1	7-17-79	REVISED RISER ELEVATIONS FROM K&F, DELETED WELD ... ADDED ... WELDS ... AS BUILT	KMcA	[illegible]	[illegible]
0	11-27-78	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	5-19-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]

QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR: D TIMMINS | DRAWN: K.McA | DATE: 4-3-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

RICHLAND, WASHINGTON 99352

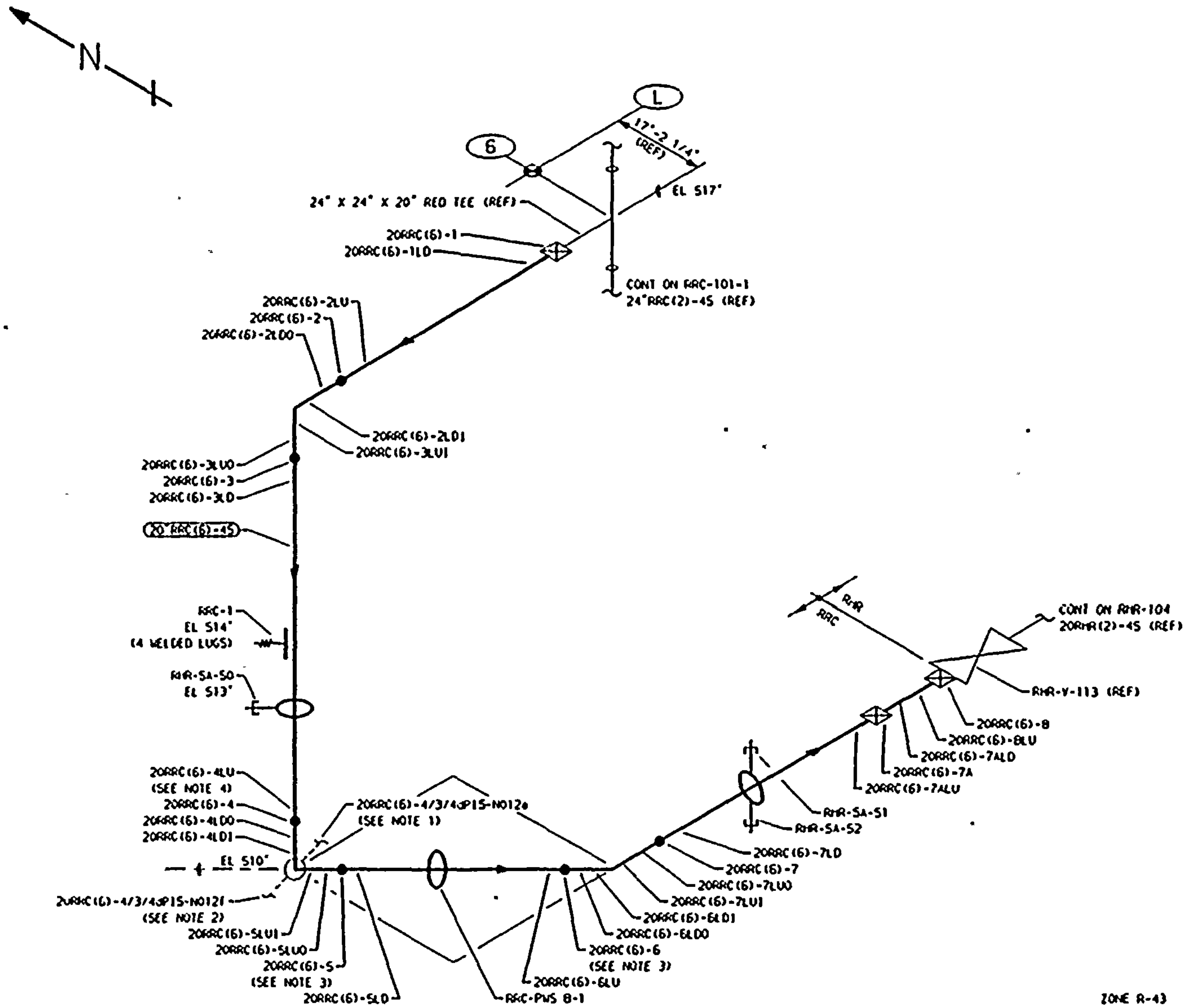
WNP-2

WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE:

REACTOR RECIRCULATION LOOP B

DWG NO: RRC-102-B | REV 2



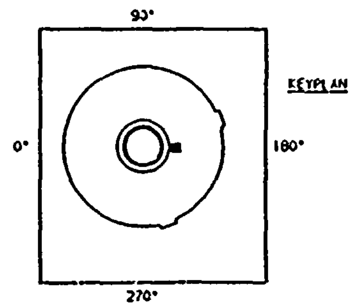
NOTES:

1. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-74e) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
2. EXTEND LEAKAGE EXAM THROUGH CONTAINMENT PENETRATION (X-74f) THROUGH EXCESS FLOW CHECK VALVE TO INSTRUMENT TUBING CONNECTION.
3. ACCESS TO WELDS 20RRC(6)-5 & 20RRC(6)-6 REQUIRES PARTIAL REMOVAL OF RRC-PWS 8-1.
4. ACCESS TO WELD 20RRC(6)-4LU REQUIRES REMOVAL OF RHR-SA-50 PIPE CLAMP.

REFERENCES:

ISI - 230-1

BOVEE & CRAIL ISOMETRIC RRC-565-1 REV 14



ZONE R-43

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTIONS PROGRAMS ONLY.

QUALITY CLASS: 1	ASME CODE CLASS: 1	
ENGR: D TIMMINS	DRAWN: K-McA	DATE: 7-14-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352

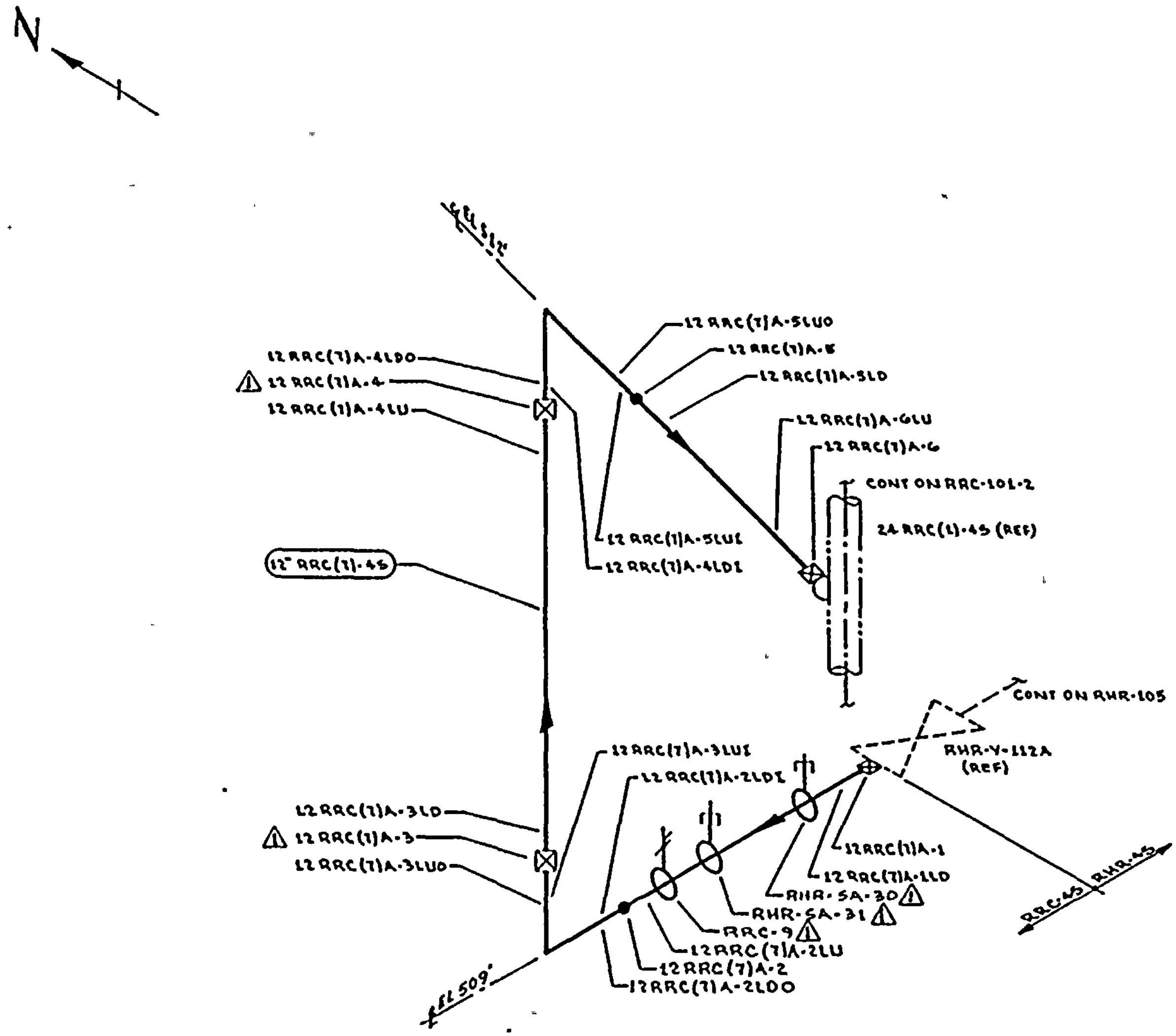
WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: RHR SHUTDOWN COOLING SUCTION INTERTIE WITH RRC LOOP A

DWG NO: RRC-105 REV 3

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
20"RRC(6)-45	20	80	1.031	SA 358 GR 304	SS	UT-9

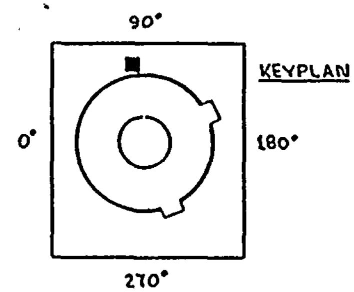
NO	DATE	REVISION	BY	CHKD	APVD
3	10-16-87	CORRECTED RRC-SA-51 & RRC-SA-52 TO RHR-SA-51 & RHR-SA-52. ADDED NOTE 4 & ISI DWG REF. MODIFIED KEYPLAN. REDRAWN	KMcA	DWP	TFH
2	11-14-83	REVISED AS NOTED ADDED KEYPLAN	K-McA	DPR	TFH
1	7-17-79	ADDED FW 20RRC(6)-7A, PER ASBUILT, ZN E-7.	K-McA	TFH/DWP	DWP
0	11-27-78	ISSUED FOR USE	K-McA	DWP	LFB
A	9-12-78	ISSUED FOR INFORMATION ONLY	K-McA	DCT	DWP



REFERENCES:

BOVEE & CRAIL ISOMETRIC

RRC-567-1 REV 9



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12" RRC(7)-45	12	80	0.687	SA 358 GR 304	SS	UT-19

NO	DATE	REVISION	BY	CHKD	APPVD
1	10-13-83	REVISED AS NOTED	KMcA	JSR	JFH
0	11-21-78	ISSUED FOR USE	KMcA	[illegible]	[illegible]
A	10-20-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]

QUALITY CLASS: 1 | ASME CODE CLASS 1

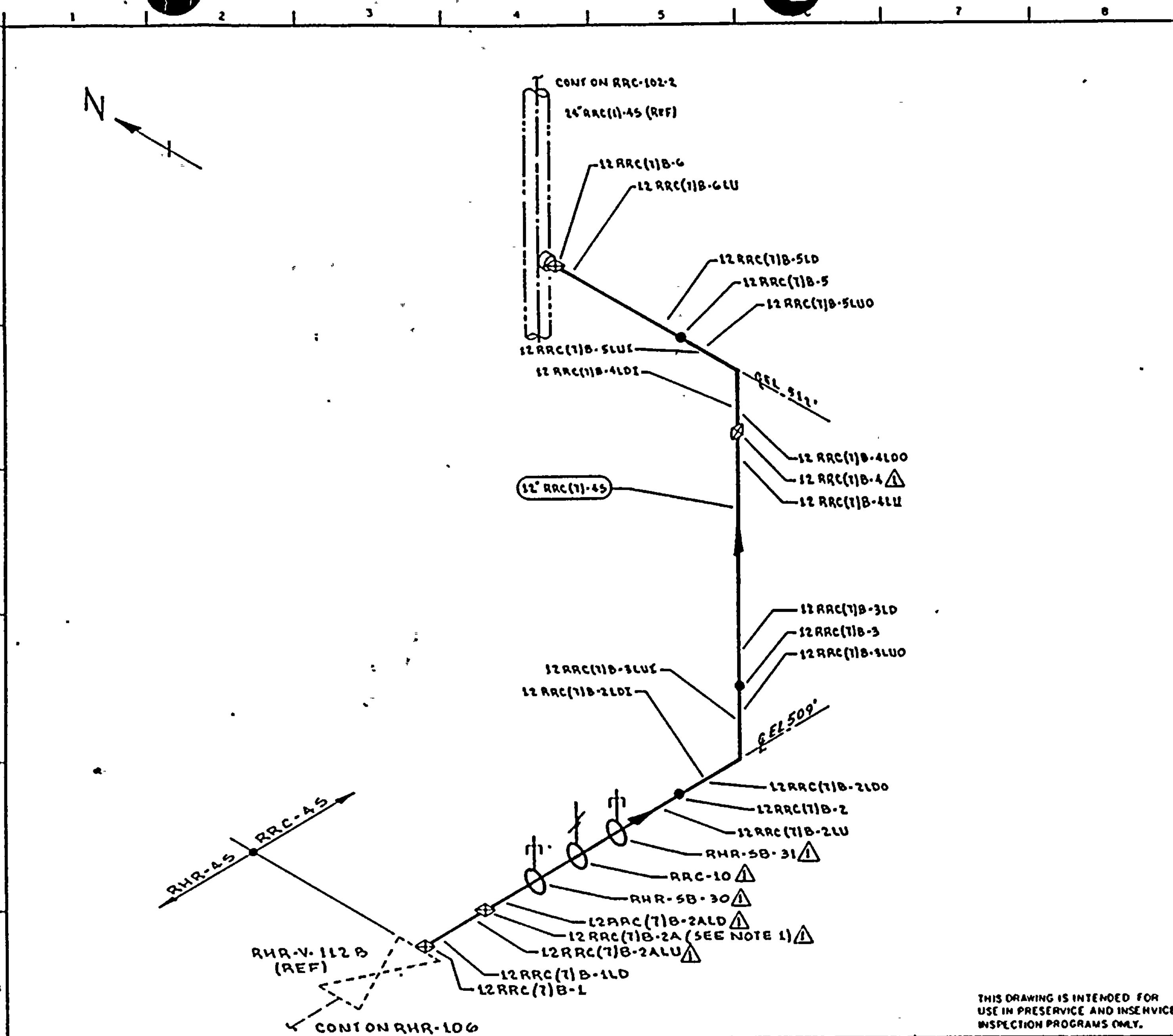
ENGR D TIMMINS | DRAWN K.McA | DATE 9-15-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WNP-2
WELD & COMPONENT
IDENTIFICATION DIAGRAM

TITLE: RHR SHUTDOWN COOLING RETURN TO RRC LOOP A

DWG NO: RRC-106 | REV 1



THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
12 RRC(7)-45	12	80	0.687	SA 358 GR 304	SS	UT-19

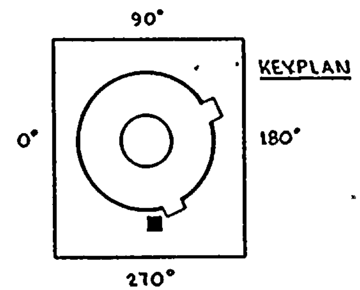
NO	DATE	REVISION	BY	CHKD	APPVD
1	10-13-83	REVISED AS NOTED ADDED KEYPLAN	[illegible]	[illegible]	[illegible]
0	11-15-78	ISSUED FOR USE	[illegible]	[illegible]	[illegible]
A	10-23-78	ISSUED FOR INFORMATION ONLY	[illegible]	[illegible]	[illegible]

NOTES:

1. ACCESS TO WELD 12RRC(7)B-2A REQUIRES REMOVAL OF RHR-SB-30.

REFERENCES:

BOVEE & CRAIL ISOMETRIC RRC-868-1 REV 9



QUALITY CLASS: 1 | ASME CODE CLASS 1

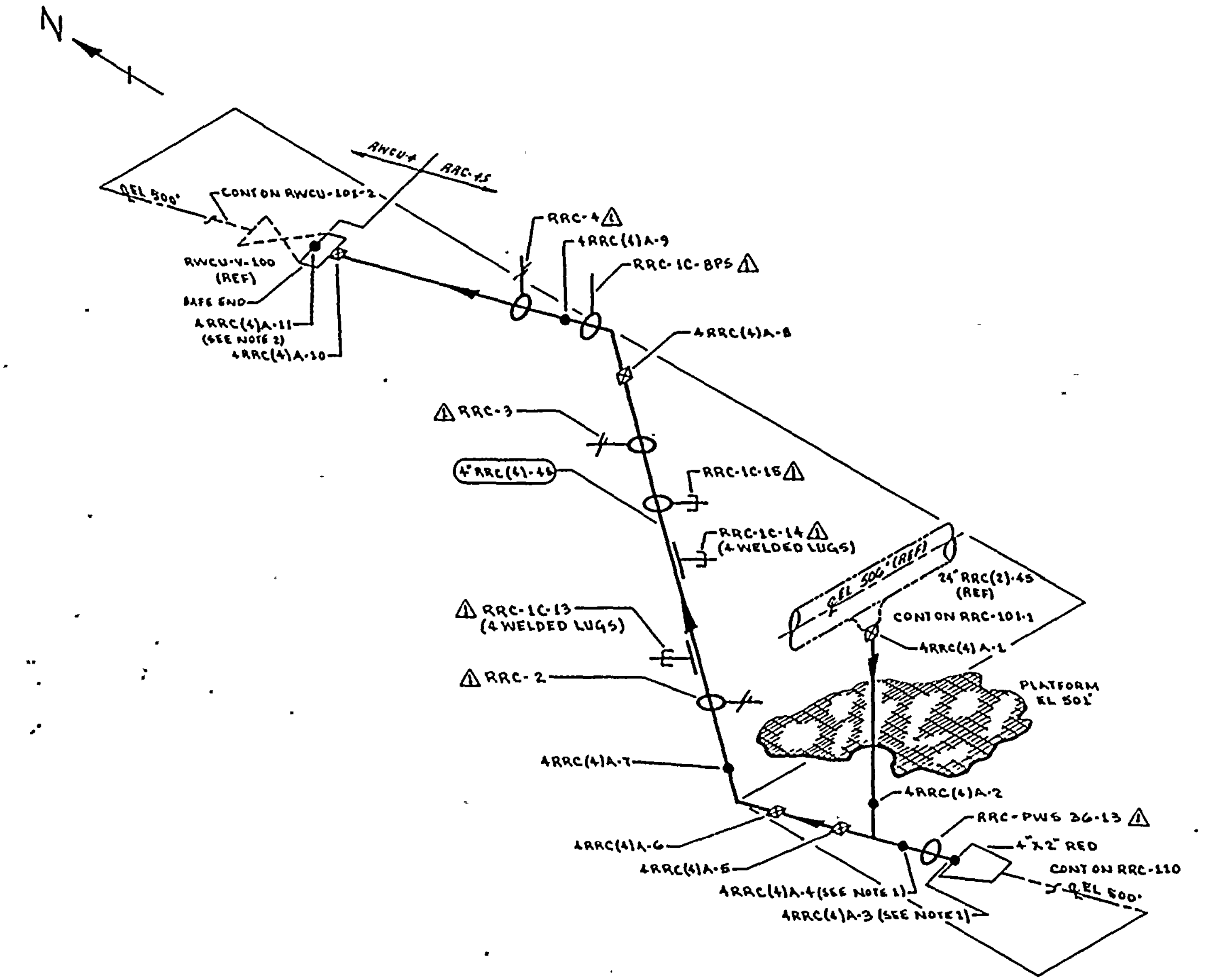
ENGR D TIMMINS | DRAWN V. McA | DATE 9-15-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

WNP 2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: RHR SHUTDOWN COOLING RETURN TO RRC LOOP B

DWG NO: RRC-107 | REV 1

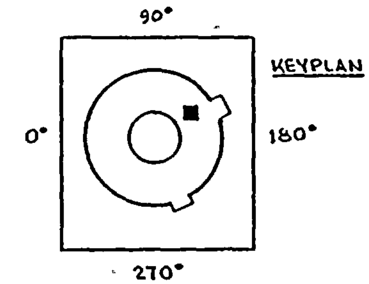


NOTES:

1. ACCESS TO WELDS 4RRC(4)A-3 & 4RRC(4)A-4 REQUIRES REMOVAL OF RRC-PWS 36-13
2. DISSIMILAR METAL WELD, CS TO SS, USE CAL BLOCK UT-29.

REFERENCES:

BOVEE & CRAIL ISOMETRIC
RRC-566-1 REV 8



QUALITY CLASS: 1 | ASME CODE CLASS: 1

ENGR. D TIMMINS | DRAWN: K-McA | DATE 7-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM
RICHLAND WASHINGTON 99352

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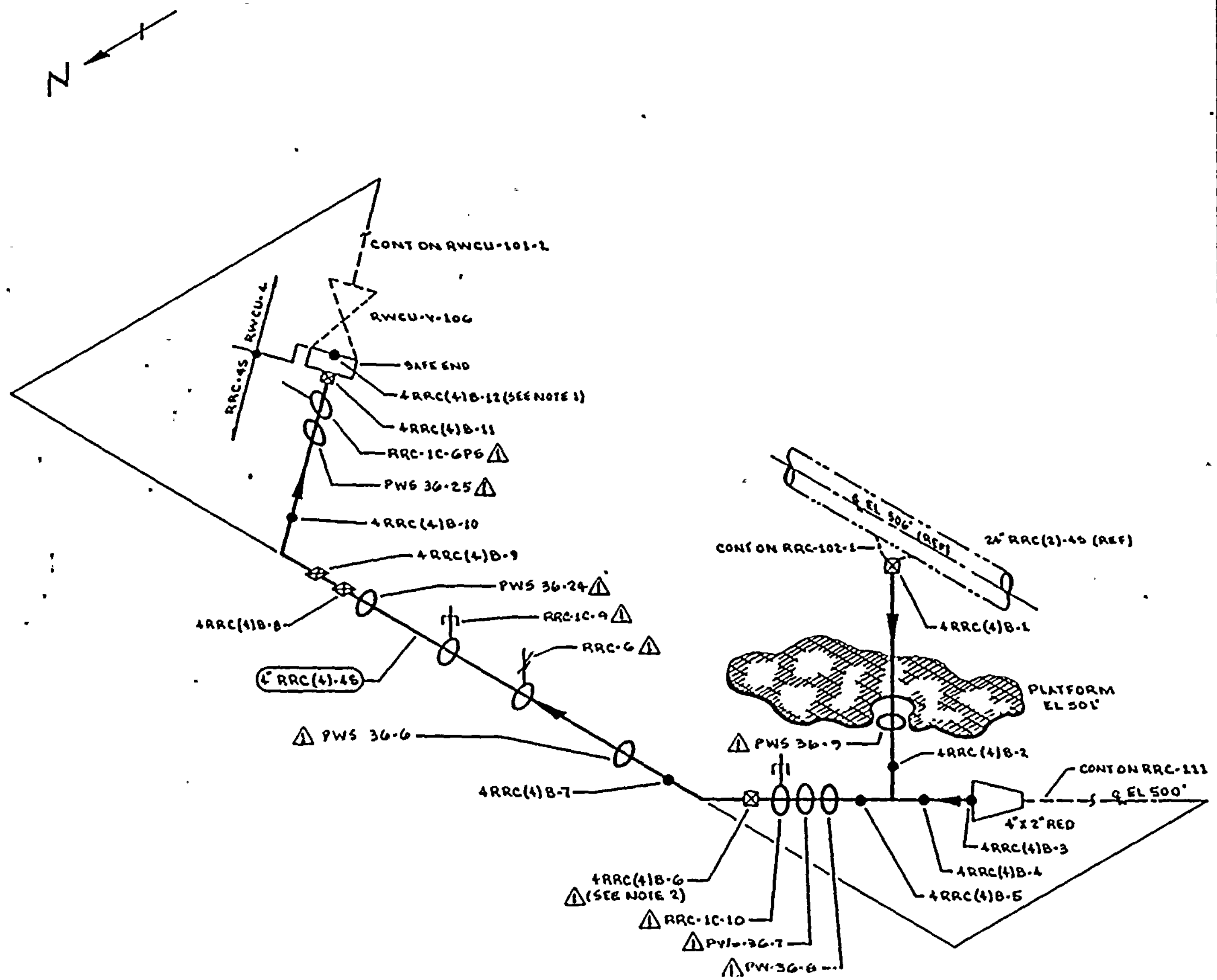
PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
4" RRC(4)-45	4	80S	0.337	SA 312 TP 304	SS	UT-29
LUGS	NA	NA	NA	SA 240 TP 304	SS	UT-47

NO	DATE	REVISION	BY	CHKD	APPVD
1	3.13.83	REVISED AS NOTED ADDED LUGS & KEYPLAN	KMcA	JJT	TTH
0	11.11.78	ISSUED FOR USE	KMcA		
A	9.15.78	ISSUED FOR INFORMATION ONLY	KMcA	DJ	DLP

WNP-2
WELD & COMPONENT IDENTIFICATION DIAGRAM

TITLE: RWCU INTERTIE TO RRC LOOP A

DWG NO: RRC-108 | REV 1

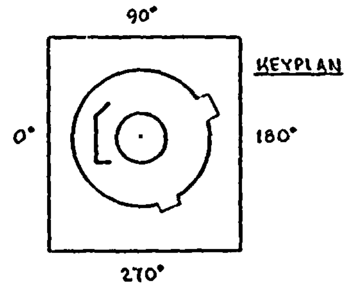


NOTES:

1. DISSIMILAR METAL WELD, CS TO SS, USE CAL BLOCK UT-29.
2. ACCESS TO WELD 4RRC(4)B-6 REQUIRES REMOVAL OF RRC-1C-10.

REFERENCES:

BOVEE & CRAIL ISOMETRIC
RRC-569-1.2 REV 8



QUALITY CLASS: 1	ASME CODE CLASS 1
ENGR'D TIMMINS	DRAWN KMcA — DATE 7-31-78

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

THIS DRAWING IS INTENDED FOR USE IN PRESERVICE AND INSERVICE INSPECTION PROGRAMS ONLY.

PIPING SYSTEM	NOM DIA (IN)	SCH	NOM WALL THK	MATERIAL SPECIFICATION	MATL TYPE	CAL BLOCK NO
4" RRC(4)-45	4	80S	0.337	SA 312 TP 304	SS	UT-29

WNP-2
WELD & COMPONENT
IDENTIFICATION DIAGRAM

TITLE: RWCU INTERTIE TO RRC LOOP B

DWG NO: RRC-109 — REV 1

NO	DATE	REVISION	BY	CHKD	APPVD
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A	9-13-78	ISSUED FOR INFORMATION ONLY	KMcA	[illegible]	[illegible]

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[illegible]

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 plant instrument air systems failures on safety-related equipment. In accordance with the requirements of the generic letter, the commitments made in Supply System letter to the NRC, dated January 30, 1989 and the commitments made in our preliminary submittal dated February 24,1989, the Supply System is providing this interim response to GL 88-14. This submittal provides the bulk of the systems review results. The complete test results and any followup activities will be identified in the final submittal. Initial air quality tests have been completed, and the results are being evaluated.

This summary briefly describes the scope of work required by GL 88-14 and it provides a short compilation of the accomplishments and conclusions reached by the Supply System as well as an overall assessment of the program to maintain adequate instrument air quality at WNP-2. A detailed description of the work completed is provided in the succeeding sections.

The plant instrument air systems have been evaluated to determine the design and operating criteria. The air systems that were included in this evaluation are the Control Air System (CAS), Containment Instrument Air (CIA) System and each of the Emergency Diesel Generator Starting Air Systems. A description of each of these systems and their performance criteria are presented in Section 4.

All safety-related air actuators in the plant have been identified. The manufacturers of these actuators and the other in-line components (e.g., pilot operators) were consulted in order to determine the component's minimum air quality requirements. These requirements were compared against the system design and performance criteria. With only three exceptions in the Control Rod Drive (CRD) System, Emergency Diesel Starting Air Systems and the Containment Isolation System, all component air quality requirements were found to be consistent with the air systems design. A complete discussion of this review is provided in Sections 5.1.1 and 5.1.2.

Instrument air quality test criteria were developed from the survey of manufacturers' requirements for minimum air quality. As discussed above, the results of the air quality tests will be submitted later. Also, any recommendations for additional tests will be presented at that time.

The normal operating position, fail-safe position and fail-safe function of the safety-related air actuators in the plant have been identified. The fail-safe position of each of these actuators has been evaluated to assure that the specified and as-built fail-safe positions reflect the design intent. All actuators have been verified to have specified fail-safe positions that are consistent with their design intent. In addition, with the exception of six actuators in the Standby Gas Treatment System, all actuators were found to have been tested prior to initial startup to demonstrate that they operate as intended. The remaining six valves will be tested during the next scheduled outage (R4). A detailed discussion of this evaluation is presented in Section 5.1.1.

[illegible]

The air supply to safety-related actuators has been reviewed (by drawing review or walkdown) to determine which actuators have in-line filters. Manufacturers have been contacted to determine the performance of these components. With only two exceptions in the CRD System and the Containment Isolation System, all component air quality requirements were found to be consistent with the air systems design. The complete discussion of this review is presented in Section 5.1.3.

The safety-related instrument air accumulators have been identified and evaluated to determine their safety function. In addition, the accumulators were confirmed to be sized for their intended design function, accumulator check valve design was reviewed and the maximum allowable leak rate was determined. Based on this review, all accumulators and backup storage bottles have been determined to be properly sized. In addition, it was confirmed that periodic tests are performed to verify the leakage integrity of essential piping systems and inter-system boundary valves. A detailed discussion of the accumulator evaluation is presented in Section 5.2.

Criteria for evaluating the plant operating (normal and abnormal), maintenance and testing procedures as well as plant personnel training plans, have been developed. These criteria are presented in Section 8.1. The plant operating, maintenance and testing procedures and training plans have been identified and evaluated to the extent possible in accordance with this criteria. Surveillance/testing frequencies cannot be fully evaluated until test results are obtained and reviewed. Based on the procedural review, it was concluded that existing procedures do not fully address the concerns of GL 88-14. To this end, a procedure to periodically establish air quality at various locations in the system was developed and is now in effect. A complete list of the procedures that were reviewed is shown in Table 8-3. The results of this review along with items for further consideration is presented in Sections 8.2 through 8.4.

NUREG-1275, Vol. 2 (AEOD/C701) "Operating Experience Feedback Report - Air System Problems" has been reviewed for applicability to WNP-2. This review did not identify any inherent weaknesses in the WNP-2 design. It merely underscored the concerns expressed in GL 88-14. The details of this review are discussed in Section 9.

Finally, further changes to be considered in the plant procedures and modifications to the air systems design resulting from the review discussed above, have been developed and are presented in Section 10. These changes are currently being evaluated by the Supply System.

In summary, an exhaustive review was conducted of the design, operation and maintenance of the instrument air systems at WNP-2. The review examined the design to verify that system equipment was specified, procured and installed to supply air quality that conformed to applicable codes and standards, and that satisfied the minimum requirements of the safety-related instrument air users. Additionally, operating and maintenance practices were reviewed to verify that they are directed to accomplish the same objectives through the use of adequate procedures and training. It was found that, with a few exceptions, these goals are met at WNP-2. Safety-related design objectives are satisfied according to FSAR commitments. The review efforts conducted in preparation for the generic letter response identified several items requiring further evaluation. These items fall in the category of enhancing system reliability by improving air quality. After obtaining final results of testing, further evaluation of these items will be completed, and final resolution of the items will be established. It is judged that this overall program will provide the safety-related air users with air that satisfies all quality requirements. This will serve to minimize plant challenges by reducing the likelyhood of loss-of-air occurrences at WNP-2.

[illegible]

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 that emphasizes 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 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 implications 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 2 "Operating Experience Feedback Report - Air System Problems." In addition, the Supplement requested recipients to review NUREG-1275, Volume 2 for applicability and to 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.

[illegible]

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 2 (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 plant instrument air systems failures 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. Verification 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 for all design-basis events, including 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 generic letter requests the licensee to:

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.

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 has undertaken the following actions to verify that the design, construction and maintenance of the instrument air systems at WNP-2 are in accordance with the recommendations presented therein:

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

2. The manufacturers of the components tabulated above have been consulted to determine the required instrument air quality for the supplied components.

3. The failure position of each of the air users tabulated above has been determined from the applicable system documentation.

   The information described in Items 1, 2 and 3 above is tabulated in Appendix 1 and evaluated in Sections 5.1.1.

4. The solenoid valves and other safety-related in-line components associated with each safety-related actuator, along with their manufacturers and model numbers, have been identified. The manufacturers of these components have been consulted to determine their performance characteristics.

   This information is tabulated in Appendix 2 and evaluated in Section 5.1.2.

5. The filter/regulators associated with each safety-related actuator, along with their manufacturers and model numbers, have been identified. The manufacturers of these filter/regulators have been consulted to determine their performance characteristics.

   This information is tabulated in Appendix 3 and evaluated in Section 5.1.3.

6. 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 accumulator size and the sizing design basis (e.g., sizing calculation, General Electric documentation).

   c. The associated check valve equipment number, size, type and manufacturer.

   This information is tabulated in Appendix 4 and evaluated in Section 5.2.

7. 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. A detailed description of the three air systems identified above and their design specifications are provided in Section 4 and Tables 4-1, 4-2 and 4-3.

8. A procedure has been 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 have been performed by taking air samples at key points in each system. The test results will be included in the July 1989 submittal. The frequency of additional testing will be established once the initial test data has been evaluated.

9. The operation of all safety-related actuators has been verified to ensure that they move to their fail-safe positions upon a loss of instrument air. This verification was completed by:

   a. Reviewing the preoperational test reports to assure that each applicable valve actuator was subjected to a loss of air test during startup and that the valve failed to the intended position as verified in Appendix 1.

   b. Those valves for which startup records could not be found have been identified as candidates for testing during the next scheduled outage (R4).

   c. All of the system design changes implemented since startup have been reviewed to establish the impact on the failure position of the applicable valves. Those valve actuators impacted by design changes since startup should be retested during the next scheduled outage.

   Section 5.1.1 identifies the list of valves that require testing to verify the as-built fail-safe positions.

10. The plant operating, maintenance procedures as well as the and training program plan have been reviewed to assure that they are responsive to the design and installation characteristics of each of the instrument air systems. The results of this review, along with a number of items identified for further consideration are presented in Section 8.

11. The events described in NUREG-1275, Vol. 2 have been evaluated to determine the potential for the occurrence of the same type of event at WNP-2. For those events which have the potential to occur, changes to plant operating and maintenance procedures, and in some cases changes to the system design, will be considered further. A summary of this evaluation is included in Section 9.

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 the appropriate flowrates and pressures to the different air users in the plant. The systems consist of two distribution systems and common air compressors, air dryers, filters and receivers. This description centers on the Control Air System, which supplies safety-related components, 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: (1) to dampen the pulsation inherent in reciprocating compressors and (2) 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, compressors 1A and 1B and their associated cooling water system can be powered from the emergency diesel generators. Compressor 1C cannot 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, a 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 (75 psig) downstream of the dryer towers, bypass valve CAS-PCV-1 automatically opens, 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 CAS and SA system components 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.

[illegible]

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 primarily 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, thereby assuring proper valve operation.

4.2 Containment Instrument Air Systems

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. 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:

- o 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:

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

In the event the cryogenic nitrogen supply 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 supplies the other four ADS accumulators. These backup cylinders automatically provide a 30-day supply of nitrogen for the 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 the cryogenic nitrogen supply 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 afterfilters and an air receiver.

The design criteria for the CIA system components described above are 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 inside 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 I.

4.3 Emergency Diesel Starting Air Systems

The standby power system at WNP-2 consists of three engine/generator sets, labeled division 1, 2 and 3. The division 1 and 2 engine/generator sets each consist of two diesel engines driving a common generator. The division 3 engine/generator set, serving the High Pressure Core Spray (HPCS) system, consists of a single diesel engine driving a generator.

Each engine/generator set is equipped with an independent 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 three engine start attempts, assuming a single failure in one starting air train.

The division 1 and 2 starting air systems consist of two redundant reciprocating compressors which draw air from within the diesel generator room. The compressors are motor driven, with one having a diesel engine backup. The compressors discharge into a common header. The compressed air then passes through an air cooled aftercooler, a deliquescent air dryer and a dryer afterfilter. 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 start attempts. Each bank of receivers serves two of the four air start motors on each engine.

The division 3 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 driven by a diesel engine. The compressors discharge into a common header. The compressed air then passes through an air cooled aftercooler, a deliquescent air dryer and a dryer afterfilter. The dry filtered air is then distributed through a single air header to two air receivers. One is a backup to the other. Each air receiver has sufficient storage capacity for a minimum of three diesel engine start attempts. The receiver serves all four diesel engine air start motors.

In addition to providing dry filtered air to the engine starting air motors, the starting air systems also provide air to the governor boosters. The governor boosters act to boost the hydraulic pressure for the governors as the engines start, to assure proper speed control. In addition to the governor boosters, the division 1 and 2 starting air systems also provide air to two,

service water supply isolation valves in the Standby Service Water System which, upon a start signal, open to admit water to the cooling water heat exchangers.

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

4.4 System Flow Diagrams

System flow diagrams for the Control and Service Air Systems, the Containment Instrument Air System, and the Emergency Diesel Starting Air Systems are presented in Figures 4-1, 4-2 and 4-3, respectively. These figures are intended to be illustrative of the system configuration. Although the figures are the latest revisions of the controlled drawings for these systems, they may not necessarily reflect all the recent design changes mentioned in this report.

5 SAFETY-RELATED AIR OPERATED CONTROL VALVES AND ASSOCIATED AIR SUPPLY EQUIPMENT

5.1 Air Operated, Safety-Related Control Valves, Filter-Regulators and Solenoid Valves

5.1.1 Safety-Related Control Valve Database

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 of each of the safety-related actuators, identify the fail-safe position of the actuators and to verify that the failure positions are consistent with the original design intent.

2. To determine the air quality requirements (i.e., particulate, moisture and hydrocarbons requirements) 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 component's location on the applicable flow diagram.

4. The actuator's 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 requirements) in accordance with the manufacturers' recommendations.

6. The supplier identification (Supply System code) 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.

[illegible]

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 their design intended position and the actual as-built failure positions of a majority of the valves have been verified. This verification was completed by:

   a. Reviewing the preoperational test reports to assure that during startup each applicable valve actuator was subjected to a loss of air test and that the valve failed to the intended position. Test records were located and reviewed for all but the following valves:

Air Operated Valve Number		Fail-Safe Position
02-CRD-V-126	(Typical of 185)	Open (NE)
02-CRD-V-127	(Typical of 185)	Open (NE)
02-SGT-V-F16		Closed (ND)
02-SGT-V-F26		Closed (ND)
02-SGT-V-F36		Closed (ND)
02-SGT-V-F46		Closed (ND)
02-SGT-V-F56		Closed (ND)
02-SGT-V-F66		Closed (ND)
02-MS-RV-2B		Closed (ND)
02-MS-RV-3A		Closed (ND)

   Both the CRD and MS valves are frequently operated and are considered adequately tested for the purpose required here. The remaining six valves should be tested to verify their failure position during the next scheduled outage (R4). The balance of the valves in our review have records indicating that the valves will fail to their intended fail-safe position on loss of air.

   b. All of the system design changes implemented since startup have been reviewed to establish the impact on the failure position of the applicable valves. To date, there have not been any design changes which impact the current fail-safe positions.

2. The air quality requirements for all of the plant safety-related air actuators have been determined. The air quality requirements are based on manufacturers' literature or conversations with manufacturers' representatives. Based on this information, the air quality test requirements discussed in Section 6 were developed. As described below, some actuators have more stringent air quality requirements than those defined by the test acceptance criteria. In those instances, air supply piping to the actuators was verified to contain an in-line filter.

3. As presented in Section 6, several air quality test locations have been identified based on the requirements of the actuators and their intended safety function. Specific test locations were selected according to accessibility considerations.

5.1.2 Safety-Related Air User Solenoid Valve and In-Line Component Database

Appendix 2, the Safety-Related Air User Solenoid Valve and In-Line Component Database, is a database of all the air system pilot valves and other in-line components associated with the safety-related actuators and end users compiled in Appendix 1. This database was compiled as a tool to accomplish the following tasks:

1. To determine and locate the air system solenoid valves and in-line components associated with each safety-related end user.

2. To determine the air quality requirements (i.e., particulate, moisture and hydrocarbons requirements) of the components identified above.

3. To determine which of the solenoid valves and in-line components require upstream filters to assure reliable operation.

To this end, the Appendix 2 database includes the following information:

1. The solenoid valve or component numbers associated with each individual end user.

2. A brief description of the associated air actuator or other end user.

3. The applicable process flow diagram.

4. The applicable component supplier code number. (Note 8 in the back of the appendix identifies the vendor associated with each number.)

5. The air quality requirements (i.e., particulate, moisture and hydrocarbon requirements) for each of the components. The air quality requirements were based on manufacturers' literature and conversations with manufacturers' representatives.

6. References to supporting documentation (CVI Nos.).

From the information gathered in the process of developing this database it was concluded that all of the associated pilot valves and in-line components have air quality requirements that are within the air quality limits for the air systems.

5.1.3 Safety-Related Air User Filter-Regulator Database

Appendix 3, Safety-Related Air Users Filter-Regulator Database, is also a database of the safety-related actuators and other air users, along with a description of the associated in-line filters. This database was developed to accomplish the following:

1. To identify the actuators that 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 characteristics 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, the database presented in Appendix 3 includes the component identification number, a brief description of the component and its intended function, the component's location on the applicable flow diagram and the actuator air quality requirements (i.e., particulate size, humidity and hydrocarbon requirements) in accordance with the manufacturers' recommendations. In addition to these items, this database includes the filter/regulator manufacturer 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 conclusions identified below 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 the valves with more stringent air quality requirements 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 actuator's maximum allowable particulate size is 40 microns or greater).

2. All the actuators that require filtered instrument air have filter/regulators installed in their instrument air supply piping.

3. The in-line filter/regulators on the air supply to the following remove particles 40 microns and larger. Currently, the actuators require air with a maximum particulate size of 35 microns.

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

[illegible]

The valve operators identified above and the respective valves are currently scheduled to be replaced within the next two years. These modifications are being made in response to concerns associated with the leakage characteristics of the existing containment isolation valves. When the new operators are installed, the necessary system design modifications will be made to assure that the air quality requirements of the actuators and the performance characteristics of the filter/regulators are consistent.

4. The Control Rod Drive System valves have a common filter, CRD-F-6, rated for 10 microns. General Electric technical document GEK-71317A requires that the common filter be rated for 5 microns. Replacing the existing filter will be considered further.

5.2 Accumulators

This section describes the design requirements and the function 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 compiled in Appendix 4, Safety-Related Accumulators. Sections 5.2.1 through 5.2.10 describe the safety function of the accumulators and related components listed in Appendix 4.

Appendix 4 is a database that was developed to summarize the design characteristics of the safety-related air receivers, accumulators, and high pressure bottles, and their associated check valves. The database includes the following:

1. The component identification number and description.
2. The applicable flow diagram and its location on that flow diagram.
3. The component size and reference to the documentation to justify that size.
4. The component identification number and the size of the check valve associated with a particular accumulator, receiver or backup bottle.
5. The type of check valve and the purchase order under which it was purchased.
6. The allowable check valve leak rate.

From the information gathered in the process of developing this database it was concluded that all the safety-related accumulators, receivers and backup bottles are adequately sized in accordance with the design intent reflected in the supporting documentation. The check valves associated with the safety-related accumulators are all equipped with soft seats. In addition, the valves are spring return to assure near leak tight closing, even under a

[illegible]

gradual loss of control air pressure. The leak rates are all acceptable in accordance with the design documentation.

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 set point to minimize the number and frequency of challenges involving the MSRV's 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.

[illegible]

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. These MSRVs are used 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 at 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 located in the reactor building railroad lock. 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.

[illegible]

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 tests are performed on each bank to confirm that Quality Class 1 air supply piping and inter-system valve leakage does not exceed the leak rate assumed in the design calculations.

5.2.5 Remote Nitrogen Bottle Station

The extended-term gas demands of the ADS valves are provided by two remote nitrogen cylinder connections located in the diesel generator building corridor, outside the secondary containment building. 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 the Quality Class 1 portions of air supply piping and inter-system valves 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. The preferred failure direction of the isolation valves is closed, and accumulator pressure is not used by the actuators to close the valves.

5.2.7 Containment Vacuum Breaker Accumulator

This accumulator allows the containment vacuum breaker valves to open and close without excessive pressure fluctuation in the branch piping. Burns and Roe Calculation 7.10.01, dated February 25, 1976 states that the accumulator was necessary because the flow rate upon valve actuation was too great for the gas system to handle.

The accumulator was sized on the basis of maintaining a minimum supply pressure of 70 psig immediately after valve operation, assuming an initial system pressure of 75 psig. The safety-related functions of this accumulator are to maintain sufficient pressure in the distribution header, and thus ensure proper operation of the vacuum breaker valves and to serve as a reliable extension of the Quality Class I air supply system.

5.2.8 Containment Vacuum Breaker Bottle Station

The reactor building-to-wetwell vacuum relief valves must open to prevent excessive vacuum from developing in the primary containment vessel as a result of inadvertent containment spray actuation. They must also close to effect isolation of the containment. The valves are equipped with a spring-to-open,

air-to-close actuator. The 10 bottles at the bottle station are sized to allow three cycles of valve operation for containment vacuum protection and hold the valves shut for 30 days to effect long-term isolation of the containment.

The adequacy of the bottle station design is documented in Supply System Calculation NE-02-84-12, Revision 1, dated August 6, 1984. Periodic tests are performed to verify that the Quality Class 1 air supply piping and inter-system check valve leakage does not exceed the design leak rate assumed in the calculation.

5.2.9 High Pressure Core Spray (HPCS) Starting Air Receivers

As described in Section 4.3, the starting air system for the HPCS division 3 diesel generator includes two starting air receivers; one is a backup to the other. The motor driven compressor in the starting air system cycles on and off as required to maintain the receivers at the required pressure. A second diesel engine driven compressor (a separate small stand-alone diesel) is provided as a backup, should the motor driven compressor fail. Although these compressors do provide a high degree of reliability, they are not safety-related, and cannot be counted on for starting the diesel generator. Therefore, each of the receivers is sized to provide enough air for three diesel generator start attempts, per General Electric NEDO-10905 73NED47 Class 1, dated May of 1973. The number of possible start attempts, without compressor operation, has been verified by actual tests.

The air receivers are equipped with check valves with soft seats and spring return features to assure minimal leakage from the accumulator. Because check valve leakage would be detected by excessive compressor cycling, and diesel generator initiation would follow a postulated loss of the starting air compressors, leakage through the receiver check valves is a negligible consideration.

The diesel engine, and therefore the starting air system, is inspected and tested on a regular basis.

5.2.10 Emergency Diesel Generator Starting Air Receivers

As described in Section 4.3, the starting air systems for the division 1 and 2 diesel generators each include two banks of starting air receivers. Each bank of receivers supplies air to one of the independent starting air headers. Each starting air system includes two compressors, one motor driven and the second motor driven with a diesel (a separate small stand-alone diesel) backup. These two compressors cycle on and off as required to maintain the receivers at the required pressure. Should power be lost to the compressor motors, the diesel driver starts as required to maintain receiver pressure. Although these compressors do provide a high degree of reliability, they are not safety-related and cannot be counted on for starting the diesel generators. Therefore, each bank of receivers is sized to provide enough air for five diesel generator starting attempts, in accordance with regulatory requirements. The number of possible start attempts, without compressor operation, has been verified by actual tests.

The air receivers are equipped with check valves with soft seats and spring return features to assure minimal leakage from the accumulator. Because check valve leakage would be detected by excessive compressor cycling and diesel generator initiation would follow a postulated loss of the starting air compressors, leakage through the receiver check valves is a negligible consideration.

The diesel engine, and therefore the starting air system, is inspected and tested on a regular basis.

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. <u>Particulate Size</u>

   The maximum allowable particulate size for the containment instrument air and control air systems, as stated in Table 6-1, is 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 instances 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. <u>Dew Point Temperature (Humidity)</u>

   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

[illegible]

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.

c. Hydrocarbon Contamination

Hydrocarbons can be introduced into a compressed air stream at the compressor or from vapors in the intake air. All of the compressors installed in the WNP 2 air systems are oil free. Therefore, negligible amounts of 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, MSRVs and the MSIVs.

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

7 RESULTS OF TESTING

Initial air quality testing has been performed, and the results are being evaluated. Changes to the operating procedures (in addition to those identified in Section 8), periodic system cleaning (blowdown) and additional periodic air quality testing will be considered following evaluation of the final results.

8 EVALUATION OF APPLICABLE PLANT PROCEDURES

The following is a summary of the plant procedures reviewed in response to Generic Letter 88-14. This summary includes the review criteria, a list of the procedures reviewed, items being considered for changes to the existing procedures and the possible additional of new procedures.

8.1 Evaluation Criteria

The WNP-2 Plant Procedures Manual is comprised of fourteen volumes. Each volume is divided into sections and each section contains individual procedures. Procedures from the following volumes of the Plant Procedures Manual have been reviewed for acceptability and completeness:

1. Volume 2 - System Operating Procedures
2. Volume 4 - Abnormal Conditions Procedure (including the Single Page Abnormal Condition Procedures)
3. Volume 7 - Surveillance Procedures
4. Volume 8 - Operating and Engineering Procedures
5. Volume 10 - Maintenance Programs and Procedures

A list of specific procedures that were reviewed is presented in Table 8-3. These procedures were reviewed in accordance with the criteria presented in Table 8-1 and Table 8-2.

8.2 Changes Being Considered for Reviewed Procedures

As a result of the procedures review, the changes discussed below are being considered.

1. The System Operating Procedures should identify portions of air systems affected by closure of main header isolation valves.
2. The Abnormal Condition Procedure should list all safety-related pneumatic instruments and expected failure indication or control output for pneumatic instrumentation.
3. The Abnormal Condition Procedure currently identifies all the valve failure positions in one list. The list should be segregated into services to safety-related systems and services to nonsafety-related systems.
4. The Abnormal Condition Procedure should include a section that describes how to locate, detect and isolate branch line failures.

[illegible]

5. The Single Page Abnormal Conditions Procedures often direct the operators to secure portions of the system or equipment. The procedures should also identify the potential ramifications of such instructions.

6. The Maintenance Programs and Procedures are augmented by the Scheduled Maintenance System computerized data base. The maintenance intervals specified in the data base for CIA and DSA system maintenance were reviewed. Maintenance intervals should be re-examined to assure that they are consistent with the criteria given in Table 8-2.

The Surveillance Procedures were considered in the procedures review. However, they were not evaluated against the criteria of Table 8-2, because it was concluded that they pertain to matters that are outside the scope of Generic Letter 88-14. Additionally, the adequacy of surveillance frequencies could only be assessed after receipt of final test results.

8.3 Considerations for Additional Procedures

With the exception of the loss of control air procedures and the operating and engineering procedures for leakage integrity verification of the Quality Class I portions of the CIA system and nitrogen system for the Containment Vacuum Breakers, the applicable plant guidance documents pertained to issues that were largely peripheral to the concerns of Generic Letter 88-14. Additional procedures will be considered to cover each of the points described in Table 8-2. Among major new plant procedures that will be considered are the following:

1. Air quality verification. CAS dew point, hydrocarbon content and particulate content should be verified periodically to be in conformance with vendor interface requirements (A test procedure was developed and is currently in effect).

2. System blowdown. The air systems piping and drains should be periodically blown down to visually check for signs of contamination.

These additional procedures address the primary concerns identified in Generic Letter 88-14. The addition of procedures addressing the remaining points in Table 8-2 will be considered to alleviate the rest of the concerns described in the generic letter.

8.4 Personnel Training Plans

Operations and plant maintenance personnel have recently been provided training on loss of instrument air. Additional training on the abnormal procedure "Control Air System Failure" has also been provided to licensed operators. It should be noted that a "Loss of Instrument Air"

simulator scenario is included as part of the initial licensed operator training as well as regularly scheduled licensed operator requalification training on an annual basis, and will be covered again later this year. Currently the instrument air portions of the systems training curriculum are being updated to reflect the latest modifications to these systems.

Training on air system failures will continue to be provided on at least biannual basis as part of the licensed operator requalification and equipment operator continuing training. The additional aspects covered by INPO's SOER 88-01 will be included in the continuing training on a biannual basis for licensed and equipment operators and technical support staff and management training as well as in the initial for operators and maintenance personnel.

As more detailed information becomes available relative to WNP-2 specific plant response, and when procedures are modified, additional modifications to the WNP-2 simulator as well as to the applicable training plans, will be considered.

9 REVIEW OF NUREG 1275 "OPERATING EXPERIENCE FEEDBACK REPORT - AIR SYSTEM PROBLEMS" AND ITS IMPACT ON WNP-2

As part of the air systems evaluation, NUREG-1275, Vol. 2 "Operating Experience Feedback Report - Air System Problems" has been reviewed for applicability to WNP-2. This review is documented in a formal report to the Supply System.

NUREG-1275 presents a number of events or failures which have occurred at different plants. The cause of these events or failures was traced to the plant air systems. The Supply System report evaluated each of the events or failures described in NUREG-1275 and determined whether the potential exists for the occurrence of the same type of event or failure at WNP-2. Where plant weaknesses were identified, recommendations for changes to plant procedures or design were developed. This review did not identify any striking weaknesses in the WNP-2 design. For the most part, the report provided a different perspective on the same areas of concern identified in this GL 88-14 review. The recommendations resulting from this report are included among the list of items for further consideration identified in Section 10.

[illegible]

10 AIR QUALITY IMPROVEMENT CONSIDERATIONS

As a result of the reviews and evaluation presented in the preceding sections, methods under considerations to improve the quality of the instrument air systems were divided into three separate categories as follows:

Air Quality Testing

A program to periodically sample the instrument air systems was developed and initial samples were taken. The results are currently being evaluated. Upon completion of the evaluation, The frequency of additional periodic testing will be established in addition to any corrective actions deemed necessary based upon the test results.

Air Systems Modifications

1. WNP-2 is considering the addition of a second dryer to be installed in parallel with the existing CAS dryer. This would allow a continuous supply of dry instrument air in the event of extended maintenance or repairs to the existing dual tower desiccant dryer.

2. A manual and/or automatic blowdown device to be installed on the upstream side of the automatic dryer bypass valve is being considered. This would eliminate any moisture buildup in the low point of the service air system.

3. The CAS supply header to the CRD hydraulic control units is equipped with an in-line filter (CRD-F-6) sized to remove all particles 10 microns and larger. General Electric document GEK-71317A requires a filter sized to remove particles 5 microns and larger. Replacing the existing in-line filter with a filter that meets the GE design requirements is being evaluated. Maintenance of this filter is currently performed annually during refueling outages. This appears to be sufficient. If the filter becomes a maintenance problem, it may be prudent in the future to install two 100-percent capacity filters in parallel. This would allow for changing filter cartridges without shutting down the plant.

4. Depending on the final air quality test results, the installation of in-line air filters in the air supplies to the MSIVs and MSRVs will be considered. The MSRVs and the inboard MSIVs are served by the CIA system. By nature of the design, the quality of air to these valves should be higher than that supplied by the CAS. However, if the test results for either system indicate the particulate matter in the applicable air system exceeds 40 microns, in-line filters should be installed. The size of the filters should be consistent with the air flow requirements for the valves.

5. Certain air cylinder manufacturers call for the use of in-line oilers to assure proper operation of their actuators. These requirements are identified in Appendix 1. However, there are no oilers installed in any of the WNP-2 air systems. To reduce wear and assure smooth actuator operation, oilers should be provided per

manufacturers recommendations. Prior to installation of the oilers, the air quality requirements of the pilot valves should be evaluated to assure that they are compatible with the lubricant that will be used.

6. The in-line filter/regulators on the air supply to the following actuators remove particles 40 microns and larger. Currently, the actuators require air with a maximum particulate size of 35 microns.

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

The valve operators identified above and the respective valves are currently scheduled to be replaced within the next two years. These modifications are being made in response to concerns associated with the leakage characteristics of the existing containment isolation valves. When the new operators are installed, the necessary system design modifications will be made to assure that the air quality requirements of the actuators and the performance characteristics of the filter/regulators are consistent.

Revisions to Plant Operating, Maintenance and Training Procedures

Revisions to the plant operating and maintenance procedures and considerations for additional procedures are presented in Sections 8.2 and 8.3 respectively.

TABLE 4-1

CONTROL AIR AND SERVICE AIR
DESIGN DATA

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
	Horsepower	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	1 micron
	Removal Efficiency	98 %
	Afterfilter:	
	Equipment Numbers	CAS-F-3A CAS-F-3B
	Type	Removable Cartridge
	Filter Area	8 ft^2
	Removal Rate	10 microns
	Removal Efficiency	98 %
Dryers:		
	Equipment Numbers	CAS-DY-1A CAS-DY-1B
	Type	Regenerative Desiccant
	Design Flowrate	750 scfm
	Dew Point Rating	-40 degree F

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 Screw
	Design Flowrate	620 scfm
	Design Pressure	100 psig
	Horsepower	125 hp
Receivers:		
	Equipment Numbers	SA-AR-1
	Volume	140 ft^3
Filters:		
	Equipment Number	SA-F-1
	First Stage:	
	Type	Coalescing Filter/ Separator
	Filter Area	ft^2
	Removal Rate	0.3 microns
	Removal Efficency	99.9+ %
	Second Stage:	
	Type	Coalescing Filter
	Filter Area	ft^2
	Removal Rate	0.01 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	
Tank Size	11,000 Gallons
Storage Capacity	1,000,000 SCF
Fluid	Liquid Nitrogen
Purity	99.9+ Percent
Backup Storage Bottles:	
Equipment Numbers	CIA-TK-1A through 15A CIA-TK-1B through 19B
Storage Capacity	223 SCF
Fluid	Compressed Nitrogen
Purity	99.9+ Percent
Filters:	
Prefilters:	
Equipment Numbers	CIA-F-1A CIA-F-1B
Type	
Filter Area	ft^2
Removal Rate	microns
Removal Efficiency	%
Afterfilter:	
Equipment Numbers	CIA-F-2A CIA-F-2B
Type	
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	CIA-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-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-2C
Type:	Two Stage Reciprocating Motor/Engine Driven
Design Flowrate	42 acfm
Design Pressure	250 psig
Horsepower (Motor)	15 hp (Note 1)
(Engine)	13.5 to 20 bhp
Compressor Aftercooler	
Equipment Numbers	DSA-HX-1A DSA-HX-1B
Type	Air Cooled Fin Tube
Flowrate	50 acfm
Pressure	250 psig
Outlet Temperature	10 Degrees F Above Ambient
Equipment Numbers	DSA-HX-1C
Type	Air Cooled Fin Tube
Flowrate	10 acfm
Pressure	250 psig
Outlet Temperature	10 Degrees F Above Ambient

TABLE 4-3 (con't)

DIESEL GENERATOR STARTING AIR SYSTEMS
DESIGN DATA

Dryer:		
	Equipment Numbers	DSA-DY-1A DSA-DY-1B DSA-DY-1C
	Type	Delequecent
	Design Flowrate	
	DSA-DY-1A & 1B	100 scfm
	DSA-DY-2A	30 scfm
	Dew Point Suppression	30 Degrees F
Filter:		
	Equipment Numbers	DSA-F-2A DSA-F-2B DSA-F-3
	Type	
	Design Flow Rate	50 scfm
	Design Pressure Drop	2 psi
	Particle Removal Rate	1 microns
	Removal Efficency	100 percent
	Aerosol Removal Rate	0.04 microns
	Removal Efficency	95 percent

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)	Design Maximum Dewpoint (degrees F)	Maximum Hydrocarbon Content (PPM)
Control Air System	40	-40 (@100 psig)	1
Containment Instrument Air System	40	NA	NA
Diesel Generator Starting Air Systems	40	+70 (@250 psig)	1

TABLE 8-1

OPERATING AND TRAINING 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, both modified to suit the WNP-2 design. After reviewing these documents it was determined that, as a minimum, the operating and training aspects addressing the loss and restoration of instrument air should address the considerations identified below:

Loss-of-Instrument Air Procedures Criteria

1. The procedures shall be "staged" so that specific operator actions are to be taken at various control room indications (i.e., when the control rods start drifting in, the operator should initiate the described actions).

2. Have a list describing the symptoms associated with the various loss-of-air scenarios

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.

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

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

   d. Corrections for containment isolation effects.

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

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

6. List and identify all safety-related air-operated valves and dampers and their expected failure position (identifying the effects of bottled air supplies).

7. List all safety-related 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 Criteria

1. Operators and plant personnel are trained for various loss of air scenarios. Attention is 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 are trained on the importance of the instrument air system, and the necessity of immediately reporting air system damage.

3. A "Loss of Instrument Air" simulator scenario is included as a portion of the annual Licensed Operator Requalification Training.

TABLE 8-2

MAINTENANCE/TESTING CRITERIA

Component	Testing	Periodicity (Proposed Industry Practice)
Control Air System Dryer Outlet	Dew point verification in accordance with ANSI/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 and 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 (silicone-based) 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 and Control Air Compressor	General compressor performance trending (vibration, etc.)	Quarterly.
CAS Backup Compressors Startup and Run/Load	Sequencer checkout and general compressor performance for trending (vibration, etc.)	Quarterly.

TABLE 8-2 (con't)

MAINTENANCE/TESTING CRITERIA

Component	Testing	Periodicity (Proposed Industry Practice)
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.
Piping and Drains	Leakage walkdown and inspection. Water accumulation and blowdown.	To be established based on operating history and dryer performance
Safety-Related Receivers, Accumulators and 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 the system and replace in-line filters if required. (Appendix 3)	To be established based on history and delta-P.
Backup Crossconnections to Service Air and Other Air Sources (CAS and CIA)	Verify that all interties downstream of the dryers are normally closed.	Weekly.

TABLE 8-3

LIST OF REVIEWED AIR SYSTEMS PROCEDURES

SYSTEM OPERATING PROCEDURES

2.3.1 Primary Containment Venting, Purging and Inheriting
2.8.1 Control and Service Air System
2.8.2 Containment Instrument Air System

ABNORMAL CONDITIONS PROCEDURE

4.8.1.1 Control Air System Failure

SINGLE PAGE ABNORMAL CONDITION PROCEDURES

4.RBHV.A-3.3	Instrument Air Header Pressure Low
4.RBHV.B-2.3	Instrument Air Header Pressure Low
4.SBHV.2-2.2	Panel SBHV-2 Instrument Air Pressure Low
4.TGHV.1A-3.2	TGHV-1 Division A Instrument Air Failure
4.TGHV.1B-3.2	TGHV-1 Division B Instrument Air Failure
4.TGHV.2A-2.4	TGHV-2 Division A Instrument Air Failure
4.TGHV-2B-2.4	TGHV-2 Division B Instrument Air Failure
4.601.A1-5.5	Diesel Air Receiver Pressure Low
4.603.A8-6.3	Scram Valve Pilot Air Header Pressure High
4.603.A8-6.4	Scram Valve Pilot Air Header Pressure Low
4.800.C1-2.1	Diesel Generator 1 Fail To Start
4.800.C5-2.1	Diesel Generator 2 Fail To Start
4.820.B1-3.4	Containment Instrument Air Prefilter B Delta P High
4.820.B2-4.4	Containment Instrument Air After Filter Delta P High
4.820.B1-5.4	CIA Division 2 Pressure High
4.820.B1-10.4	CIA Division 2 Out of Service
4.840.A5-1.4	Air Compressor CAS-C-1A Motor Trip
4.840.A5-1.5	Air Compressor CAS-C-1B Motor Trip
4.840.A5-1.6	Air Compressor CAS-C-1C Motor Trip
4.840.A5-2.4	Air Compressor CAS-C-1A Oil Pressure Low
4.840.A5-2.5	Air Compressor CAS-C-1B Oil Pressure Low
4.840.A5-2.6	Air Compressor CAS-C-1C Oil Pressure Low
4.840.A5-3.4	Air Compressor CAS-C-1A Discharge Temperature High
4.840.A5-3.5	Air Compressor CAS-C-1B Discharge Temperature High
4.840.A5-3.6	Air Compressor CAS-C-1C Discharge Temperature High
4.840.A5-4.3	Containment Instrument Air Receiver Pressure Low
4.840.A5-4.4	Air Compressor CAS-C-1A Cooler Temperature High
4.840.A5-4.5	Air Compressor CAS-C-1B Cooler Temperature High
4.840.A5-4.6	Air Compressor CAS-C-1C Cooler Temperature High
4.840.A5-5.3	Containment Instrument Air Header Pressure Low
4.840.A5-5.4	Air Compressor CAS-C-1A Cooler Level High
4.840.A5-5.5	Air Compressor CAS-C-1B Cooler Level High
4.840.A5-5.6	Air Compressor CAS-C-1C Cooler Level High
4.840.A5-6.4	Air Receiver CAS-AR-1A Pressure Low

[illegible]

SINGLE PAGE ABNORMAL CONDITION PROCEDURES (con't)

4.840.A5-7.4	Control Air Header Pressure Low
4.840.A5-7.5	Service Air Header Pressure Low
4.840.A5-7.6	Service Air Header Isolated
4.840.A5-8.4	Air Pre-Filter 2A Delta P High
4.840.A5-8.5	Air Pre-Filter 2B Delta P High
4.840.A5-9.3	CIA Division 1 Header Pressure High
4.840.A5-9.4	Air After Filter 3A Delta P High
4.840.A5-9.5	Air After Filter 3B Delta P High
4.840.A5-10.3	CIA Division 1 Out of Service
4.840.A5-10.4	Control Air Header Moisture High
4.840.A5-10.5	Air Dryer Trouble

SURVEILLANCE PROCEDURES

7.4.0.5.15	CIA Valve Operability
7.4.0.4.23	CIA Valve Operability-Shutdown
7.4.0.5.53	CIA-V-40 Operability Test
7.4.5.1.21	ADS-Accumulator Backup Low Pressure Alarm-CC
7.4.1.3.5.3	Control Rod Scram Accumulator Check Valve Operability Check
7.4.5.1.20	ADS-Accumulator Backup Low Pressure Alarm-CFT
7.4.6.1.8.2	Wetwell Purge Supply and Exhaust Leak Rate Test
7.4.6.1.8.3	Drywell Purge Supply and Exhaust Leak Rate Test
7.4.6.3.3	CSP and CEP Containment Isolation Valve Operability
7.4.6.4.2.2	Reactor Building-Suppression Chamber Vacuum Breaker Operability
7.4.8.1.1.2.1	Diesel Generator #1-Monthly Operability Test
7.4.8.1.1.2.2	Diesel Generator #1-Semi-annual Operability Test
7.4.8.1.1.2.11	Diesel Generator #2-Monthly Operability Test
7.4.8.1.1.2.12	HPCS Diesel Generator Monthly Operability Test

OPERATING AND ENGINEERING PROCEDURES

8.3.13	Periodic Leak Check of CSP-V-5, 6 & 9 Air Supply Piping (18 Months)
8.3.49	CIA to ADS Valve Air Supply Leak Check
8.3.130	Instrument Air Sampling

MAINTENANCE PROGRAMS AND PROCEDURES

10.1.13	System Cleanliness Control
10.2.40	Installation/Modification of Instrument and Process Tubing
10.2.55	Compressor Testing
10.2.56	Air Operated Valve Testing
10.17.1	Main Steam Relief Valve Removal and Replacement
10.17.6	Main Steam Relief Valve solemoid Replacement and Overhaul
10.17.7	Main Steam S/RV Actuator Rebuild

10.20.3	DSA-Engine-1A2 & 1B2 Maintenance
10.20.4	DSA-Engine-3B Maintenance
10.20.10	Diesel Air Start Motor Maintenance
10.23.5	Heating and Ventilation Damper Testing
10.24.106	PM Cal/Test - Fisher Valve Positioner Model 667
10.24.121	PM Cal/Test - Fisher Model 4160 Controller
10.24.122	PM Cal/Test - Fisher Valve Positioner Model 3580
10.24.159	PM Cal/Test - Fisher Valve Positioner Model 3570

APPENDIX 1

SAFETY-RELATED CONTROL VALVE DATABASE

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: DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 2, REVISION 5								
02-SW-AO-214 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-AO-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-AO-216 **	DIESEL COOLING WTR SUPPLY	H-14	CLOSED NE	OPEN	E	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	C630		(15)
02-SW-AO-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-AO-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-AO-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		(10)
02-RCIC-AO-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-AO-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-AO-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-AO-65	OUTBOARD RCIC HEAD SPRAY VALVE	H-6	---	---	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
02-RCIC-AO-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	NA	---	---	---	---	---	(17)
SYSTEM: HPCS AND LPCS				FLOW DIAGRAM: M520, REVISION 60							
02-HPCS-AO-5	HPCS INJECTION TO RPV	H-10	---	---	NA	---	---	---	---	---	(17)
02-LPCS-AO-6	LPCS INJECTION TO RPV	H-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 1, REVISION 63							
02-RHR-AO-41A	LPCI PATH TO RPV	G-6	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	NA	---	---	---	---	---	(17)
SYSTEM: RHR				FLOW DIAGRAM: M521 SHEET 2, REVISION 64							
02-RHR-AO-41B	LPCI PATH TO RPV	H-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-41C	LPCI PATH TO RPV	D-11	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	NA	---	---	---	---	---	(17)
02-RHR-AO-89	SERVICE WTR INTERTIE	J-10	---	---	NA	---	---	---	---	---	(17)
SYSTEM: FUEL POOL COOLING & CLEANUP				FLOW DIAGRAM: M526, REVISION 48							
02-FPC-AO-1	FUEL POOL FLOW CONTROL	C-9	MODLT'D ND	OPEN	C	CLEAN	DRY	OIL FREE	F130	---	(10)
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)

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
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: MS29, REVISION 57							
02-MS-AO-1A * (B22-F013J)	STEAM LINE A MSRV	F-11	CLOSED NO	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 NO	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 NO	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 NO	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 NO	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 NO	CLOSED	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-2C * (B22-F013D)	STEAM LINE C MSRV	F-7	CLOSED NO	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 NO	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: MS29, REVISION 57 (Con't)							
02-MS-AO-3A * (B22-F013B)	STEAM LINE A MSRV	F-9	CLOSED ND	CLOSED	M	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	M	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	M	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	M	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	M	50	-24 DEG.F @ 0 PSIG	OIL FREE	C710	02-02B22-08, 7, 2	
02-MS-AO-5C * (B22-F013N)	STEAM LINE C MSRV	F-8	CLOSED ND	CLOSED	M	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	D	40	35 DEG.F at 0 PSIG	NO SPCFD LIMITS	S157		(6),(12)
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)

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
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 49							
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	H	CLEAN	DRY	NA	B350		(7)
02-EDR-AO-395	RB SUMP DSCHG ISOL	C-15	OPEN NE	CLOSED	H	CLEAN	DRY	NA	B350		(7)
SYSTEM: FLOOR DRAINS-REACTOR BLDG.				FLOW DIAGRAM: M539, REVISION 58							
02-FDR-AO-3	DRYWELL FLOOR DRAIN	E-6	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	OIL FREE	K-125		(8)
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	OPEN NE	CLOSED	A	35	FREE OF LIQ WTR	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
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: M543 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	02-68-00-30, 1	(3)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-5	WETWELL VACUUM RELIEF VALVE	C-5	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-6	WETWELL VACUUM RELIEF VALVE	B-15	CLOSED NE	OPEN	Q	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-CSP-AO-7	WETWELL VAC BREAKER	C-5	----	----	NA	----	----	----			(17), (18)
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	02-68-00-30, 1	(3)
02-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	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
SYSTEM: PRIMARY CONT. COOLING & PURGING				FLOW DIAGRAM: M543 SHEET 1, REVISION 61							
02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	CLOSED ND	CLOSED	A	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 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	02-68-00-30, 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	02-68-00-30, 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	02-68-00-30, 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. OF 18)	WETWELL DOWNCOMER VACUUM BREAKERS	B7-13	----	----	NA	----	----	----			(17),(18)
SYSTEM: STANDBY GAS TREATMENT				FLOW DIAGRAM: M544, REVISION 41							
02-SGT-AO-2A	SGTS REACTOR BUILDING INTAKE	H-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 1	(3)
02-SGT-AO-2B	SGTS REACTOR BUILDING INTAKE	D-15	CLOSED NE	OPEN	K	40	NO SPCFD LIMITS	NA	M-322	02-68-00-30, 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)

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
02-SGT-AO-F26	SGT CHRCOAL FLTR DELUDGE VALVE	F-11	CLOSED NO	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 NO	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 NO	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 NO	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 NO	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)
02-ROA-AO-10	HVAC DAMPER TO DIV. II MCC 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 MCC 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.MCC 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)

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
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 *	CIA ISOLATION	J-11	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)
02-CIA-AO-39B *	CIA ISOLATION	E-10	OPEN NE	CLOSED	J	CLEAN	DRY	CLEAN	B237	02-586-00-2, 1	(4)
::											

[illegible]

I. <u>General Note(s):</u>

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. <u>Fail Safe Function(s):</u>

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 nonsafety-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 (nonsafety-related) pneumatic power is assumed to be available following events that require the use of this valve for the residual heat removal alternate cooling path.

[illegible]

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 a safety-related air supply 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 implode the containment, the actuator is designed to allow containment vacuum protection.

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 : "Provide 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 lines 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, dried 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, which confirms that the actuator were supplied by Miller Fluid Power Company. Thus their standard air quality requirements given in telephone call between M.R./A.T. Osborne (BPC) and Bob Frane (Miller) in December 1988 are applicable.

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 Group 2 and nonsafety-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. The operators are only used for periodic testing. In an emergency, the valve operators are not capable of overcoming the differential pressure across the valve and preventing the valve from performing its safety-related functions (i.e., to relieve a postulated vacuum condition and isolate in the reverse flow direction).

APPENDIX 2

SAFETY-RELATED AIR USER

SOLENOID VALVE AND IN-LINE COMPONENT DATABASE

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM:DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 1, REVISION 7						
02-DSA-V-80	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213		(1),(10)
02-DSA-SPV-5C1/1	NONE	SEE NOTE 11	E-9	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	02-E22-07, 54,1	(1),(11)
02-DSA-SPV-5C1/2	NONE	SEE NOTE 11	F-9	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	02-E22-07, 54,1	(1),(11)
SYSTEM:DIESEL OIL AND MISC.			FLOW DIAGRAM: M512 SHEET 2, REVISION 5						
02-DSA-SPV-5A1/4	NONE	SEE NOTE 11	E-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5A1/2	NONE	SEE NOTE 11	F-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5A2/4	NONE	SEE NOTE 11	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5A2/2	NONE	SEE NOTE 11	F-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-V-79A1	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1),(10)
02-DSA-V-79A2	NONE	SEE NOTE 10	F-6	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1),(10)
02-DSA-SPV-40A1	02-SW-V-214	AIR SUPPLY TO SW ADMISSION VLV	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-40A2	02-SW-V-215	AIR SUPPLY TO SW ADMISSION VLV	E-7	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V31A1/1	NONE	SEE NOTE 12	F-8	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3),(12)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-DSA-V31A2/1	NONE	SEE NOTE 12	F-5	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3),(12)
02-DSA-M-6A2/1 (TYP OF 8)	NONE	SEE NOTE 13	G-6	NO SPCFD LIMITS	DRY	CLEAN	E147		(13),(14)
SYSTEM: DIESEL OIL AND MISC.		FLOW DIAGRAM: M512 SHEET 3, REVISION 4							
02-DSA-SPV-5B1/4	NONE	SEE NOTE 11	E-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5B1/2	NONE	SEE NOTE 11	F-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5B2/4	NONE	SEE NOTE 11	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-SPV-5B2/2	NONE	SEE NOTE 11	F-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2),(11)
02-DSA-V-79B1	NONE	SEE NOTE 10	F-11	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1),(10)
02-DSA-V-79B2	NONE	SEE NOTE 10	F-6	NO SPCFD LIMITS	NO SPCFD LIMITS	NO SPCFD LIMITS	G213	2-25,00,68	(1),(10)
02-DSA-SPV-40B1	02-SW-V-216	AIR SUPPLY TO SW ADMISSION VLV	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-SPV-40B2	02-SW-V-217	AIR SUPPLY TO SW ADMISSION VLV	E-7	50	35 DEG F @ 100PSIG	1ppm	A610	2-25,00,68	(2)
02-DSA-V31B1/1	NONE	SEE NOTE 12	F-8	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3),(12)
02-DSA-V31B2/1	NONE	SEE NOTE 12	F-5	40	SEE NOTE 3	SEE NOTE 3	C339	2-25,00,68	(3),(12)
02-DSA-M-6B2/1 (TYP OF 8)	NONE	SEE NOTE 13	G-6	NO SPCFD LIMITS	DRY	CLEAN	E147		(13),(14)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM: RCIC			FLOW DIAGRAM: M519, REVISION 57						
02-RCIC-SPV-4	02-RCIC-AO-4	RCIC COND PUMP DISCH TO DRN	B-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-5	02-RCIC-AO-5	RCIC COND PUMP DISCH TO DRN	B-10	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-25	02-RCIC-AO-25	RCIC TURB STM SUP TO MN COND	E-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00, 160,505	(2)
02-RCIC-SPV-26	02-RCIC-AO-26	RCIC TURB STM SUP TO MN COND	D-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-54	02-RCIC-AO-54	RCIC TURB STM SUP TO MN COND	E-9	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-65	02-RCIC-AO-65	PUMP DISCH TO HEAD SPRAY	H-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RCIC-SPV-66	02-RCIC-AO-66	PUMP DISCH TO HEAD SPRAY	H-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: HPCS AND LPCS			FLOW DIAGRAM: M520, REVISION 60						
02-HPCS-SPV-5	02-HPCS-AO-5	HPCS INJECTION TO RPV	H-7	------	------	------	------	------	(4)
02-HPCS-SPV-6	02-HPCS-AO-6	HPCS INJECTION TO RPV	H-10	------	------	------	------	------	(4)
SYSTEM: RHR			FLOW DIAGRAM: M521 SHEET 1, REVISION 63						
02-RHR-SPV-41A	02-RHR-AO-41A	LPCI PATH TO RPV	H-6	------	------	------	------	------	(4)
02-RHR-SPV-50A	02-RHR-AO-50A	LPCI PATH TO RPV	F-7	------	------	------	------	------	(4)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
SYSTEM: RHR		FLOW DIAGRAM: M521 SHEET 2, REVISION 64							
02-RHR-SPV-41B	02-RHR-AO-41B	LPCI PATH TO RPV	H-12	------	------	------	------	------	(4)
02-RHR-SPV-41C	02-RHR-AO-41C	LPCI PATH TO RPV	D-11	------	------	------	------	------	(4)
02-RHR-SPV-50B	02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	------	------	------	------	------	(4)
02-RHR-SPV-89	02-RHR-AO-89	SERVICE WATER INTERTIE	J-10	------	------	------	------	------	(4)
SYSTEM: STANDBY SERVICE WATER SYSTEM			FLOW DIAGRAM: M524 SHEET 1, REVISION 64						
02-SW-SPV-38A	02-SW-AO-38A	SW TO COOLING TOWER	J-3	50	35 DEG F @ 100PSIG	1ppm	A610	2-42-01,16	(15),(2)
SYSTEM: STANDBY SERVICE WATER SYSTEM		FLOW DIAGRAM: M524 SHEET 2, REVISION 62							
02-SW-SPV-38B	02-SW-AO-38B	SW TO COOLING TOWER	H-3	50	35 DEG F @ 100PSIG	1ppm	A610	2-42-01,16	(15),(2)
SYSTEM: FUEL POOL COOLING & CLEANUP			FLOW DIAGRAM: M526, REVISION 48						
02-FPC-SPV-1	02-FPC-AO-1	FUEL POOL FLOW CONTROL	C-9	------	------	------	------	------	(4)
SYSTEM: CONTROL ROD DRIVE			FLOW DIAGRAM: M528, REVISION 48						
02-CRD-SPV-9	02-CRD-AO-10 02-CRD-AO-11	SDV VENT	D-11	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	02C12-07,7	(5)
02-CRD-SPV-182	02-CRD-AO-10 02-CRD-AO-180 02-CRD-AO-181	SDV VENT	D-10	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	02C12-07,7	(5)
02-CRD-SPV-186	02-CRD-AO-11	SDV VENT	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-CRD-SPV-110A	NONE	SEE NOTE 9	D-13	50	35 DEG F @ 100PSIG	1ppm	A610	02C12-07,4	(2),(9)
02-CRD-SPV-110B	NONE	SEE NOTE 9	D-13	50	35 DEG F @ 100PSIG	1ppm	A610	02C12-07,5	(2),(9)
02-CRD-V-24A	NONE	SEE NOTE 13	G-12	50	20 DEG.F @ 100 PSIG	OIL FREE	V030	541-00,3,1	(5),(13)
02-CRD-V-24B	NONE	SEE NOTE 13	G-12	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5),(13)
02-CRD-V-25A	NONE	SEE NOTE 13	K-4	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5),(13)
02-CRD-V-25B	NONE	SEE NOTE 13	K-4	50	20 DEG.F @ 100 PSIG	OIL FREE	V030		(5),(13)
02-CRD-SPV-117	02-CRD-V-126,-127	SCRAM PILOT AIR VLV	D-2	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CRD-SPV-118	02-CRD-V-126,-127	SCRAM PILOT AIR VLV	D-2	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: NUCLEAR BOILER - MAIN STEAM				FLOW DIAGRAM: M529, REVISION 57					
02-MS-SPV-1A-A	02-MS-AO-1A	STEAM LINE A MSRV	F-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1A-B	02-MS-AO-1A	STEAM LINE A MSRV	F-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1A-C	02-MS-AO-1A	STEAM LINE A MSRV	F-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-1B-A	02-MS-AO-1B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1B-B	02-MS-AO-1B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-1B-C	02-MS-AO-1B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-1C-A	02-MS-AO-1C	STEAM LINE C MSRV	F-6	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1C-B	02-MS-AO-1C	STEAM LINE C MSRV	F-6	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1C-C	02-MS-AO-1C	STEAM LINE C MSRV	F-6	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-1D-A	02-MS-AO-1D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1D-B	02-MS-AO-1D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-1D-C	02-MS-AO-1D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-2A-A	02-MS-AO-2A	STEAM LINE A MSRV	F-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2A-B	02-MS-AO-2A	STEAM LINE A MSRV	F-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2A-C	02-MS-AO-2A	STEAM LINE A MSRV	F-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-2B-A	02-MS-AO-2B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2B-B	02-MS-AO-2B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2B-C	02-MS-AO-2B	STEAM LINE B MSRV	D-11	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-2C-A	02-MS-AO-2C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-2C-B	02-MS-AO-2C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2C-C	02-MS-AO-2C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-2D-A	02-MS-AO-2D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2D-B	02-MS-AO-2D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-2D-C	02-MS-AO-2D	STEAM LINE D MSRV	D-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-3A-A	02-MS-AO-3A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3A-B	02-MS-AO-3A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3A-C	02-MS-AO-3A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-3B-A	02-MS-AO-3B	STEAM LINE B MSRV	D-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3B-B	02-MS-AO-3B	STEAM LINE B MSRV	D-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3B-C	02-MS-AO-3B	STEAM LINE B MSRV	D-10	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-3C-A	02-MS-AO-3C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3C-B	02-MS-AO-3C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710		(6)
02-MS-SPV-3C-C	02-MS-AO-3C	STEAM LINE C MSRV	F-7	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-3D-A	02-MS-AO-3D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-3D-B	02-MS-AO-3D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-3D-C	02-MS-AO-3D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4A-A	02-MS-AO-4A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4A-B	02-MS-AO-4A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4A-C	02-MS-AO-4A	STEAM LINE A MSRV	F-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4B-A	02-MS-AO-4B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4B-B	02-MS-AO-4B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4B-C	02-MS-AO-4B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4C-A	02-MS-AO-4C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4C-B	02-MS-AO-4C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4C-C	02-MS-AO-4C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4D-A	02-MS-AO-4D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)
02-MS-SPV-4D-B	02-MS-AO-4D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02B22-08,7	(6)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-4D-C	02-MS-AO-4D	STEAM LINE D MSRV	D-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5B-A	02-MS-AO-5B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5B-B	02-MS-AO-5B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5B-C	02-MS-AO-5B	STEAM LINE B MSRV	D-9	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5C-A	02-MS-AO-5C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5C-B	02-MS-AO-5C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-5C-C	02-MS-AO-5C	STEAM LINE C MSRV	F-8	FILTERED	-40 DEG.F @ 100 PSIG	OIL FREE	C710	02822-08,7	(6)
02-MS-SPV-22A-P1	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-P2	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-P3	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C1	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C2	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22A-C3	02-MS-AO-22A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-P1	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-22B-P2	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-P3	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C1	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C2	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22B-C3	02-MS-AO-22B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P1	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P2	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-P3	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C1	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C2	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22C-C3	02-MS-AO-22C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P1	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P2	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-P3	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-22D-C1	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-C2	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-22D-C3	02-MS-AO-22D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P1	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P2	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-P3	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C1	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C2	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28A-C3	02-MS-AO-28A	STEAM LINE A MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P1	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P2	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-P3	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-C1	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28B-C2	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-MS-SPV-28B-C3	02-MS-AO-28B	STEAM LINE B MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P1	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P2	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-P3	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C1	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C2	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28C-C3	02-MS-AO-28C	STEAM LINE C MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P1	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P2	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-P3	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C1	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C2	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-MS-SPV-28D-C3	02-MS-AO-28D	STEAM LINE D MSIV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32A-1	02-MS-AO-32A	STEAM LINE A SUPPLY VLV	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-RFW-SPV-32A-2	02-MS-AO-32A	STEAM LINE A SUPPLY VLV	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32B-1	02-MS-AO-32B	STEAM LINE B SUPPLY VLV	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-RFW-SPV-32B-2	02-MS-AO-32B	STEAM LINE B SUPPLY VLV	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: EQUIPMENT DRAINS		FLOW DIAGRAM: M537, REVISION 49							
02-EDR-SPV-19	02-EDR-AO-19	DRYWELL DRN SUMP VENT VALVE	D-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,247	(2)
02-EDR-SPV-20	02-EDR-AO-20	DRYWELL DRN SUMP VENT VALVE	D-9	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,490	(2)
02-EDR-SPV-394	02-EDR-AO-394	REACTOR BLDG DRN SUMP TO WASTE COL TK IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-EDR-SPV-395	02-EDR-AO-395	REACTOR BLDG DRN SUMP TO WASTE COL TK IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: FLOOR DRAINS-REACTOR BLDG.		FLOW DIAGRAM: M539, REVISION 58							
02-FDR-SPV-3	02-FDR-AO-3	DRYWELL FLOOR DRN VLV	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,241	(2)
02-FDR-SPV-4	02-FDR-AO-4	DRYWELL FLOOR DRN VLV	E-6	50	35 DEG F @ 100PSIG	1ppm	A610	2-58-00,490	(2)
02-FDR-SPV-219	02-FDR-AO-219	REACTOR BLDG DRN SUMP IN-LINE VLV	D-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-FDR-SPV-220	02-FDR-AO-220	REACTOR BLDG DRN SUMP IN-LINE VLV	D-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-FDR-SPV-221	02-FDR-AO-221	REACTOR BLDG DRN SUMP IN-LINE VLV	C-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-FDR-SPV-222	02-FDR-AO-222	REACTOR BLDG DRN SUMP IN-LINE VLV	C-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: PRIMARY CONT. COOLING & PURGING			FLOW DIAGRAM: M543 SHEET 1, REVISION 61						
02-CSP-SPV-1	02-CSP-AO-1	DRYWELL PURGE SUPPLY VLV	D-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-2	02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-3	02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-4	02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-5	02-CSP-AO-5	VAC RELIEF TO SUPP CHAMB.VLV	C-5	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-6	02-CSP-AO-6	VAC RELIEF TO SUPP CHAMB.VLV	B-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-7AB	02-CSP-AO-7	WETWELL VAC BREAKER	C-5	-------	-----------	-------	-------	-------	(4),(7)
02-CSP-SPV-8AB	02-CSP-AO-8	WETWELL VAC BREAKER	B-15	-------	-----------	-------	-------	-------	(4),(7)
02-CSP-SPV-9	02-CSP-AO-9	VAC RELIEF TO SUPP CHAMB.VLV	B-6	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CSP-SPV-10AB	02-CSP-AO-10	WETWELL VAC BREAKER	C-6	-------	-----------	-------	-------	-------	(4),(7)
02-CEP-SPV-1A	02-CEP-AO-1A	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-1B	02-CEP-AO-1B	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-CEP-SPV-2A	02-CEP-AO-2A	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-2B	02-CEP-AO-2B	DRYWELL PURGE EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-3A	02-CEP-AO-3A	WETWELL EXHAUST VALVE	C-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-3B	02-CEP-AO-3B	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-4A	02-CEP-AO-4A	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CEP-SPV-4B	02-CEP-AO-4B	WETWELL EXHAUST VALVE	J-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CVB-SPV-1AB (TYP 18)	02-CVB-AO-1AB	WETWELL DOWNCOMER VACUUM BREAKERS	B7-13	-------	-----------	-------	-------	-------	(4),(7)
SYSTEM: STANDBY GAS TREATMENT			FLOW DIAGRAM: M544, REVISION 41						
02-SGT-SPV-2A	02-SGT-AO-2A	SGT OIL SUPPLY VALVE	J-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-2B	02-SGT-AO-2B	SGT OIL SUPPLY VALVE	D-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F16	02-SGT-AO-F16	SGT SUPPLY VALVE	F-12	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F26	02-SGT-AO-F26	SGT SUPPLY VALVE	F-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F36	02-SGT-AO-F36	SGT SUPPLY VALVE	F-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F46	02-SGT-AO-F46	SGT SUPPLY VALVE	B-12	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-SGT-SPV-F56	02-SGT-AO-F56	SGT SUPPLY VALVE	B-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-SGT-SPV-F66	02-SGT-AO-F66	SGT SUPPLY VALVE	B-9	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: HVAC-REACTOR BLDG.			FLOW DIAGRAM: M545, REVISION 61						
02-REA-SPV-1	02-REA-AO-1	HVAC REACTOR BLDG ISOLATION VLV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-REA-SPV-2	02-REA-AO-2	HVAC REACTOR BLDG ISOLATION VLV	K-3	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-100	02-ROA-AO-1	HVAC DAMPER IN UNIT-ROA-HV-1	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-200	02-ROA-AO-2	HVAC DAMPER IN UNIT-ROA-HV-1	G-4	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-10	02-ROA-AO-10	HVAC DAMPER TO DIV. II MCC RM	E-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-11	02-ROA-AO-11	HVAC DAMPER TO DIV. I MCC RM	D-7	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-12	02-ROA-AO-12	HVAC DAMPER TO D.C.MCC RM(DIV I)	C-7	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-13	02-ROA-AO-13	HVAC DAMPER TO H2 RECOMB MCC RM DIV. I	E-15	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-14	02-ROA-AO-14	HVAC DAMPER TO H2 RECOMB MCC RM DIV. II	G-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-ROA-SPV-15	02-ROA-AO-15	HVAC DAMPER TO SAMPLING ANALYZER RM IA	G-13	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

Component ID No.	Associated Air Actuator	Air Actuator Description	Dwg. Loc	Maximum Allow Part Size (Micron)	Maximum Allow Moisture (Dw Pt)	Maximum Allow Oil Content	Supplier (Note 8)	CVI No.	Comments
02-ROA-SPV-17	02-ROA-AO-17	HVAC DAMPER TO SAMPLING ANALYZER RM IB	G-14	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
SYSTEM: CONTAINMENT INSTRUMENT AIR			FLOW DIAGRAM: N556 SHEET 1, REVISION 38						
02-CIA-SPV-39A	02-CIA-AO-39A	CIA ISOLATION	J-11	50	35 DEG F @ 100PSIG	1ppm	A610		(2)
02-CIA-SPV-39B	02-CIA-AO-39B	CIA ISOLATION	E-10	50	35 DEG F @ 100PSIG	1ppm	A610		(2)

[illegible]

APPENDIX 2 NOTES

1. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative R. Caudill of Graham-White on March 6, 1989.

2. Air supply requirements are based on a letter from ASCO to K. Larssen of BPC dated March 20, 1989.

3. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative D. Prawl of Circle Seals Controls on March 7, 1989. Additional requirements are based on guidelines provided in "Air Quality Federal Standard BB-A-1034A, Amendment 1, Grade C"

4. The actuator is designated Quality Class II and is non-safety related. Therefore, air quality specifications are not required for these valves. The testable check valves associated with these solenoid 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 valve opens on forward flow when the upstream pressure exceeds the downstream pressure.

5. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative D. Heilman of Valcor Engineering on March 2, 1989.

6. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative A. Rollo of Crosby Valve and Gage on March 3, 1989.

7. The actuator is designated Quality Class II and is non-safety related. Therefore, air quality specifications are not required for these valves. The swing check valves have opening and closing air operators for testing purposes only. The valves operate independently of the air operators. The operators are only used for periodic testing. In an emergency, the valve operators are not capable of overcoming the differential pressure across the valve and preventing the valve from performing its safety-related functions (i.e., to relieve a postulated vacuum condition and isolate in the reverse flow direction).

8. The following matrix identifies the suppliers associated with the listed code numbers:

Code Number	Supplier
A610	ASCO
V030	Valcor Engineering Co.
G213	Graham-White Mfg Co.
C339	Circle Seals Controls
F130	Fisher Controls
C710	Crosby Valve and Gage
E147	Electromotive (General Motors)

APPENDIX 2 NOTES

9. Scram backup valve.

10. Shuttle valve admitting air to governor booster.

11. Governs start motor pinion gear engagement.

12. Shuttle valve admitting air to service water inlet valve.

13. Engine start motor..

14. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative H. Falter of Morrison-Knudson on March 15,1989.

15. Air supply requirements are based on a telephone call between W. Sarakbi of BPC and supplier representative K. Goudy of Fisher Controls on March 3,1989. Ms. Goudy stated that ASCO supplies their solenoid valves.

APPENDIX 3

SAFETY-RELATED AIR USER

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	NO F/R		(2)
02-SW-AO-215	DIESEL COOLING WTR SUPPLY	H-2	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	NO F/R		(2)
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	NO F/R		(2)
02-SW-AO-217	DIESEL COOLING WTR SUPPLY	H-1	SERVICE AIR	FREE OF LIQ WTR	NO SPCFD LIMITS	NO F/R		(2)
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), (5)
02-RCIC-AO-66	INBOARD RCIC HEAD SPRAY VALVE	J-4	---	---	---	FISHER 67FR	40	(1), (5)

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-AO-5	HPCS INJECTION TO RPV	H-10	---	---	---	FISHER 67FR		(5)
02-LPCS-AO-6	LPCS INJECTION TO RPV	H-7	---	---	---	FISHER 67FR		(5)
SYSTEM: RHR		FLOW DIAGRAM: M521 SHEET 1, REVISION 63						
02-RHR-AO-41A	LPCI PATH TO RPV	G-6	---	---	---	FISHER 67FR		(5)
02-RHR-AO-50A	RHR SHUTDOWN COOLING RETURN	F-7	---	---	---	FISHER 67FR		(5)
SYSTEM: RHR		FLOW DIAGRAM: M521 SHEET 2, REVISION 64						
02-RHR-AO-41B	LPCI PATH TO RPV	H-12	---	---	---	FISHER 67FR		(5)
02-RHR-AO-41C	LPCI PATH TO RPV	D-11	---	---	---	FISHER 67FR		(5)
02-RHR-AO-50B	RHR SHUTDOWN COOLING RETURN	F-12	---	---	---	FISHER 67FR		(5)
02-RHR-AO-89	SERVICE WTR INTERTIE	J-10	---	---	---	FISHER 67FR		(5)
SYSTEM: FUEL POOL COOLING & CLEANUP		FLOW DIAGRAM: M526, REVISION 48						
02-FPC-AO-1	FUEL POOL FLOW CONTORL	C-9	CLEAN	DRY	OIL FREE	NO F/R		(2)
SYSTEM: CONTROL ROD DRIVE		FLOW DIAGRAM: M528, REVISION 48						
02-CRD-AO-10	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)

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-AO-11	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-AO-180	SDV VENT	K-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-AO-181	SDV DRAIN	F-6	50	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-V-126	SCRAM CHG VALVE (HCU TYP OF 185)	C-4	10	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
02-CRD-V-127	SCRAM DSCHG VLV (HCU TYP OF 185)	C-3	10	20 DEG.F @ 100 PSIG	OIL FREE	DOLLINGER DD203	10	(6)
SYSTEM: NUCLEAR BOILER - MAIN STEAM FLOW DIAGRAM: M529, REVISION 57								
02-MS-AO-1A (B22-F013J)	STEAM LINE A MSRV	F-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1B (B22-F013E)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1C (B22-F013L)	STEAM LINE C MSRV	F-6	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-1D (B22-F013K)	STEAM LINE D MSRV	D-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2A (B22-F013A)	STEAM LINE A MSRV	F-10	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2B (B22-F013F)	STEAM LINE B MSRV	D-11	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-2C (B22-F013D)	STEAM LINE C MSRV	F-7	50	-24 DEG.F @ 0 PSIG	OIL FREE	NO F/R		(2)
02-MS-AO-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: M529, REVISION 57 (Con't)						
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-F013V)	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-F013M)	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)

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	(3)
02-EDR-AO-20	DRYWELL SUMP DRAIN	D-9	35	FREE OF LIQ WTR	OIL FREE	FISHER 67FR	40	(3)
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	(3)
02-FDR-AO-4	DRYWELL FLOOR DRAIN	E-6	35	FREE OF LIQ WTR	OIL FREE	FISHER 67F	40	(3)

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	(4)	(2)
02-CSP-AO-2	DRYWELL PURGE SUPPLY VLV	D-6	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(2)
02-CSP-AO-3	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(2)
02-CSP-AO-4	WETWELL PURGE SUPPLY VLV	C-5	40	NO SPCFD LIMITS	NA	FISHER 95H	(4)	(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	(5)
02-CSP-AO-8	WETWELL VAC BREAKER	B-15	----	----	----	FISHER 67F	40	(5)
02-CSP-AO-9	WETWELL VACUUM RELIEF VALVE	B-6	40	NO SPCFD LIMITS	NA	NO F/R	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-CSP-AO-10	WETWELL VAC BREAKER	C-6	----	----	----	FISHER 67F	40	(5)
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	(4)	(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	(4)	(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	(4)	(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	(4)	(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-1 (TYP. OF 18)	WETWELL DOWNCOMER VACUUM BREAKERS	C-6	----	----	----			(5)
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	(4)	(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	(4)	(2)
02-SGT-AO-F36	SGT CHRCOAL FLTR DELUDGE VALVE	F-10	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F46	SGT CHRCOAL FLTR DELUDGE VALVE	B-12	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F56	SGT CHRCOAL FLTR DELUDGE VALVE	B-11	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(2)
02-SGT-AO-F66	SGT CHRCOAL FLTR DELUDGE VALVE	B-9	CLEAN	DRY	CLEAN	FISHER 95H	(4)	(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 MCC RM	E-15	CLEAN	NO SPCFD LIMITS	NO SPCFD LIMITS	FISHER 67F	40	(1)
02-ROA-AO-11	HVAC DAMPER TO DIV. I MCC 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.MCC 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	CIA ISOLATION	J-11	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)
02-CIA-AO-39B	CIA ISOLATION	E-10	CLEAN	DRY	CLEAN	FISHER 67AFR239	40	(1)

APPENDIX 3 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, but is provided for additional assurance of proper air quality.

3. 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.

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

5. Actuators are not safety-related. See Appendix 1 for an explanation.

6. The Control Rod Drive (CRD) System actuators are protected by a common filter CRD-F-6 which has a rating of 10 microns. General Electric technical document GEK-71317A requires a filter rated for 5 microns in the CRD instrument air header servicing the hydraulic control units.

APPENDIX 4

SAFETY-RELATED AIR ACCUMULATORS

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
SYSTEM: Control Air System				Flow Diagram: M510, Revision 65						
02-MS-TK-2A	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29A	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2B	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29B	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2C	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29C	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
02-MS-TK-2D	OUTBOARD MSIV ACCUMULATOR	D-1	35	GE SPEC 23A1886 SHT AA, R11	CAS-V-29D	1/2	SPRING RETURN SOFT SEAT	DRAGON	1	
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 1, Rev. 7						
02-DSA-AR-1C	HPCS Diesel Gen. Air Receiver	J-6	35 ft3	Note 6	DSA-V-75	3/4	SOFT SEAT	ANCO	NA	
02-DSA-AR-2C	HPCS Diesel Gen. Air Receiver	J-8	35 ft3	Note 6	DSA-V-76	3/4	SOFT SEAT	ANCO	NA	
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 2, Rev 5						
02-DSA-TK-1A Through 02-DSA-TK-8A	Div. 1 Diesel Starting Air Receiver	J-6 - J-10	32 ft3. each	Note 7	DSA-V-16A & DSA-V-15A	3/4 3/4	SOFT SEAT	KINGSTON	NA	(5)
SYSTEM: Diesel Oil and Misc. Systems				Flow Diagram: M512, Sht 3, Rev. 4						
02-DSA-TK-1B Through 02-DSA-TK-8B	Div. 2 Diesel Starting Air Receiver	J-6 - J-10	32 ft3 each	Note 7	DSA-V-16B & DSA-V-15A	3/4 3/4	SOFT SEAT	KINGSTON	NA	(5)

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
SYSTEM : Primary Containment Cooling & Purging				Flow Diagram : M543, Sheet 1, Revision 61 (I & C Dwg. No. : M619, Sheet 161, Revision 11)						
02-CSP-TK-51	CONTAINMENT VACUUM BREAK TANK	---	137		CSP-V-65	1 1/2	SPRING RETURN SOFT SEAT	VOGT	1	(1)
02-CSP-TK-1 thru 02-CSP-TK-10	BACKUP NITROGEN CYLINDERS	---	223 SCF (each)	SEE NOTE 3	CSP-V-65	1 1/2	SPRING RETURN SOFT SEAT	VOGT	1	(3)
SYSTEM : Heating, Ventilation & Air Conditioning System				Flow Diagram : M545, Revision 61						
02-ROA-ACC-1	OUTBOARD ROA ACCUMULATOR	F-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-ROA-ACC-2	INBOARD ROA ACCUMULATOR	F-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-REA-ACC-1	INBOARD REA ACCUMULATOR	J-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
02-REA-ACC-2	OUTBOARD REA ACCUMULATOR	J-3	59.5	NA	NA	1	SPRING RETURN SOFT SEAT		NA	(2),(4)
SYSTEM : Containment Instrument Air System				Flow Diagram : M556 Sheet 1, Revision 38						
02-MS-TK-1A	INBOARD MSIV ACCUMULATOR	J-4	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24A	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-1B	INBOARD MSIV ACCUMULATOR	J-3	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24B	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-1C	INBOARD MSIV ACCUMULATOR	K-4	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24C	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-1D	INBOARD MSIV ACCUMULATOR	K-3	35	GE SPEC 23A1886 SHT AA, R11	CIA-V-24D	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4A	MSRV ACCUMULATOR	F-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36A	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4B	MSRV ACCUMULATOR	F-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36B	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4C	MSRV ACCUMULATOR	D-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36C	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4D	MSRV ACCUMULATOR	C-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36D	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4E	MSRV ACCUMULATOR	F-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36E	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4F	MSRV ACCUMULATOR	G-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36F	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4G	MSRV ACCUMULATOR	C-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36G	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4H	MSRV ACCUMULATOR	H-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36H	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4J	MSRV ACCUMULATOR	E-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36J	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-4K	MSRV ACCUMULATOR	E-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36K	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4L	MSRV ACCUMULATOR	E-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36L	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4M	MSRV ACCUMULATOR	B-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36M	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4N	MSRV ACCUMULATOR	B-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36N	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4P	MSRV ACCUMULATOR	C-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36P	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4R	MSRV ACCUMULATOR	H-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36R	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4S	MSRV ACCUMULATOR	G-3	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36S	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4U	MSRV ACCUMULATOR	H-4	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36U	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-4V	MSRV ACCUMULATOR	D-2	10	GE SPEC 23A1886 SHT AA, R11	CIA-V-36V	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3M	ADS ACCUMULATOR	C-3	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40M	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	

APPENDIX 4

Component ID No.	Component Description	DWG. LOC	Accumulator Size (Gals)	Accumulator Sizing Calculation	Associated Check Valve ID No.	Check Valve Size (in)	Type of Check Valve	Check Valve Manufacturer	Leak Rate (SCFH)	Comments
02-MS-TK-3N	ADS ACCUMULATOR	B-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40N	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3P	ADS ACCUMULATOR	D-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40P	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3R	ADS ACCUMULATOR	J-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40R	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3S	ADS ACCUMULATOR	G-4	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40S	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3U	ADS ACCUMULATOR	J-5	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40U	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-MS-TK-3V	ADS ACCUMULATOR	D-3	42	GE SPEC 23A1886 SHT AA, R11	CIA-V-40V	1/2	SPRING RETURN SOFT SEAT	DRAGON	NA	
02-CIA-TK-1A thru 02-CIA-TK-15A	BACKUP NITROGEN CYLINDERS	F-11	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-52A THRU CIA-V-66A	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-1B thru 02-CIA-TK-19B	BACKUP NITROGEN CYLINDERS	A-11	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-52B THRU CIA-V-70B	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-20A	REMOTE NITROGEN BOTTLES	H-13	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-103A	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)
02-CIA-TK-20B	REMOTE NITROGEN BOTTLES	D-13	223 SCF SEE NOTE 3	WNP-2 CALC 5.46.05	CIA-V-103B	1/2	SPRING RETURN SOFT SEAT	BORG-WARNER	NA	(3)

APPENDIX 4 NOTES

1. The size of the accumulator is based on the dimensions given on Supply System drawing CVI No. 2-220-01-55-1, Rev. 0

2. The size of the accumulator is based on the dimensions given on the following Drawings:

   CVI No. 2-220-01-60-5, Rev. 0
   CVI No. 2-220-01-58-3, Rev. 0
   CVI No. 2-220-01-57-2, Rev. 0

3. Each nitrogen bottle is a standard model Department of Transportation (DOT) 3AA3600 rated at 3600 psig with 10 percent overpressure. Capacity is 223 SCF at the minimum pressure of 2200 psig. Normal pressure is 3000 psig.

4. The accumulator is provided to prevent pressure fluctuations and does not serve a safety-related function.

5. Check valve DSA-V-16A(B) is associated with receivers DSA-TK-1A(B), 2A(B), 5A(B) and 6A(B); Check valve DSA-V-15A(B) is associated with receivers DSA-TK-3A(B), 4A(B), 7A(B) and 8A(B).

6. The size of the receivers is based on General Electric NEDO-10905-2, dated April of 1976.

7. The size of the receivers is based on a Stewart & Stevenson Services letter dated Sept. 16, 1974.

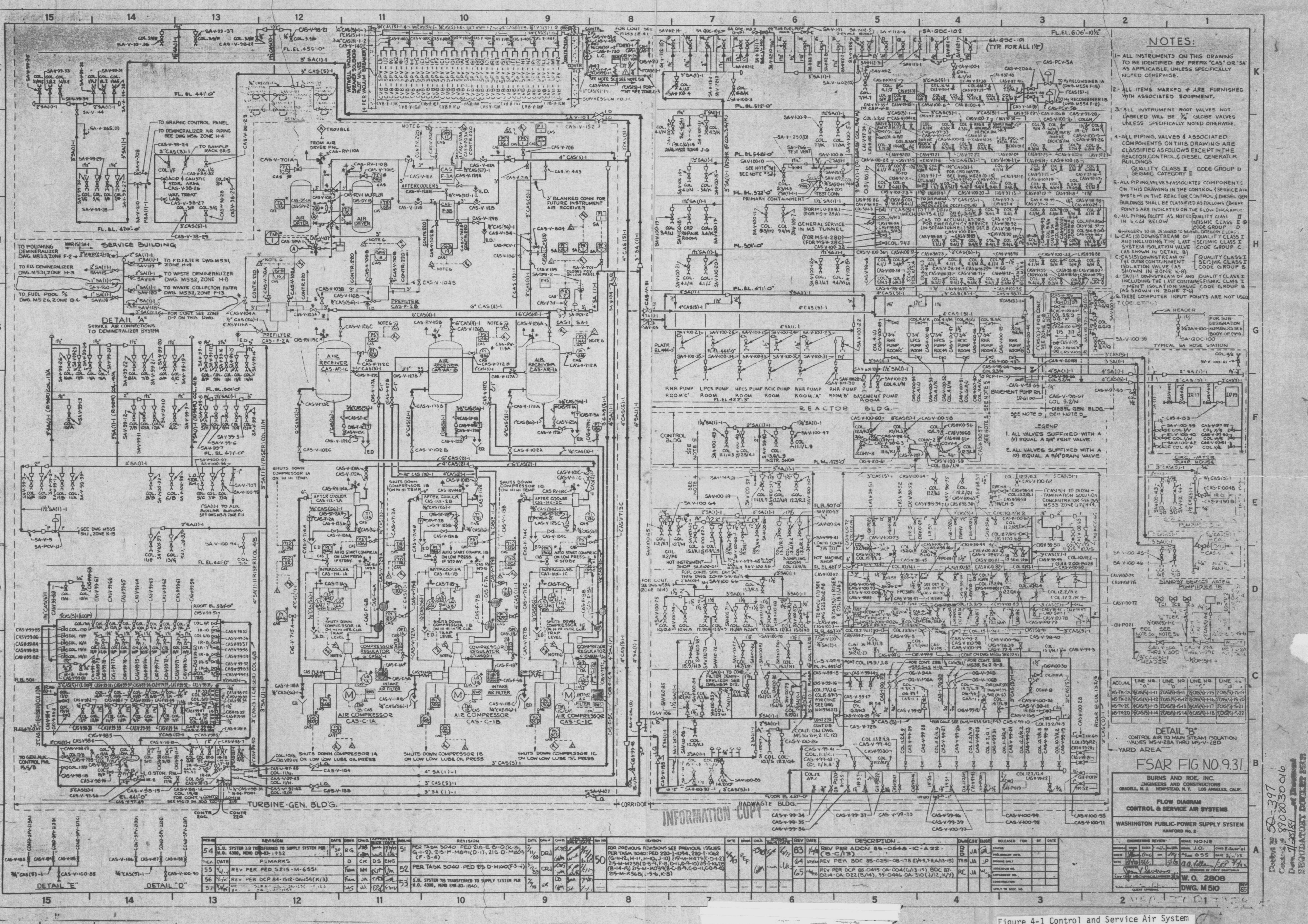
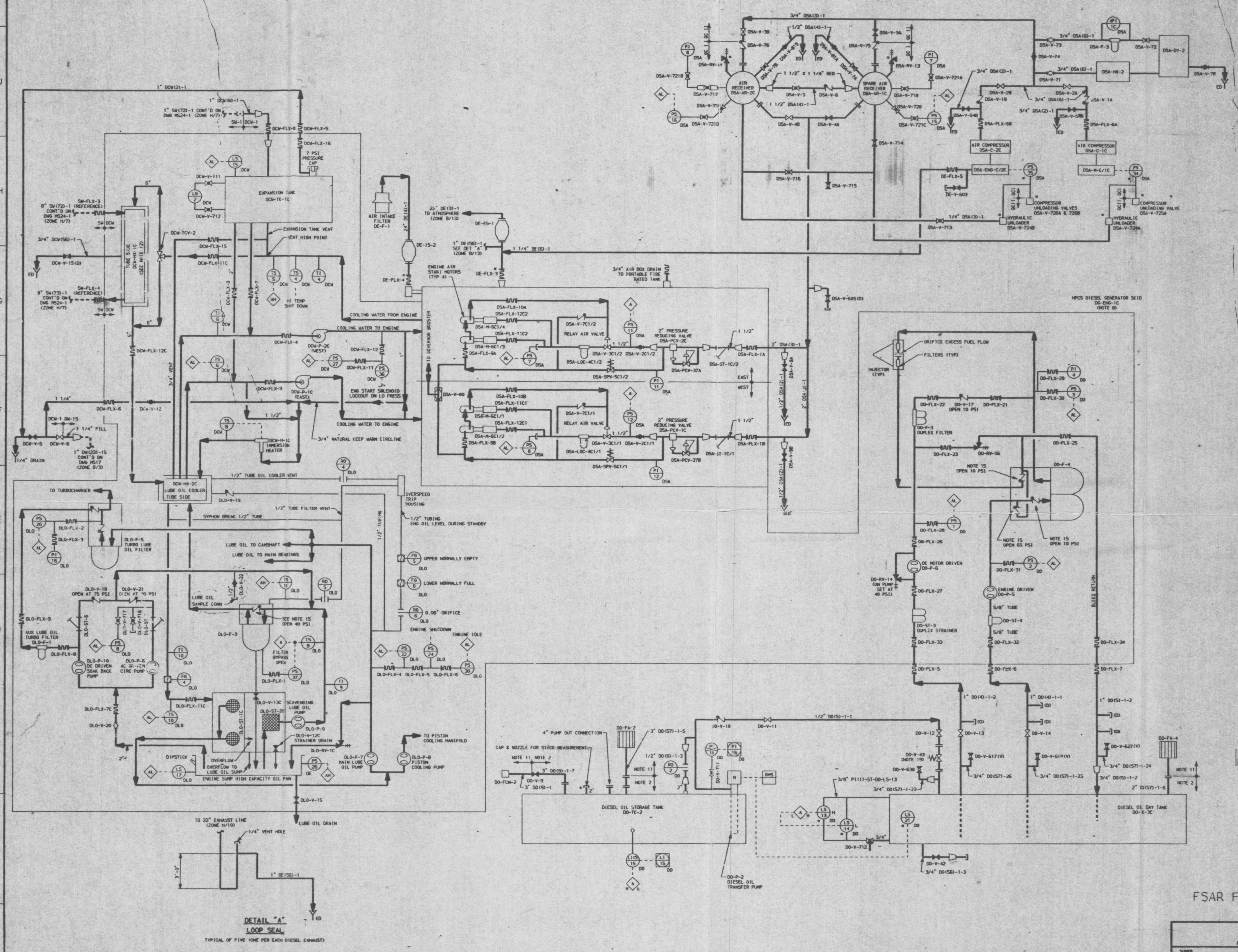


Figure 4-1 Control and Service Air System



DETAIL "A"
LOOP SEAL
TYPICAL OF FIVE (ONE PER EACH DIESEL EXHAUST)

NOTES:

1. ALL DIESEL STARTING AIR (DSA), DIESEL COOLING WATER (DCW), AND DIESEL EXHAUST (DE) PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 215 EXCEPT AS NOTED IN NOTES ARE CLASSIFIED:
   QUALITY CLASS I
   CODE GROUP D
   SEISMIC CATEGORY I
2. ALL DIESEL OIL (DO) PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 215 EXCEPT AS NOTED IN NOTES 10 & 11 ARE CLASSIFIED:
   QUALITY CLASS I
   CODE GROUP C
   SEISMIC CATEGORY I
3. (DELETED)
4. ALL PIPING AND FITTINGS FOR DE(1)-1 AND DE(2)-1 ARE SUPPLIED BY CONTRACT 53 AND SUPPORTED AND ERECTED BY CONTRACT 215.
5. PIPING AND EQUIPMENT FOR DIESEL GENERATOR DG-ENG-1B IS IDENTICAL TO THAT SHOWN FOR DIESEL GENERATOR DG-ENG-1A.
6. EQUIPMENT TAG NUMBER WITH SUFFIX A1 REFERS TO NUMBER 1 ENGINE OF DIESEL GENERATOR DG-ENG-1A. SUFFIX A2 REFERS TO NUMBER 2 ENGINE OF DIESEL GENERATOR DG-ENG-1A. SUFFIX B1 REFERS TO NUMBER 1 ENGINE OF DIESEL GENERATOR DG-ENG-1B AND SUFFIX B2 REFERS TO NUMBER 2 ENGINE OF DIESEL GENERATOR DG-ENG-1B.
7. ALL ITEMS MARKED * ARE FURNISHED WITH ASSOCIATED EQUIPMENT.
8. ALL PIPING COMPONENTS AND INSTRUMENTATION SHOWN WITHIN THE CONFINES OF THE SKID PACKAGE ARE SUPPLIED WITH THE ASSOCIATED EQUIPMENT INSTRUMENT LINES FROM THE ENGINES TO THE CONTRACT 53 SUPPLIED GAGE PANELS SHALL BE:
   QUALITY CLASS I
   CODE GROUP D
   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 ISOLATION VALVE OPEN TO THE ATMOSPHERE INCLUDED IN CONTRACT 215 IS CLASSIFIED:
   QUALITY CLASS I
   CODE GROUP D
   SEISMIC CATEGORY I
11. ALL DIESEL OIL (DO) PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 215 AND REFERRED TO BY THIS NOTE ARE CLASSIFIED:
   QUALITY CLASS II
   CODE GROUP D
   SEISMIC CATEGORY II
12. DCW-HX-1C IS GE SUPPLIED EQUIPMENT AND IN ACCORDANCE WITH THEIR CONTRACT COMPLIES WITH SECTION VIII DIVISION I OF ASME B & PV CODE, 1968 EDITION, SUMMER 1970 ADDENDA.
13. ALL DSA PIPING AND ASSOCIATED COMPONENTS ON THIS DRAWING INCLUDED IN CONTRACT 215 REFERRED TO BY THIS NOTE ARE CLASSIFIED:
   QUALITY CLASS II
   CODE GROUP D
   SEISMIC CATEGORY II ⊕
   ⊕ HANGERS TO BE DESIGNED TO SEISMIC CATEGORY I LOADS
14. CODE BREAK DEFINITIONS FOR THERMOWELLS ARE SHOWN ON DRAWING M610 "INSTALLATION OF THE THERMOWELLS AND SAMPLE PROBES".
15. ALL ITEMS REFERRING TO THIS NOTE ARE INSTALLED WITHIN THEIR RESPECTIVE FUEL FILTER MANIFOLD.
16. (DELETED)
17. DSA PIPING & EQUIPMENT UPSTREAM OF DSA-V-15A & -16A ARE CLASSIFIED:
   QUALITY CLASS II
   CODE GROUP D
   SEISMIC CATEGORY II
18. THE DIESEL LUBE OIL (DLO) SYSTEM FOR DG-ENG-1A & 1B IS A DUPLICATE OF STEWART & STEVENSONS VENDOR DRAWING NUMBER 209 (CVI NUMBER 53-00,53) AS-MODIFIED BY POWER SYSTEMS DRAWING 691TR03002 SHEET 1 THRU SHEET 4 (CVI NUMBER 332-00,1,1 THRU 332-00,1,4 RESPECTIVELY).
19. VALVE DO-V-43 IS NO LONGER FUNCTIONAL, INTERNAL PARTS HAVE BEEN REMOVED.
20. PRESSURE SWITCHES ARE INSTALLED BUT JUMPER IS INSTALLED TO BYPASS THEM.

LEGEND:

1. ALL VALVES SUFFIXED WITH A (V) ARE A VENT VALVE.
2. ALL VALVES SUFFIXED WITH A (D) ARE A DRAIN VALVE.

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FSAR FIG NO. 9.5-4A
3.2-22A (C)

REV	DATE	REMARKS	DRWN	CHKD	ENGR
6	4-22-88	REDRAWN AND REVISED PER SDC 55-0371-0A-013	DRJ	SRP	JCM
7	9-15-88	REVISED PER DCP 86-0193-0A-004 (D/13-14).	TCS	JA	[illegible]

WASHINGTON PUBLIC POWER
SUPPLY SYSTEM
RICHLAND, WASHINGTON 99352-0968

WNP 2

SIGNED		DATE
APPROVED	JC MOWERY	4-22-88
DESIGN	JR MILLER	4-22-88
CHECKED	SR PAYNE	4-11-88
DRAWN	DR JACOBSEN	3-24-88

TITLE: FLOW DIAGRAM
DIESEL OIL &
MISCELLANEOUS SYSTEMS
DIESEL GENERATOR BUILDING

DRAWING # M512
SCALE N/A REV. 7 SHEET 1 OF 4

NRC TOP TIER

Figure 4-3 Diesel Oil and Miscellaneous Systems, Sheet 1

SI
APERTURE
CARD

8908030033-02

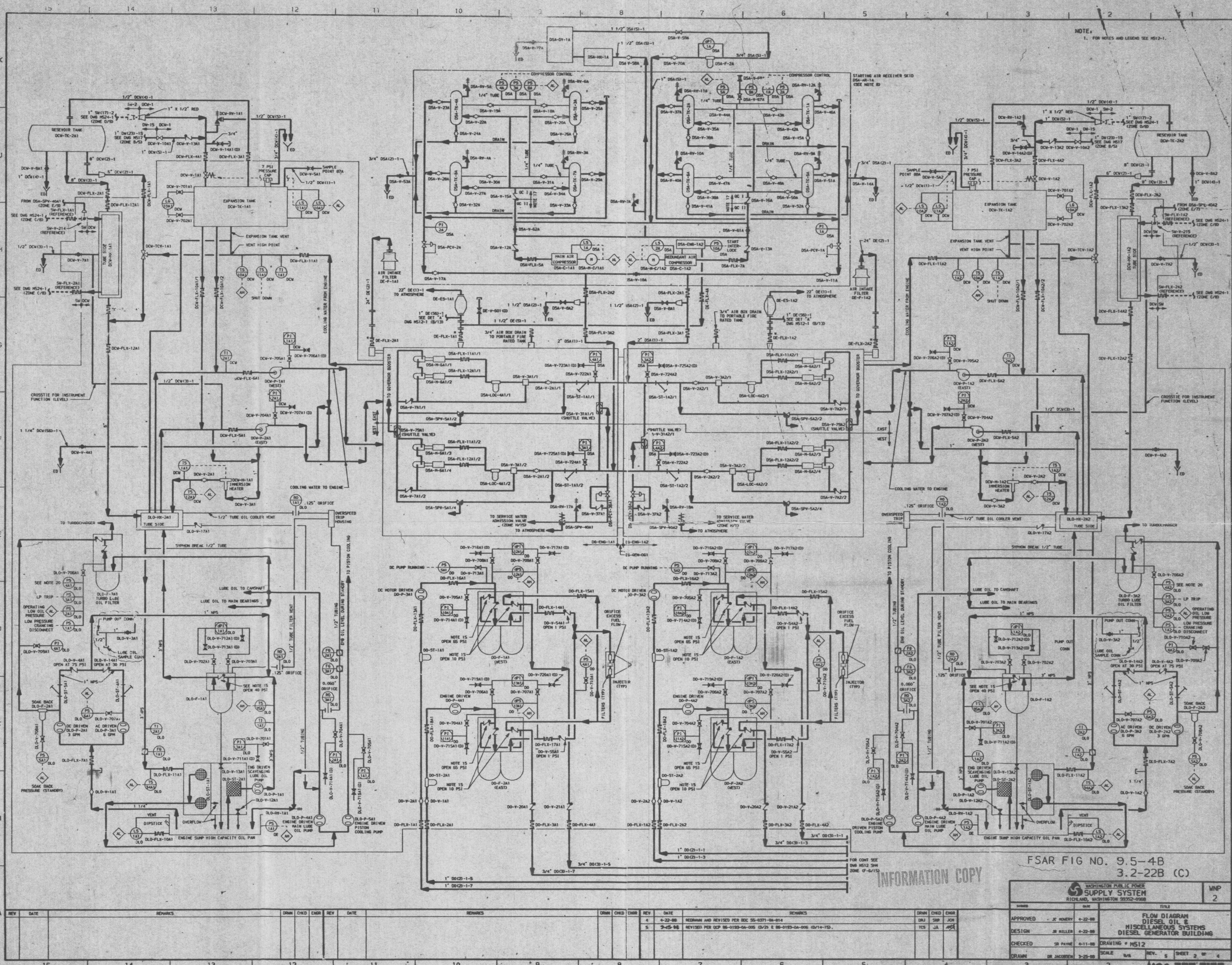

Figure 4-3 Diesel Oil and Miscellaneous Systems, Sheet 2

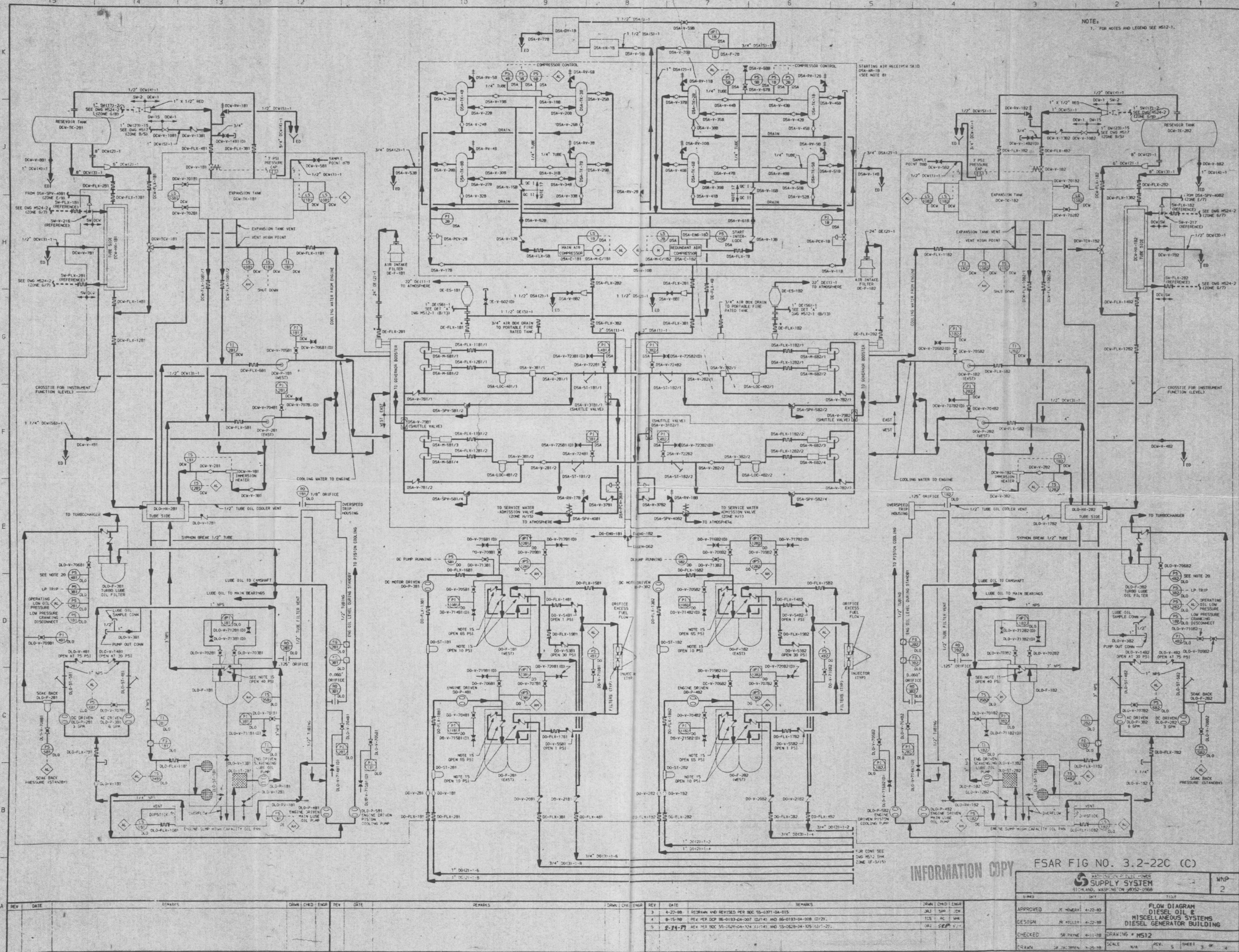

Figure 4-3 Diesel Oil and Miscellaneous Systems, Sheet 3