10 CFR 50.55a

Progress Energy

Serial: RNP-RA/12-0017
MAR 16 2012

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

INSERVICE TESTING PROGRAM PLAN FOR THE FIFTH TEN-YEAR INTERVAL

Ladies and Gentlemen:

Pursuant to 10 CFR 50.55a(f)(5)(i), Carolina Power and Light (CP&L) Company, now doing business as Progress Energy Carolinas, Inc., is submitting the "Inservice Testing Program Plan – Fifth Interval" for the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2. The HBRSEP, Unit No. 2, Fifth Ten-Year Interval begins on July 21, 2012.

10 CFR 50.55a(f) requires inservice testing (IST) of American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves. 10 CFR 50.55a(f)(4)(ii) requires that IST programs conducted during successive ten-year inspection intervals following the initial ten-year interval comply with the requirements of the latest edition and addenda of the Code, incorporated by reference in paragraph (b) of 10 CFR 50.55a, twelve months prior to the start of the ten-year interval, subject to the limitations and modifications listed within paragraph (b) of that section. Therefore, the HBRSEP, Unit No. 2, "Inservice Testing Program Plan – Fifth Interval" is based on the requirements of the ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code), 2004 Edition with 2006 Addenda. The HBRSEP, Unit No.2, "Inservice Testing Program Plan – Fifth Interval" is provided as Attachment I.

Attachment I to this submittal is the HBRSEP, Unit No. 2, "Inservice Testing Program Plan – Fifth Interval." Attachment 10.2 of the program plan contains Relief Requests IST-RR-1, IST-RR-2, and IST-RR-3 which are being submitted for approval pursuant to 10 CFR 50.55a(a)(3)(i). Attachment II to this submittal provides the system diagrams for the components identified in the program.

A047
NRR

Progress Energy Carolinas, Inc.
Robinson Nuclear Plant
3581 West Entrance Road
Hartsville, SC 29550

As noted above, the HBRSEP, Unit No. 2, Fifth Ten-Year Interval begins on July 21, 2012. The first refueling outage of the Fifth Ten-Year Interval is Refueling Outage 28 (RO-28), which is currently scheduled to begin in September of 2013. In order to support implementation of the Fifth Ten-Year Interval Inservice Testing Program, and to facilitate preparations for RO-28, CP&L requests NRC approval of the associated relief requests by July 18, 2012.

If you have any questions regarding this matter, please contact Richard Hightower at (843) 857-1329.

Sincerely,

Chris Kamilaris
Manager - Support Services - Nuclear

PSF/psf

Attachments:

I. Inservice Testing Program Plan – Fifth Interval
II. System Diagrams

c: V. M. McCree, NRC, Region II
A. T. Billoch-Colon, NRC, NRR
NRC Resident Inspectors

United States Nuclear Regulatory Commission
Attachment I to Serial: RNP-RA/12-0017
230 Pages (including cover page)

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

INSERVICE TESTING PROGRAM PLAN – FIFTH INTERVAL

REVISION 0

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

PLANT OPERATING MANUAL

VOLUME 6
PART 1

RNP2 Fifth IST Plan

INSERVICE TESTING PROGRAM

SUMMARY OF CHANGES

SECTION	REVISION
New	New program plan to identify the implementation of the 2004 Edition through 2006 Addenda of the ASME OM Code subject to conditions imposed by the NRC. This document represents the program plan for the RNP IST Program Fifth Inservice Test Interval.

TABLE OF CONTENTS

1.0 PURPOSE

1.1 This procedure details the Inservice Testing (IST) Program Plan for the fifth ten year interval. This procedure identifies the components subject to test or examination, responsibilities, methods, intervals, parameters to be measured and evaluated, criteria for evaluating the results, corrective action and record keeping. These requirements apply to:

1.1.1 Pumps and valves that are required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident.

1.1.2 Pressure relief devices that protect systems that are required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident.

1.1.3 Dynamic restraints (snubbers) used in systems that are required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident, or to ensure the integrity of the reactor coolant boundary.

1.2 This procedure provides compliance with UFSAR Section 3.9.6, and Technical Specification Section 5.5.8.

2.0 REFERENCES

2.1 Code of Federal Regulations, Title 10, Part 50, Section 55a, and Appendix J.

2.2 ASME OM Code – 2004 Edition through 2006 Addenda.

2.3 HBRSEP Unit 2 Technical Specifications, Section 5.5.8.

2.4 HBR 2 Updated FSAR, Section 3.9.6, In-Service Inspection and Inservice Testing of Pumps and Valves.

2.5 NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, revision 1.

2.6 NUREG/CR-6396, Examples, Clarification, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements.

2.7 Federal Register 36269, dated July 19, 2011.

2.8 TMM-005, 10CFR50, Appendix "J" Testing Program

2.9 TMM-008, Check Valve Program Technical Requirements

2.10 TMM-009, Inservice Test Program Administration

2.11 EST-111, Safety, Pressure Relief & Vacuum Breaker Valve Test Selection and Verification (Refueling Shutdown and as Needed After Maintenance)

2.12 EST-112, Pressure, Safety, and Relief Valve Bench Testing

2.13 Generic Issue Document 90-181, Reactor Containment IsolationPLP-037, Conduct of Infrequently Performed Tests or Evolutions and Pre-Job Briefs

2.14 Calculation RNP-M/MECH 1621, Containment Isolation Valves 10CFR50 Appendix J Allowable Leakage Rates

2.15 CAP-NGGC-0200, Condition Identification and Screening Process

2.16 EGR-NGGC-008, Engineering Programs

2.17 NAS Assessment R-ES-99-01

2.18 NAS Assessment RES-ES-01-01

2.19 ESR 95-00796, AFW Self-Cooling

2.20 ESR 95-00189, Flow through SI Test Line during OST-151

2.21 RNP-M/MECH 1802, Safety Related Pump Minimum Performance Requirements

2.22 ESR 97-00383, Cool Water Injection to SWBP 'B' Discharge

2.23 ESR 98-00295, Function of EDG Skid Mounted Check Valves

2.24 ESR 98-00386, Locking Manual Containment Isolation Valves

2.25 ESR 98-00509, North Service Water Header Piping Replacement

2.26 ESR 99-00176, Removing North Service Water Header From Service

2.27 SOER 98-01, Safety System Status Control

2.28 NRC Information Notice 97-16, Preconditioning of Plant Structures, Systems, and Components

2.29 NRC Information Notice 97-090, Use of Non Conservative Acceptance Criteria in Safety Related Pump Surveillance Tests

2.30 TMM-015, Inservice Repair and Replacement Program

2.31 EC 52357, SW South Header Flow Instrument Installation

2.32 EC 52753, CS/SI Pump Test Line

2.33 EC 51299, System Vents For RHR Piping

2.34 NAS Assessment R-ISI/SBO-05-01

2.35 ADM-NGGC-0115 , Preconditioning of Structures, Systems and Components

2.36 Regulatory Guide 1.192, Operation and Maintenance Code Case Acceptability, ASME OM Code

2.37 Regulatory Guide 1.193, ASME Code Cases Not Approved for Use

2.38 NCR 455255, R-ISI-11-01-F1, Established Fleet Processes Not used to Document Conditions for Evaluation

2.39 EGR-NGGC-0028, Engineering Evaluation

2.40 OPS-NGGC-1305, Operability Determinations

2.41 EC 80584, Seismic Qualification of the SFP / RWST Purification System

3.0 RESPONSIBILITIES

3.1 The Supervisor - Engineering Programs is responsible for compliance with this procedure.

3.2 The IST Engineer has the responsibility to monitor, analyze, trend and archive IST data obtained during performance of surveillance procedures to comply with this procedure. Additionally, the IST Engineer will report adverse trends to the Responsible or System Engineers, as applicable.

3.3 The IST Engineer ensures that implementing test procedures are placed on Administrative Hold per RDC-NGGC-0002, *Document Control Program* when acceptance criteria have been revised and the existing procedure criteria is no longer valid.

3.4 The System Engineer is responsible for performing a component and system level review when necessary when performance parameters are outside the acceptable range (Alert, Required Action).

3.5 The IST and affected System or Responsible Engineer are accountable for working together to address any concerns over abnormal or unexplained findings.

3.6 The affected System or Responsible Engineer is responsible for providing a peer check of any acceptance limit derivation.

4.0 PREREQUISITES

N/A

5.0 PRECAUTIONS AND LIMITATIONS

N/A

6.0 SPECIAL TOOLS AND EQUIPMENT

N/A

7.0 ACCEPTANCE CRITERIA

N/A

8.0 INSTRUCTIONS

8.1 IST Program Development – General

8.1.1 Regulatory Requirements

The Code of Federal Regulations, Title 10, Part 50.55a (10CFR50.55a), paragraph (f)(5)(i) requires each licensee of pressurized water-cooled nuclear reactors to revise the IST Program to meet the requirements of 10CFR50.55a(f)(4)(ii). As a result, the IST Program must be revised at 120-month intervals to comply with the requirements of the latest edition and addenda of the Code incorporated by reference in 10CFR50.55a(b) 12 months prior to the start of the 120-month interval.

8.1.2 Interval Information

The first program interval commenced on November 7, 1977 and ended on March 7, 1981.

The second 120-month interval commenced on March 7, 1981 and ended on February 19, 1992.

The third 120-month interval commenced on February 19, 1992 and ended on February 18, 2002.

The fourth 120-month interval is applicable from February 19, 2002 through and including July 20, 2012.

The fifth 120-month interval is applicable from July 21, 2012 through and including February 18, 2022.

8.1.3 Applicable Code

In accordance with 10CFR50.55a, the code of record for the IST Program is ASME OM Code - 2004 Edition through 2006 Addenda and subject to limitations and modifications in 10CFR50.55a(b)(3).

8.1.4 Selection of Components

1. Pumps and valves are selected for inclusion in the IST Program based on a review of all plant systems. This review includes UFSAR, Technical Specifications, Plant Operating Manual procedures, design documents and Piping & Instrument Diagrams. In accordance with 10CFR50.55a(f), the components subject to OM Code requirements are limited to ASME Class 1, 2, and 3 pumps and valves.
2. Components and tests that are optionally included in this IST Program Plan are identified as follows:
   - Components optionally classified as Code Class 3 (e.g., Diesel Fuel Oil system) are identified as Augmented in the Remarks column of the Pump Table and Valve Table.
   - Components not within the Code Class 1, 2, or 3 boundaries are identified as Augmented in the Remarks column of the Pump Table and Valve Table.

- Components not in the scope of the IST Program Plan are identified as Augmented in the Remarks column of the Pump Table and Valve Table.
- Specific tests that are not necessary to meet OM Code requirements are identified with "Aug" next to the test in the Test Type column of the Valve Table.
- Relief Requests and Test Deferral Justifications are not provided for components and tests identified as Augmented.

8.1.5 Code Classification

Code classification of pumps and valves at RNP is described in UFSAR Section 3.9.6 and is shown on the Piping and Instrumentation Diagrams provided in following section.

8.1.6 Systems and Flow Diagrams

A list of systems included in the IST Program along with the associated Piping and Instrumentation Diagrams (P&ID's) that identify the Code boundaries is provided in ATTACHMENT 10.1.

8.1.7 Relief Requests

1. Specific requests for relief in accordance with 10CFR50.55a(f)(5)(iii), and 10CFR50.55a(f)(5)(iv) are provided in ATTACHMENT 10.4. Where conformance with the requirements of the Code have been determined to be impracticable, alternate testing is proposed that would provide an acceptable level of quality and safety. Where conformance with the requirements of the Code would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, alternate testing is proposed that would provide useful information to assess the operational readiness of the component tested.
2. The relief requests define the component(s) and test(s) involved the basis for relief and the proposed alternative testing.
3. Relief requests approved by the NRC shall not be altered without prior notification and approval by the NRC. The modification need not be in the form of a relief request; however, correspondence and acceptance by the NRC is required prior to implementing the revised request.
4. Relief requests are numbered in an "**IST-RR-N**" format where:

   IST = Designates the relief request is applicable to the IST Program Plan

   RR = Relief request

   N = Unique sequential number

8.1.8 Use of Later Editions and Addenda (NRC Regulatory Issue Summary 2004-12)

Later editions or addenda of the OM Code, incorporated by reference in paragraph (b) of 10CFR50.55a may be implemented during the course of an inspection interval subject to the limitations and modifications listed in paragraph (b) of 10CFR50.55a and provided all related requirements of the respective Code edition or addenda have been met. The voluntary update to a later Code edition or addenda of the Code referenced in paragraph (b) is not considered a relief request. Therefore, the requirements are not as stringent. A letter must be submitted to the NRC and should include a discussion of the related requirements. NRC approval is required prior to implementation. RIS 2004-12 provides clarification related to the process by which NRC approval can be obtained.

8.1.9 ASME Code Case Applicability

1. The NRC staff has developed RG 1.192 "Operation and Maintenance Code Case Acceptability, ASME OM Code" and RG 1.193 "ASME Code Cases Not Approved for Use."
2. Per revision 1 of NUREG 1482, the licensee may implement the Code cases listed in RG 1.192 without obtaining further NRC review, if the Code cases are used in their entirety, with any supplemental conditions specified in the regulatory guide (RG). RG 1.192 also lists Code cases that are conditionally acceptable.
3. Code cases that may be utilized by the inservice test program are listed in the reference section. If utilized, a brief description will be provided below.
    a. There are currently no Code cases being implemented

8.1.10 Test Deferral Justifications

1. In accordance with paragraphs 8.3.15 and 8.3.31, certain valves are full stroke exercised during cold shutdown conditions when they cannot be exercised during normal operation. When a valve cannot be exercised during normal operation or cold shutdown conditions, then it is full stroke exercised during refueling outages. The technical justification for exercising a valve during cold shutdown or refueling outages rather than normal operation is provided in a Cold Shutdown Test Justification or Refueling Outage Test Justification.

2. Valves tested during cold shutdowns or refueling outages shall be scheduled in accordance with paragraphs 8.3.15 and 8.3.31.

3. Cold Shutdown Test Justifications and Refueling Outage Test Justifications are numbered in a "**XXX-VCS-N**" or "**XXX-VRS-N**" format where:

   XXX = System Acronym

   VCS = Cold Shutdown Test Justifications

   VRS = Refuel Outage Justifications

   N = Unique sequential number (e.g., SI-VCS-2 would be the second Cold Shutdown Test Justification for valves in the safety injection system)

4. Cold Shutdown Test Justifications are provided in ATTACHMENT 10.3 and Refueling Outage Test Justifications are provided in ATTACHMENT 10.4.

8.2 IST Program Development – Pumps

8.2.1 Pump Scope

1. Pumps included in the IST Program are those Safety Class 2 and 3 centrifugal and positive displacement pumps provided with an emergency power source that are required to:
   - Shut down the reactor to the safe shutdown condition, or
   - Maintain the reactor in the safe shutdown condition, or
   - Mitigate the consequences of an accident.
2. Excluded from the above are:
   - Drivers, except where the pump and driver form an integral unit and the pump bearings are in the driver;
   - Pumps supplied with emergency power solely for operating convenience.
   - Skid-mounted pumps and component subassemblies that are tested as part of the major component.

8.2.2 Pump Table Format

A complete list of pumps in the scope of IST Program and their associated required tests are listed (in a tabular format) in ATTACHMENT 10.5. The Pump Table is sorted alphabetically. A description of each column in the Pump Table is shown below with applicable abbreviations.

Pump Unique alphabetical designator assigned to each pump.

Description Descriptive name of the pump

P&ID (SHT) P&ID in which the pump is located. A complete list of P&ID's is provided in ATTACHMENT 10.1.

Coord Drawing coordinate of pump location on the P&ID.

Pump Group Testing Group

- **A** Pumps that are operated continuously or routinely during normal operation, cold shutdown or refueling operations.
- **B** Pumps in standby systems that are not operated routinely except for testing.

Pump Type Pump design

- **C-H** Centrifugal pump where orientation of the pump and motor shaft is in the horizontal plane
- **C-V** Centrifugal pump where orientation of the pump and motor shaft is in the vertical plane.
- **PD** Positive displacement pump.

VLS	Centrifugal vertically suspended pump where the pump driver and pumping element are connected by a line shaft within an enclosing column which contains the pump bearings
Speed	Identifies whether the pump speed is fixed or variable. All pumps in the IST Program Plan are tested at speeds greater than 600 rpm.
Fixed	Speed is constant and is a function of the motor design.
Vari	Speed is variable.
Test Type	Parameters measured and evaluated during the pump test.
Comp.	Test types prefixed with designator comply with the requirements for Comprehensive pump tests per OM Code.
Grp A	Test types prefixed with designator comply with the requirements for Group A pump tests per OM Code.
Grp B	Test types prefixed with designator comply with the requirements for Group B pump tests per OM Code.
dP	Pump differential pressure
Q	Pump flow
N	Pump speed (variable speed pumps only).
P	Discharge pressure
V	Pump or motor bearing vibration velocity (broad band unfiltered peak in inches per second or peak to peak in mils).
Test Freq	Frequency of pump testing per OM Code
Q	Quarterly (once per 92 days)
Bi	Biennial (once per 731 days)
Relief Request	Reference to applicable relief request. Relief requests are located in ATTACHMENT 10.2.
Remarks	Applicable notes or other unique comments that provide clarification.

8.2.3 Pump Groups

Pumps are divided into groups based on their frequency of operation. These groups are then used to determine the test frequency, test parameters measured, and acceptance criteria.

- Group A Pumps – are operated continuously or routinely during normal operation, cold shutdown, or refueling.
- Group B Pumps – pumps in standby systems that are not operated routinely except for testing.

8.2.4 Testing Requirements

1. When a Group A Test is required, a Comprehensive Test may be substituted.
2. When a Group B Test is required, a Group A Test or Comprehensive Test may be substituted.
3. A Preservice Test may be substituted for any Inservice Test.

8.2.5 Preservice Tests

1. Tests are conducted during the preservice test period or before implementing inservice testing. The tests shall be conducted under conditions as near as practicable to those expected during subsequent inservice testing. Only one preservice test is required for each pump. The parameters to be measured are those identified for Group A Tests, Group B Tests, and Comprehensive Tests in Table 8.2-1.
2. For centrifugal and vertical line shaft pumps where resistance can be varied, flow rate and differential pressure shall be measured at a minimum of 5 points. A pump curve shall be established based on the measured points and at least one point shall be identified as the reference point. If practical, these points shall be from pump minimum flow to at least pump design flow. A pump curve need not be established for pumps in systems where resistance cannot be varied.
3. For positive displacement pumps, reference values shall be taken at or near pump design pressure for the parameters specified in Table 8.2-1.
4. Vibration measurements are only required to be taken at the reference point(s).

Table 8.2-1
Inservice Test Parameters

Quantity	Preservice Test	Group A Test	Group B Test	Comprehensive Test	Remarks
Speed, N	X	X	X	X	If variable speed
Differential Pressure, ΔP	X	X	X [Note (1)]	X	Centrifugal pumps, including vertical line shaft pumps
Discharge Pressure, P	X	X		X	Positive displacement pumps
Flow Rate, Q	X	X	X [Note (1)]	X	
Vibration Displacement, V_d Velocity, V_v	X	X		X	Measure either V_d or V_v Peak-to-peak Peak

NOTE:
(1) For positive displacement pumps, flow rate shall be measure or determined; for all other pumps, differential pressure or flow rate shall be measured or determined.

8.2.6 Inservice Testing

Inservice testing shall commence when the pumps are required to be operable.

8.2.7 Reference Values

Reference values shall be obtained as follows:

1. Initial reference values shall be determined from the results of Preservice Tests or from the results of the first Inservice Test.
2. New or additional reference values shall be established in accordance with paragraphs 8.2.8, 8.2.9, and 8.2.10.
3. Reference values shall be established only when the pump is known to be operating acceptably.
4. Reference values shall be established at a point(s) of operation (reference point) readily duplicated during subsequent tests.
5. Reference values should be established in a region(s) of relatively stable pump flow.
    a. Reference values should be established within ±20% of pump design flow rate for the comprehensive test.
    b. Reference values should be established within ±20% of design flow for Group A and Group B pumps, if practical. If not practical, the reference flow rate shall be established at the highest practical flow rate.
6. All subsequent test results shall be compared to these initial reference values or to new reference values established in accordance with paragraphs 8.2.8, 8.2.9, and 8.2.10.
7. If the particular parameter being measured or determined can be significantly influenced by other related conditions, then these conditions shall be analyzed and documented in the record of test.

8.2.8 Effect of Pump Maintenance, Replacement, or Repair

1. When a reference value or set of reference values may have been affected by repair, replacement, or routine servicing of a pump, a new reference value or set of reference values shall be determined in accordance with paragraph 8.2.7 or the previous value reconfirmed by a Comprehensive or Group A test run before declaring the pump operable.
2. The Owner shall determine whether the requirements of Preservice Testing (paragraph 8.2.5), to reestablish reference values, apply.
3. Deviations between the previous values and new values shall be evaluated, and verification that the new values represent acceptable pump operation shall be placed in the record of test.

8.2.9 Establishment of Additional Set of Reference Values

If it is considered necessary or desirable, for some reason other than paragraph 8.2.8, to establish an additional set of reference values, a Group A or Comprehensive Test shall be performed at the conditions of an existing set of reference values and the results analyzed. If operation is acceptable in accordance with paragraph 8.2.29 an additional set of reference values may be established as follows.

- For centrifugal pumps, the additional set of reference values shall be determined from the pump curve established during Preservice Testing (paragraph 8.2.5). Vibration acceptance criteria shall be established by a Group A or Comprehensive test at the new reference point. If vibration data was taken at all points used in determining the pump curve, an interpolation of the new vibration reference value is acceptable.
- For positive displacement pumps, the additional set of reference values shall be established in accordance with Preservice Testing (paragraph 8.2.5).

A test shall be run to verify the new reference values before their implementation. Whenever an additional set of reference values is established, the reason for so doing shall be justified and documented in the record of test.

8.2.10 New Reference Values

In cases where the pump's test parameters are within either the alert or required action ranges, and the pump's continued use at the changed values is supported by an analysis, a new set of reference values may be established. This analysis shall include verification of the pump's operational readiness. The analysis shall include a pump level and system level evaluation of operational readiness, the cause of the change in pump performance, and an evaluation of all trends indicated by available data. The results of this analysis shall be documented in the record of test. The system level evaluation shall be performed by the applicable system engineer. Caution should be exercised if an evaluation is used to recommend pump operability when performance is in the alert or required action range. OPS-NGGC-1305, *Operability Determinations* should be consulted to determine if the process for a degraded or non-conforming condition should be followed.

8.2.11 Data Collection

8.2.12 General

1. Accuracy – Instrument accuracy shall be within the limits of Table 8.2-2. If a parameter is determined by analytical methods instead of by measurement, then the determination shall meet the requirements of the table. For individual analog instruments, the required accuracy is percent of full scale. For digital instruments, the required accuracy is over the calibrated range. For a combination of instruments, the required accuracy is loop accuracy.

2. Range

   - The full-scale range of each analog instrument shall not be greater than three times the reference value.
   - Digital instruments shall be selected such that the reference value does not exceed 90% of the calibrated range of the instrument.
   - Vibration instruments are excluded from the range requirements identified above.

Table 8.2-2
Required Instrument Accuracy

Quantity	Group A and Group B Tests	Comprehensive and Preservice Tests
Pressure	±2	±½
Flow Rate	±2	±2
Speed	±2	±2
Vibration	±5	±5
Differential Pressure	±2	±½

3. Instrument Location – The sensor location shall be established by the Owner, documented in plant records, and shall be appropriate for the parameter being measured. The same location shall be used for subsequent tests. Instruments that are position sensitive shall be either permanently mounted, or provision shall be made to duplicate their position.

4. Calibration – Instruments and instrument loops shall be calibrated in accordance with the H. B. Robinson Quality Assurance Program.

5. Fluctuations – Symmetrical dampening devices or averaging techniques may be used to reduce instrument fluctuations. Hydraulic instrument may be damped by using gage snubbers or by throttling small valves in instrument lines.

6. Frequency Response Range – The frequency response range of the vibration measuring transducers and their readout system shall be from one-third minimum pump shaft rotational speed to at least 1000 Hz.

8.2.13 Pressure

1. Gage Lines – If the presence or absence of liquid in a gage line could produce a difference of more than 0.25% in the indicated value of the measured pressure, means shall be provided to ensure or determine the presence or absence of liquid as required for the static correction used.
2. Differential Pressure – When determining differential pressure across a pump, a differential pressure gage or a differential pressure transmitter that provides direct measurement of pressure difference, or the difference between the pressure at a point in the inlet and the pressure in the outlet shall be used.

8.2.14 Rotational Speed

Rotational speed measurements of variable speed pumps shall be taken by a method that meets the requirements of paragraph 8.2.12.

8.2.15 Vibration

1. On centrifugal pumps, except vertical line shaft pumps, measurements shall be taken in a plane approximately perpendicular to the rotating shaft in two approximately orthogonal directions on each accessible pump thrust bearing housing. Measurements shall also be taken in the axial direction on each accessible pump thrust bearing housing.
2. On vertical line shaft pumps, measurements shall be taken on the upper motor-bearing housing in three approximately orthogonal directions, one of which is the axial direction.
3. On reciprocating pumps, the location shall be on the bearing housing of the crankshaft, approximately perpendicular to both the crankshaft and the line of plunger travel.
4. If a portable vibration indicator is used, the measurement points shall be clearly identified on the pump to permit subsequent duplication in both location and plane.

8.2.16 Flow Rate

When measuring flow rate, a rate or quantity meter shall be installed in the pump test circuit. If a meter does not indicate flow rate directly, the record shall include the method used to reduce data.

8.2.17 Testing Methods

Testing methods are clearly defined within the implementing procedures.

8.2.18 Frequency of tests

Group A and Group B Tests shall be performed quarterly. Comprehensive Tests shall be performed biennially.

8.2.19 Test Procedure

Implementing Group A, Group B and comprehensive pump tests are listed in ATTACHMENT 10.5.

8.2.20 Group A Test

Group A Tests shall be conducted with the pump operating at a specified reference point. The test parameters shown in Table 8.2-1 shall be determined and recorded as required by this paragraph. The test shall be conducted as follows.

1. The pump shall be operated at nominal motor speed for constant speed drives or at a speed adjusted to the reference point (± 1%) for variable speed drives.
2. For centrifugal and vertical line shaft pumps, the resistance of the system shall be varied until the flow rate equals the reference point. The differential pressure shall then be determined and compared to its reference value. Alternatively, the flow rate may be varied until the differential pressure equals the reference point and the flow rate determined and compared to its reference value.
3. For positive displacement pumps, the resistance shall be varied until the discharge pressure equals the reference point. The flow rate shall then be determined and compared to its reference value.
4. Where resistance cannot be varied, flow rate and pressure shall be determined and compared to their respective reference values.
5. Vibration (displacement or velocity) shall be determined and compared with the reference value. Vibration measurements shall be broadband (unfiltered). If velocity measurements are used, they shall be peak. If displacement amplitudes are used, they shall be peak to peak.
6. All deviations from the reference values shall be compared with the ranges in Table 8.2-3 and Table 8.2-4 and corrective action taken as specified in paragraph 8.2.29.
7. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges in Table 8.2-3.

8.2.21 Group B Test

Group B tests shall be conducted with the pump operating at a specified reference point. The test parameter value identified in Table 8.2-1 shall be determined and recorded as required by this paragraph. The test shall be conducted as follows.

1. The pump shall be operated at nominal motor speed for constant speed drives or at a speed adjusted to the reference point (± 1%) for variable speed drives.
2. For centrifugal and vertical line shaft pumps, the pressure or flow rate shall be determined and compared to its reference value.
3. For positive displacement pumps, the flow rate shall be determined and compared to its reference value.
4. System resistance may be varied as necessary to achieve the reference point.
5. All deviations from the reference values shall be compared with the ranges of Table 8.2-5 and correction action taken as specified in paragraph 8.2.29.

8.2.22 Comprehensive Tests

Comprehensive Tests shall be conducted with the pump operating at a specified reference point. The test parameters shown in Table 8.2-1 shall be determined and recorded as required by this paragraph. The test shall be conducted as follows.

1. The pump shall be operated at nominal motor speed for constant speed drives or at a speed adjusted to the reference point (± 1%) for variable speed drives.
2. For centrifugal and vertical line shaft pumps, the resistance of the system shall be varied until the flow rate equals the reference point. The differential pressure shall then be determined and compared to its reference value. Alternatively, the flow rate may be varied until the differential pressure equals the reference point and the flow rate determined and compared to its reference value.
3. For positive displacement pumps, the resistance shall be varied until the discharge pressure equals the reference point. The flow rate shall then be determined and compared to its reference value.
4. Where resistance cannot be varied, flow rate and pressure shall be determined and compared to their respective reference values.
5. Vibration (displacement or velocity) shall be determined and compared with the reference value. Vibration measurements shall be broadband (unfiltered). If velocity measurements are used, they shall be peak. If displacement amplitudes are used, they shall be peak to peak.
6. All deviations from the reference values shall be compared with the ranges in Table 8.2-3 and Table 8.2-6 and corrective action taken as specified in paragraph 8.2.29.
7. The vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges in Table 8.2-3.

Table 8.2-3
Group A and Comprehensive Tests Vibration Acceptance Criteria

Pump Type	Pump Speed	Test Parameter	Acceptable Range	Alert Range	Required Action Range
Centrifugal and vertical line shaft [Notes (2) and (3)]	<600 rpm	V_d or V_v	≤2.5V_r	>2.5V_r to 6V_r or >10.5 to 22 mils	>6V_r or >22 mils
Centrifugal and vertical line shaft [Notes (2) and (3)]	≥600 rpm	V_d or V_v	≤2.5V_r	>2.5V_r to 6V_r or >0.325 to 0.7 in./sec	>6V_r or >0.7 in./sec
Reciprocating		V_d or V_v	≤2.5V_r	>2.5V_r to 6V_r	>6V_r

GENERAL NOTE: The subscript *r* denotes reference value.

NOTE:
(1) Vibration parameter is per Table 8.2-1. V_r is vibration reference value in the selected unit.
(2) Refer to OM Code Figure ISTB 5.2-1 to establish displacement limits for pumps with speeds ≥600 rpm or velocity limits for pumps with speeds <600 rpm.
(3) Including positive displacement pumps except reciprocating.

Table 8.2-4
Group A Test Hydraulic Acceptance Criteria

Test Parameter	Acceptable Range	Alert Range	Required Action Range	
			Low	High
P (Positive displacement pumps)	0.93 to 1.10P_r	0.90 to <0.93P_r	<0.90P_r	>1.10P_r
ΔP (Vertical line shaft pumps)	0.95 to 1.10ΔP_r	0.93 to <0.95ΔP_r	<0.93ΔP_r	>1.10ΔP_r
Q (Positive displacement and vertical line shaft pumps)	0.95 to 1.10Q_r	0.93 to <0.95Q_r	<0.93Q_r	>1.10Q_r
ΔP (Centrifugal pumps)	0.90 to 1.10ΔP_r	none	<0.90ΔP_r	>1.10ΔP_r
Q (Centrifugal pumps)	0.90 to 1.10Q_r	none	<0.90Q_r	>1.10Q_r

GENERAL NOTE: The subscript *r* denotes reference value.

Table 8.2-5
Group B Test Hydraulic Acceptance Criteria

Test Parameter	Acceptable Range	Required Action Range	
		Low	High
ΔP (Centrifugal pumps including vertical line shaft pumps), or	0.90 to 1.10ΔP_r	<0.90ΔP_r	>1.10ΔP_r
Q (All types) [See Note (1)]	0.90 to 1.10Q_r	<0.90Q_r	>1.10Q_r

GENERAL NOTE: The subscript *r* denotes reference value.
Note:
(1) Measure Q for positive displacement pumps.

Table 8.2-6
Comprehensive Test Hydraulic Acceptance Criteria

Test Parameter	Acceptable Range	Alert Range	Required Action Range	
			Low	High
P (Positive displacement pumps)	0.93 to 1.03P_r	0.90 to <0.93P_r	<0.90P_r	>1.03P_r
ΔP (Vertical line shaft pumps)	0.95 to 1.03ΔP_r	0.93 to <0.95ΔP_r	<0.93ΔP_r	>1.03ΔP_r
Q (Positive displacement and vertical line shaft pumps)	0.95 to 1.03Q_r	0.93 to <0.95Q_r	<0.93Q_r	>1.03Q_r
ΔP (Centrifugal pumps)	0.93 to 1.03ΔP_r	0.90 to <0.93ΔP_r	<0.90ΔP_r	>1.03ΔP_r
Q (Centrifugal pumps)	0.94 to 1.03Q_r	0.90 to <0.94Q_r	<0.90Q_r	>1.03Q_r

GENERAL NOTE: The subscript r denotes reference value.

8.2.23 Pumps in Regular Use

Group A pumps that are operated more frequently than every 3 months need not be run or stopped for a test provided the plant records show the pump was operated at least once every three months at the reference conditions and quantities specified were determined, recorded, and analyzed.

8.2.24 Pumps in Systems Out of Service

For a pump in system declared inoperable or when it is not required to be operable, the test schedule need not be followed. Within 3 months before the system is placed in an operable status, the pump shall be tested and then the normal test schedule followed. Pumps that can only be tested during plant operation shall be tested within 1 week following plant startup.

8.2.25 Pumps Lacking Required Inventory

Group B pumps lacking required fluid inventory (pumps in dry sumps) shall receive a comprehensive test at least once every two years except as provided in paragraph 8.2.24. The required fluid inventory shall be provided during the test. A Group B Test is not required.

8.2.26 Duration of Tests

1. Group A Test – After pump conditions are as stable as the system permits, each pump shall be run for at least 2 minutes. At the end of this time, at least one measurement or determination of the quantities required by Table 8.2-1 shall be made and recorded.
2. Group B Test – After pump conditions are stable, at least one measurement or determination of the quantity required by Table 8.2-1 shall be made and recorded.
3. Comprehensive Test – After pump conditions are as stable as the system permits, each pump shall be run for at least 2 minutes. At the end of this time, at least one measurement or determination of the quantities required by Table 8.2-1 shall be made and recorded.

8.2.27 Analysis and Evaluation

Requirements for analysis and evaluation are defined within implementing procedures.

8.2.28 Trending

Test parameters shown in Table 8.2-1, except for fixed values shall be trended.

8.2.29 Acceptance Criteria

1. Alert Range – If the measured test parameters values fall within the alert range of Table 8.2-3, Table 8.2-4, or Table 8.2-6, as applicable, the frequency of testing specified in paragraph 8.2.18 shall be doubled until the cause of the deviation is determined and the condition is corrected.
2. Action Range – If the measured test parameter values fall within the required action range of Table 8.2-3, Table 8.2-4, or Table 8.2-6, as applicable, the pump shall be declared inoperable until the cause of the deviation is determined and the condition is corrected, or an analysis of the pump is performed and a new reference values are established in accordance with paragraph 8.2.10.
3. Systematic Error – When a test shows measured parameter values that fall outside of the acceptance range of Table 8.2-3, Table 8.2-4, Table 8.2-5, or Table 8.2-6, as applicable, and have resulted from an identified systematic error such as improper system lineup or inaccurate system instrumentation, the test shall be rerun after correcting the error.

8.3 IST Program Development - Valves

8.3.1 Valve Scope

1. Valves included in the IST Program Plan are those active or passive Safety Class 1, 2, and 3 valves that are required to perform a specific function in:
   - Shutting down the reactor to the safe shutdown condition, or
   - Maintaining the reactor in the safe shutdown condition, or
   - Mitigating the consequences of an accident.
2. Pressure relief devices included in the IST Program Plan are those Safety Class 1, 2, and 3 pressure relief devices for protecting systems or portion of systems that perform a specific function in:
   - Shutting down the reactor to the cold shutdown condition, or
   - Maintaining the reactor in the cold shutdown condition, or
   - Mitigating the consequences of an accident.
3. The following are excluded from above, provided that they are not required to perform a specific function as specified above:
   - Valves used only for operating convenience such as vent, drain, instrument, and test valves.
   - Valves used only for system control, such as pressure regulating valves.
   - Valves used only for system or component maintenance.
   - External control and protection systems responsible for sensing plant conditions and providing signals for valve operation.
   - Skid-mounted valves and component subassemblies that are tested as part of the major component.

Valves (except some vent and drain valves) that are excluded from the IST Program are listed in ATTACHMENT 10.7.

8.3.2 Valve Table Format

A complete list of valves in the scope of the IST Program and their associated required tests are listed (in a tabular format) in ATTACHMENT 10.6. The Valve Table is sorted alpha-numerically by valve number. A description of each column in the Valve Table is shown below with applicable abbreviations.

Valve Number	Unique alpha-numeric designator assigned to each valve. The valve number used in the Valve Table is taken from the P&ID's listed in ATTACHMENT 10.1.
P&ID (SHT)	P&ID in which the valve is located. A complete list of P&ID's is provided in ATTACHMENT 10.1.
Coord	Drawing coordinate of valve location on the P&ID.
Cat	Category as defined in paragraph 8.3.4.
A	Valves for which seat leakage is limited to a specific amount in the closed position for fulfillment of their required function(s).
A/C	Valves which are both self actuating and for which seat leakage is limited to a specific amount in the closed position for fulfillment of their required function(s).
B	Valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function(s).
C	Valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of the required function(s).
D	Valves which are actuated by an energy source capable of only one operation such as rupture disks or explosively actuated valves. (Note: There are no Category D components at RNP.)
Act Pass	Identifies whether the valve performs an active or passive safety function as defined in paragraph 8.3.4.
Act	Active valve
Pass	Passive valve
Size	Valve size, in inches.
Valve Type	Valve design body style.
BL	Ball valve
BF	Butterfly valve
CK	Check valve
DA	Diaphragm valve
GA	Gate valve
GL	Globe valve
ND	Needle valve
SCK	Stop check valve

RV	Relief valve
TW	Three-way valve
VB	Vacuum breaker
PORV	Power Operated Relief Valve that is remotely actuated and not capacity certified under ASME Section III overpressure protection requirements
Act Type	Actuator type used to change valve obturator position.
AO	Air operator
HYD	Hydraulic operator
PNE	Pneumatic operator
M	Manual operator
MO	Motor operator
SA	Self actuated
SO	Solenoid operator
Norm Pos	Identifies the valve position during normal plant operation as defined by plant operating procedures.
C	Closed
LC	Locked Closed
LO	Locked Open
O	Open
O/C	Open and Closed
Safe Pos	Identifies the valve position required for the valve to perform its function.
C	Closed
O	Open
O/C	Open and Closed
Fail Pos	Identifies the position of the valve on loss of actuator power.
AI	As is
C	Closed
O	Open
N/A	Not applicable. Valve does not have a fail position
App J Type C	Identifies if the valve is included in the 10CFR50 Appendix J, Type C testing program.
N	No
Y	Yes
Pos Ind	Identifies if the valve is equipped with remote position indication.

N	No
Y	Yes
Test Type	Identifies the test requirements which apply to the valve.
DA	Valve will be disassembled and visually inspected in accordance with paragraph 8.3.34.3 as described in the applicable Refueling Outage Test Justification.
CV	Closure verification of a check valve to satisfy the bi-directional test requirement of paragraph 8.3.34.1.
FC	Fail stroke closed exercise valve with a fail-safe actuator to the closed position in accordance with paragraph 8.3.18.2
FF	Full stroke open exercise of Category C valves in accordance with paragraph 8.3.31.
FO	Fail stroke open exercise valve with a fail-safe actuator to the open position in accordance with paragraph 8.3.18.2.
FS	Full stroke exercise Category A or B valves to the open and closed position in accordance with paragraph 8.3.15.
FV	Functional verification of component operation (this is an Augmented test which does not satisfy OM Code requirements)
LJ	Leak test per 10CFR50 Appendix J, Type C, in accordance with paragraph 8.3.26 (containment isolation function only)
LK	Leak test in accordance with paragraph 8.3.27 (leakage rate for other than containment isolation valves)
OV	Open verification of a check valve to satisfy the bi-directional test requirement in accordance with paragraph 8.3.34.1.
PI	Valve with remote position indication verified in accordance with paragraph 8.3.12.
RF	Full stroke close exercise of Category C valves in accordance with paragraph 8.3.31.
RL	Relief valve testing in accordance with EST-112.
TM	Stroke time valve open (O) or closed (C) in accordance with paragraph 8.3.17.
Test Freq	Identifies the frequency required for valve testing as determined by OM Code.
App. I	Test frequency in accordance with EST-111 and Appendix I of the OM Code. For augmented components, the frequency may be set in accordance with the PM program.
App. II	Test frequency in accordance with the Appendix II condition monitoring program and as described in paragraph 8.3.35 and TMM-008.

App. J Test frequency in accordance with the 10CFR50 Appendix J program for Type C testing.

Bi Biennial, Once per 731 days (2 years).

CS Cold Shutdown, Testing performed during the cold shutdown condition (if not performed during the previous 92 days). If required, testing may be performed during the transition period between normal operation and cold shutdown

Q Quarterly, Once per 92 days

R Refueling Outage, Testing performed during the refueling outage condition. If required, testing may be performed during the transition period between normal operation and refueling

Test Deferral This field identifies, by unique number, applicable relief request (RR), cold shutdown test justification (VCS) and refueling outage test justification (VRS) for the individual component or test. These documents are located in ATTACHMENT 10.2, 10.3, and 10.4 respectively.

Remarks Applicable notes or other unique comments that provide clarification.

8.3.3 Excluded Valve Table

Valves (except vent and drain valves) that are excluded from the IST Program are listed in ATTACHMENT 10.7.

Table 8.3-1
Inservice Test Requirements

Category	Valve Function	Leakage Test Procedure	Exercise Test Procedure	Special Test Procedure [Note (1)]	Position Indication Verification
A	Active	See para. 8.3.24	See para. 8.3.13	None	See para. 8.3.12
A	Passive	See para. 8.3.24	None	None	See para. 8.3.12
B	Active	None	See para. 8.3.13	None	See para. 8.3.12
B	Passive	None	None	None	See para. 8.3.12
C (Safety and Relief) [Note (3)]	Active	None [Note (2), (3)]	See para. 8.3.27	None	See para. 8.3.12
C (Check) [Note (4)]	Active	None [Note (3)]	See para. 8.3.298	None	See para. 8.3.12
D	Active	None [Note (3)]	None	See paras. 8.3.39, 8.3.40	None

NOTE:
(1) Note additional requirement for fail-safe valves, paragraph 8.3.19.
(2) Leak test as required for Mandatory Appendix I
(3) When more than one distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is not necessary.
(4) If a check valve used for a pressure relief device is capacity certified, then it shall be classified as a pressure or vacuum relief device. If a check valve used to limit pressure is not capacity certified, then it shall be classified as a check valve.

8.3.4 Valve Categories

Valves shall be placed in one or more of the following categories. When more than one distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is not necessary.

- Category A – Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their required function.
- Category B – Valves for which seat leakage in the closed position is inconsequential for fulfillment of the required function(s).
- Category C – Valves that are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of their function.
- Category D – Valves that are actuated by an energy source capable of only one operation, such as rupture disks or explosively actuated valves.

In addition to the valve categories described above, valves are also characterized as active or passive based on the definitions below.

- Active Valves – Valves that are required to change obturator position to accomplish their required function.
- Passive Valves – Valves that maintain obturator position and are not required to change obturator position to accomplish their required function.

8.3.5 Preservice Testing

Each valve shall be tested during the preservice period. These tests shall be conducted under conditions as near as practicable to those expected during subsequent inservice testing. Note that the Preservice Period had already passed when IST requirements were first introduced at Robinson. Only one preservice test of each valve is required with the following exceptions:

- Any valve that has undergone maintenance that could affect its performance after the preservice test shall be tested in accordance with paragraph 8.3.8;
- Safety and relief valves and non-reclosing pressure relief devices shall meet the preservice test requirements of Appendix I of the OM Code.

8.3.6 Inservice Testing

Inservice testing shall commence when the valves are required to be operable to fulfill their required function(s).

8.3.7 Reference Values

1. Reference values shall be determined from the results of preservice testing or from the results of inservice testing. These tests shall be performed under conditions as near as practicable to those expected during subsequent inservice testing.
2. Values shall be established only when the valve is known to be operating acceptably. If the particular parameter being measured can be significantly influenced by other related conditions, then these conditions shall be analyzed.

8.3.8 Effect of Valve Maintenance, Replacement, or Repair

1. When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valves performance, a new reference value shall be determined or the previous value shall be reconfirmed by an inservice test before it is returned to service. Deviations between the previous and new reference values shall be identified and analyzed. Verification that the new values represent acceptable operation shall be documented in the record of tests.
2. Safety and relief valves and nonreclosing pressure relief devices shall be tested as required by the replacement, repair and maintenance requirements of EST-027, EST-028, EST-068, EST 112 and EST-130. These EST's meet the requirements of OM Code, Appendix I.

8.3.9 Establishment of Additional Set of Reference Values

1. If it is necessary or desirable for some reason, other than the requirements of paragraph 8.3.8, to establish additional reference values, an inservice test shall first be run at the conditions of an existing set of reference values, or, if impractical, at the conditions for which the new reference values are required, and the results analyzed.
2. If operation is acceptable in accordance with 8.3.17.1 below, a second test shall be performed under the new conditions as soon as practicable.
3. The results of the second test shall establish the additional reference values.
4. The reasons for establishing additional reference values shall be justified and documented in plant records.

8.3.10 Inservice Testing Requirements

Active and passive Category A, B, C, and D valves shall be tested in accordance with Table 8.3-1.

NOTE: There are no category D explosive valves or rupture discs at RNP.

8.3.11 Testing Methods

8.3.12 Valve Position Verification

Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated.

- Where practicable, this local observation should be supplemented by other indications such as flow or pressure. These observations need not be concurrent.
- Where local indication is not possible other indications shall be used to verify valve operation.

8.3.13 Category A and B Valve Exercise Tests

8.3.14 Exercising Test Frequency

Active Category A and B valves shall be tested nominally every three months, except as provided by paragraphs 8.3.15, 8.3.20 and 8.3.21.

8.3.15 Exercising Requirements

Valves shall be tested as follows:

1. Full stroke exercising during plant operation to the position required to fulfill its function;
2. If full-stroke exercising during plant operation is not practicable, it may be limited to part-stroke exercising during plant operation and full-stroke exercising during cold shutdown;
3. If exercising is not practicable during plant operation, it may be limited to full stroke exercising during cold shutdown;
4. If exercising is not practicable during plant operation and full-stroke during cold shutdowns is also not practicable, it may be limited to part stroke during cold shutdowns, and full-stroke during refueling outages;
5. If exercising is not possible during plant operations or cold shutdowns, it may be limited to full stroke exercising during refueling outages;
6. Except as specified below, valves full-stroke exercised during cold shutdowns shall be exercised during each cold shutdown. Exercising is not required if the time period since the pervious full-stroke exercise is less than 3 months.
7. Valve exercising during cold shutdown shall commence within 48 hours of achieving cold shutdown and continue until all testing is completed or the plant is ready to return to power. For extended outages, testing need not be commenced in 48 hours provided all valves required to be tested during cold shutdowns will be tested prior to plant startup and all valves that are required to perform their specified function are exercised every 3 months. However, it is not intended to keep the plant in cold shutdown to complete cold shutdown testing.
8. All valve testing required to be performed during a refueling outage shall be completed before returning the plant to operation.

8.3.16 Valve Obturator Movement

The necessary valve obturator movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights or observing other evidence such as changes in system pressure, flow rate, level, or temperature.

8.3.17 Power-Operated Valve Stroke Testing:

1. Limiting values of full-stroke time of each power-operated valve shall be specified;
2. The stroke time shall be measured to the nearest second;
3. Any abnormality or erratic action shall be recorded and an evaluation shall be made to determine if corrective action is required.

8.3.18 Power-Operated Control Valve Testing

1. For power-operated control valves that have only a fail-safe safety function, the requirements for valve stoke-time measurement testing, the associated stroke-time test acceptance criteria, and any corrective actions that would result from stroke-time testing need not be met. For these valves, all other applicable requirements listed below shall be met.
   a. Stroke Testing
   b. Position Indication Testing
   c. Leakage Testing
   d. Any abnormality or erratic action shall be recorded and an evaluation shall be made regarding the need for corrective action.
2. Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuator power in accordance with the exercising frequency of paragraph 8.3.14. Note that there are valves with fail-safe actuators where neither the actuator nor the valve has a safety function. These actuators are not included in the program.

8.3.19 Power-Operated Relief Valve Testing

1. Power-operated relief valves testing shall be performed in the following sequence or concurrently. If testing in the following sequence is impractical, it may be performed out of sequence, and a justification shall be documented in the record of tests for each test or in the test plan. Pursuant to this requirement, leakage testing of PORVs is performed on a continuous basis using installed plant indicators and daily RCS leak rate computations. These tests are performed at normal operating pressure and exceed the test pressures required by Appendix I of the OM Code for seat tightness testing. Therefore, an additional seat leakage test is not necessary. RNP power-operated relief valves are not capacity certified.

The following test requirements apply to power-operated relief valves

a. Leakage testing

b. Stroke testing, including stroke time

c. Position Indication Testing

d. Any abnormality or erratic action shall be recorded and an evaluation shall be made regarding the need for corrective action

e. Stroke testing shall be performed during normal operating conditions for temperature and pressure

8.3.20 Valves in Regular Use

Valves that operate in the course of plant operation at a frequency that satisfies the exercising requirements need not be additionally exercised, provided that the observations otherwise required for testing are made and analyzed during operation. The results shall be recorded in the plant record at intervals no greater than specified in paragraph 8.3.14.

8.3.21 Valves in systems Out of Service

For valves in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. Valves shall be exercised within three months before placing the system in operable status and the normal test frequency resumed.

8.3.22 Power Operated Valves Stroke Time Acceptance Criteria

Test results shall be compared to the initial reference values or reference values established in accordance with paragraphs 8.3.8 or 8.3.9.

1. Motor operated valves with reference stroke times of greater than 10 seconds shall exhibit no more than ± 15% change in stroke time when compared to the reference value.

2. Pneumatic, Hydraulic, Solenoid and Power-operated relief valves with reference stroke times of greater than 10 seconds shall exhibit no more than ± 25% change in stroke time when compared to the reference value.

3. Motor operated valves with reference stroke times of less than or equal to 10 seconds shall not exhibit no more than ± 25% nor ± 1 second change in stroke time, whichever is greater, when compared to the reference value.

4. Pneumatic, Hydraulic, Solenoid and Power-operated relief valves with reference stroke times of less than or equal to 10 seconds shall exhibit no more than ±50% change in stroke time when compared to the reference value.

5. Power operated valves that stroke in less than 2 seconds may be exempted from paragraphs 3 and 4 above. In such cases the maximum stroke time shall be 2 seconds.

8.3.23 Corrective Action for Stroke-Timed Valves

1. If a valve fails to exhibit the required change of obturator position or exceeds the limiting values of full-stroke time of paragraph 8.3.17.1, the valve shall be immediately declared inoperable.
2. Valves with measured stroke times that do not meet the acceptance criteria of paragraph 8.3.22, shall be immediately retested or declared inoperable. If the valve is retested and the second set of data also does not meet the acceptance criteria, the valve shall be declared inoperable. If the second set of data meets the acceptance criteria, the cause of the initial deviation shall be analyzed and documented in the record of tests.
3. Valves declared inoperable shall be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably.
4. Valve operability based upon analysis shall have the results recorded in the record of tests. Caution should be exercised if an evaluation is used to recommend valve operability when performance is in the alert or required action range. OPS-NGGC-1305, *Operability Determinations* should be consulted to determine if the process for a degraded or non-conforming condition should be followed.
5. Before returning a repaired or replaced valve to service, a test demonstrating satisfactory operation shall be performed.

8.3.24 Seat Leakage Tests for Category A Valves

8.3.25 Scope

Category A valves shall be leakage tested, except that valves which function in the course of plant operation in a manner that demonstrates functionally adequate seat leak tightness need not be additionally tested. In such cases, the valve record shall provide the basis for the conclusion that operational observations constitute satisfactory demonstration.

8.3.26 Containment Isolation Valves

1. Containment isolation valves with a leakage rate requirement based on an Appendix J program shall be tested in accordance with TMM-005. Procedure TMM-005 meets the requirements of 10CFR50, Appendix J
2. Containment isolation valves with a leakage requirement based on other functions shall be tested in accordance with paragraph 8.3.27.

8.3.27 Leakage Rate for other than Containment Isolation Valves

These valves shall be leakage tested to verify their leak-tight integrity. Valve closure before seat leakage testing shall be by using the valve operator with no additional closing force applied.

1. Frequency – Tests shall be conducted at least once every two years,
2. Differential Test Pressure – Differential pressure shall be applied in the same direction as when the valve is performing its function with the following exceptions:

a. Globe valves may be tested with the pressure under the seat,

b. Butterfly valves may be tested in either direction, provided their seat construction is designed for sealing against pressure on either side.

c. Double-disk gate valves may be tested by pressurizing between the seats,

d. Seat leakage tests involving pressure differential lower than function pressure differentials are permitted in those valves in which service pressure will tend to diminish the overall leakage channel opening,

e. Valves that do not qualify for reduced pressure testing shall be tested at maximum function pressure.

3. Seat Leakage Measurement – Valve Seat leakage shall be determined by one of the following methods:

   a. Measuring leakage through a downstream telltale connection while maintaining pressure on one side of the valve, or

   b. Maintaining feed rate required to maintain test pressure in the test volume or between two seats of a gate valve, provided the total apparent leakage rate is charged to the valve or valve combination, or

   c. Determining leakage by measuring pressure decay in the test volume.

4. Test Medium - shall be specified in the procedure.

5. Analysis of Leakage Rates – Leakage rate measurements shall be compared with the permissible leakage rates specified by the Owner (usually identified in the implementing test procedure). The permissible leakage rate specified by the Owner should be based on specific design or operational criteria limits. When this criteria cannot be determined, then the permissible leak rate may be calculated as follows:

   a. For water, 0.5D gal/min or 5 gal/min, whichever is less, at functional differential pressure, where D equals nominal valve size.

   b. For air, 7.5D standard ft^3/day, at functional differential pressure.

6. Corrective Action – Valves or valve combinations with leakage rates exceeding the values specified by the Owner in paragraph 8.3.27.5 shall be declared inoperable and either repaired or replaced. A retest demonstrating acceptable operation shall be performed following any required corrective action before the valve is returned to service.

8.3.28 Tests for Category C Safety and Relief Valves

Tests for Category C Safety and Relief Valves are conducted in accordance with Appendix I of the OM Code.

1. Pressurizer safety valves are tested in accordance with EST-027.
2. Main Steam Safety Valves are tested in accordance with EST-028.
3. All other safety and relief valves required to be tested pursuant to ASME OM Code requirements are tested in accordance with EST-112.
4. Containment Spray Additive Tank Vacuum Breakers are tested in accordance with EST-068.
5. The CCW Surge Tank Vacuum Breaker is tested in accordance with EST-130.
6. EST-111 'Safety, Pressure Relief & Vacuum Breaker Valve Test Selection and Verification' is utilized to periodically verify that test frequencies applicable to safety valves, relief valves and vacuum breakers conform to the frequency requirements specified in Appendix I of the OM Code.

8.3.29 Exercise Tests for Category C Check Valves

8.3.30 Exercising Test Frequency

Check valves shall be exercised nominally every three months except as provided in paragraphs 8.3.31 through 8.3.36.

8.3.31 Exercising Requirements

Valves shall be exercised as follows:

1. During plant operation, valves shall be exercised or examined in a manner that verifies obturator travel by using the methods in paragraph 8.3.34.
2. Each check valve exercise test shall include open and close tests. Open and close tests need only be performed at an interval when it is practical to perform both tests. Open and close tests are not required to be performed at the same time if they are both performed within the same interval.
3. If exercising is not practicable during plant operation, it shall be performed during cold shutdowns.
4. If exercising is not practicable during plant operation and cold shutdown, it shall be performed during refueling outages.
5. Valves exercised at shutdowns shall be exercised during each shutdown, except as specified in "6" below. Such exercise is not required if the interval since the previous exercise is less than three months.
6. Valve exercising shall commence within 48 hours of achieving cold shutdown and continue until all testing is complete or the plant is ready to return to power. For extended outages, testing need not be commenced in 48 hours if all the valves required to be tested during cold shutdown will

be tested before plant startup. However it is not the intent to keep the plant in cold shutdown to complete cold shutdown testing.

7. All valve testing required to be performed during refueling outages shall be completed before returning the plant to operation.

8.3.32 Exercise Tests for Manual Valves

Manual valves shall be full stroke exercised at least once every two years, except where adverse conditions may require the valve to be tested more frequently to assure operational readiness. Any increased testing frequency shall be specified. The valve shall exhibit the required change of obturator position.

8.3.33 Valves in Regular Use

Check valves that operate in the course of plant operation, at a frequency that would satisfy the exercising requirements, need not be additionally exercised. The observations otherwise required for testing are required to be made, analyzed, and recorded in the plant records at intervals not greater than three months.

8.3.34 Valve Obturator Movement

1. The necessary valve obturator movement shall be demonstrated by performing both an open and a closed test.
    a. Check valves that have a safety function in both the open and closed directions shall be exercised by initiating flow and observing that the obturator traveled to either the full open position, or to the position required to perform its intended function. Verification that on cessation of flow the obturator has traveled to its seat shall also be demonstrated.
    b. Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled to either the full open position or to the position required to perform its intended function and verify closure.
    c. Check valves that have a safety function in only the closed direction shall be exercised by initiating flow and observing that the obturator has traveled to at least the partially open position, and verify that on cessation or reverse flow, the obturator has traveled to its seat.
2. Observations shall be made by observing a direct indicator or by other positive means such as change in system pressure, flow rate, level, temperature, seat leakage testing, or non-intrusive testing.
3. If the test methods described in paragraph 8.3.34.1 are impractical for certain check valves, or if sufficient flow cannot be achieved or verified, a sample disassembly examination program shall be used to verify valve obturator movement.
    a. The sample disassembly program shall group valves of similar design, application, and service condition and require a periodic

examination of one valve from each group. The details and bases for the sampling program shall be documented.

b. Grouping of check valves shall be technically justified and shall consider valve manufacturer, design, service, size, materials of construction, and orientation

c. During the disassembly process, the full-stroke motion of the obturator shall be verified. Valves that have been disturbed prior to verifying obturator movement shall be examined to determine if a condition exists that could prevent full opening or reclosing of the obturator.

d. At least one valve from each group shall be disassembled and examined at each refueling outage. All valves in each group shall be disassembled and inspected once every eight years.

e. Before return to service, valves that were disassembled for examination or that received maintenance that could affect their performance shall be exercised if practicable with flow in accordance with 8.3.31.

1) These valves shall also be tested for other requirements such as leak rate testing.

2) Examples of check valves that can be impacted by disassembly include spring loaded check valves or check valves with the obturator supported by the bonnet.

8.3.35 Check Valve Condition Monitoring

As an alternative to the testing or examination requirements of paragraphs 8.3.30 through 8.3.34, a Condition Monitoring program may be established. The purpose of this program is both to improve valve performance and to optimize testing, examination, and preventative maintenance activities in order to maintain the continued acceptable performance of a select group of check valves.

1. The program may be implemented on a valve or group of similar valves.

2. The program is implemented in accordance with TMM-008, subject to any conditions imposed by the NRC in the Federal Register.

a. Each valve must be tested to both the open and closed direction (bi-directional test).

b. The maximum test or examination interval for a valve or group of valves is based on the following table. All valves in the group must be tested or examined within the maximum interval to be considered a valid extension.

Group Size	Maximum Interval (years)
≥4	16
3	12
2	12
1	10

3. TMM-008 meets the requirements of Appendix II of the OM Code and lists the tests, examinations, frequencies, recommended post maintenance tests (following disassembly to meet the Appendix II program) and groupings that are applicable to a particular valve included in the condition monitoring program.
4. If the condition-monitoring program for a valve or group of valves is discontinued, then the requirements of paragraphs 8.3.30 through 8.3.34 must be applied.
5. Valves subject to the requirements of a condition monitoring program are identified by the reference to App. II in the Test Frequency column.

8.3.36 Valves in Systems Out of Service

For valves in a system declared inoperable or not required to be operable, the exercising test schedule need not be followed. The valve shall be exercised and the schedule followed within three months of placing the system in an operable status.

8.3.37 Series Valve Pairs

If two check valves are in series configuration without provisions to verify individual reverse flow closure, and the plant safety evaluation assumes closure of either valve (not both), the valve pair may be operationally tested closed as a unit. If the plant safety evaluation assumes that a specific valve or both valves of the pair close to perform the safety function, the required valve(s) shall be tested to demonstrate individual valve closure.

8.3.38 Corrective Action for Check Valve Exercise Tests

1. If a check valve fails to exhibit the required change of obturator position, it shall be declared inoperable. A retest showing acceptable performance shall be run following any required corrective action before the valve is returned to service,
2. Check valves in a sample disassembly program that are not capable of being full stroked exercised, or have failed or have unacceptable valve internals, shall have the cause of the failure analyzed and the condition corrected. Other valves in the sample group that may also be affected shall be examined or tested during the same refueling outage.
3. Series valves tested as a unit in accordance with paragraph 8.3.37 and fail to prevent reverse flow shall be declared inoperable, and both valves shall be either repaired or replaced.

8.3.39 Tests for Category D Explosively Actuated Valves

Not applicable to RNP.

8.3.40 Tests for Category D Rupture Disks

Not applicable to RNP.

8.3.41 Tests for Dynamic Restraints (Snubbers)

Requirements, selection and methods for the testing of snubbers are defined in accordance with TMM-038, *Inservice Examination Program* and TMM-006, *Shock Suppressor (Snubber) Examination and Testing Program.*

9.0 RECORDS

9.1 Records generated as a result of this procedure (e.g., IST Evaluations) shall be reviewed, approved and forwarded to the QA Records vault for retention.

9.2 Pumps

9.2.1 Pump Records

Records shall be maintained that include the following for each pump:

- Manufacturer and manufacturer's model and serial or other identification number;
- A copy or summary of the manufacturer's acceptance test, report, if available; and
- A copy of the pump manufacturer's operating limits.

9.2.2 Inservice Test Plans

Record of test plans and procedures shall be maintained that include the following:

- Identification of pumps subject to testing;
- Category of each pump;
- Hydraulic circuit to be used;
- Location and type of measurement for the required test parameters;
- Reference Values;
- Method of determining test parameter values that are not directly measured by instrumentation.

9.2.3 Record of Test

Records of each test shall be maintained that include the following:

- Pump identification;
- Date of test;
- Reason for test (e.g., scheduled, post maintenance test, establishing new reference values);
- Values of measured parameters;
- Identification of instruments used;
- Comparisons with allowable ranges and analysis of deviations;
- Requirement for corrective action;
- Evaluation and justification for changes of reference values; and
- Signature of the person or persons responsible for conducting and analyzing the test.

ATTACHMENT 10.5 provides a list of pumps within the scope of the IST Program and their associated test procedures.

9.3 Valves

9.3.1 Valve Records

Records shall be maintained that include the following information:

- The manufacture and manufacturers model and serial or other unique identification number;
- A copy or summary of the manufacturers acceptance test report if available;
- Preservice test results;
- Limiting values of full-stroke time.

9.3.2 Inservice Test Plans

Record of test plans and procedures shall be maintained that include the following:

- Identification of valves subject to testing;
- Category of each valve;
- Tests to be performed;
- Justification for deferral of stroke (exercising) testing;
- Details and bases of the check valve sample disassembly examination program, such as grouping characteristics, frequency and justification for not performing an exercise test to at least a partially open position after reassembly or periodic exercising;
- Basis for testing series check valve pairs.

ATTACHMENTs 10.2, 10.3 and 10.4 provide the test deferral justifications. ATTACHMENT 10.6 provides a list of the valves in the scope of the IST Program.

9.3.3 Record of Test

Records of each test shall be maintained that include the following:

- Valve identification;
- Date of test;
- Reason for test (e.g., scheduled, post maintenance test, establishing new reference values);
- Values of measured parameters;
- Identification of instruments used;
- Comparison with allowable ranges and analysis of deviations;
- Requirement for corrective action;
- Signature of the person or persons responsible for conducting and analyzing the test.

9.4 Records of Corrective Action

Records of corrective action shall be maintained and shall include a summary of the correction made, the subsequent inservice tests, confirmation of operational adequacy, and the signature of the individual responsible for the corrective action and the individual responsible for verification.

9.5 Preconditioning (NRC Information Notice 97-16)

NRC IN 97-16 has been evaluated for applicability and corrective measures have been taken to address preconditioning concerns involving IST activities. Preconditioning may be defined as the alteration, variation, manipulation or adjustment of the physical condition of an SSC before Technical Specification surveillance or ASME Code testing. In some cases, the safety benefit of a preconditioning activity may outweigh the benefits of testing in the as-found condition. In the event that this condition arises, the activity should be evaluated to determine whether it constitutes acceptable or unacceptable preconditioning. The overall effect of the activity and a justification documenting the continued confidence in the capability to assess the operational readiness of the component must be considered in order to determine whether the activity constitutes acceptable pre-conditioning.

NRC Inspection Manual, Part 9900 should be consulted for additional guidance to assist in determining whether a certain activity should be considered to be preconditioning. It may also be used to provide further guidance as to the acceptability or unacceptability of the preconditioning event. Unacceptable preconditioning is to be avoided. The following are examples of acceptable and unacceptable preconditioning.

Acceptable preconditioning:

- Periodic venting of pumps, which is not routinely scheduled directly prior to testing, but may be performed occasionally prior to testing.
- Pump venting prior to testing provided that the venting operation has proper controls with a technical evaluation to establish that the amount of gas vented would not adversely affect pump operation.
- Occasional lubrication of a valve stem prior to testing a valve, where stem lubrication is not typically performed prior to testing.
- Unavoidable movement attributable to the setup and connection of test equipment.
- Improper timing of a power operated valve where the valve must be immediately retested in order to obtain a valid stroke time measurement.

Adequate assurance must be available to support the conclusion that the valve stroke time would have been below the limiting value. The deviation shall be documented in the record of test.

Unacceptable preconditioning:

- Routine lubrication of a valve stem prior to testing the valve.
- Operation of a pump or valve shortly before a test, if such operation could be avoided through plant procedures with personnel and plant safety maintained.
- Venting a pump immediately prior to testing without proper controls and scheduling.
- An activity performed to ensure that the pump or valve will meet its acceptance criteria.
- An activity performed to mask the as-found condition of the pump or valve.

ADM-NGGC-0115, *Preconditioning of Structures, Systems and Components* provides more detail on this subject.

9.6 Use of Non-conservative Acceptance Criteria (NRC information Notice 97-090)

Information regarding the minimum performance requirements for each pump tested to ASME Code requirements may be found in calculation RNP-M/MECH-1802. All surveillance test acceptance criteria are reviewed to ensure that minimum performance requirements are met.

Design engineering provides the minimum allowable pump performance. The minimum performance point shall include maximum instrument error (not uncertainty) associated with the flow rate instrument, pressure (differential pressure) instruments and speed instruments, if the pump is a variable speed pump. The performance shall be additionally compensated to account for the minimum allowable EDG frequency specified in the Plant TS. The resultant criteria shall be included in the appropriate pump performance tests used to confirm design basis requirements (reference OE 31798, Misunderstanding of Power Up-Rate Margin Application).

9.7 Program Notebook

A program notebook will be developed and maintained by IST personnel consistent with the guidelines established in EGR-NGGC-0008, *Engineering Programs.*

9.8 Background Information

A background document is maintained in the IST database. This data should be used for information only. The IST database is a tool intended to assist the user in understanding the rationale for testing or excluding certain pumps or valves from the IST program. The database shall not be used to verify design or licensing basis.

9.9 Inservice Testing Evaluation

The EVAL EC process described in EGR-NGGC-0028, *Engineering Evaluation* should be used to document component conditions or program positions noted during inservice testing activities, or during routine plant operations. The EVAL EC process may be used to evaluate component performance, establish new reference values, establish corresponding acceptance criteria, or document a response to an ASME OM Code related inquiry provided the solution:

- Is within Bounding Technical Requirements defined in EGR-NGGC-0028,
- Is technically acceptable with respect to existing design inputs,
- Conforms to existing design bases, committed standards, and regulations,
- Doe not adversely affect the design function, or adversely affect the method of performing or controlling a design function,
- Does not introduce new failure modes, and
- Does not change the Licensing Basis

The determination of acceptance limits is based on multiplication tables provided in the ASME OM Code, unless truncated by a design document. The derivation of acceptance limits involves simple arithmetic and is not considered to be a calculation. These new limits shall be peer checked by the system or responsible engineer.

Component performance evaluations shall follow all requirements of the Code; however, minimum fundamental elements must be addressed when completing the evaluation.

- Is the cause of the deviation known and the impact understood?
- Are the proposed acceptance limits within design basis performance requirements? Generally, pump performance must achieve a minimum hydraulic point and power operated valves must stroke below a specified limiting value.
- For changes to pump vibration reference values, does the Vibration Engineer concur with the proposed alert and required action limits?
- Established processes shall be used to ensure that the impacted procedure has been identified and is placed on hold, if changes to acceptance limits are required.

Caution should be exercised if an evaluation is used to recommend pump operability when performance is in the alert or required action range. OPS-NGGC-1305, *Operability Determinations* should be consulted to determine if the process for a degraded or non-conforming condition should be followed. In addition:

- For pump performance in the alert or required action range, and continued performance at this range is supported by an analysis, a pump and system level evaluation of operational readiness must be performed by the applicable System Engineer.

10.0 ATTACHMENTS

10.1 Systems and P&ID's

10.2 Relief Requests

10.3 Cold Shutdown Justifications

10.4 Refueling Shutdown Justifications

10.5 Pump Table

10.6 Valve Table

10.7 Excluded Valve Table

ATTACHMENT 10.1
Page 1 of 2
Systems and P&ID's

System	P&ID (Sheet)
Primary Sampling System	5379-353 (1)
Component Cooling Water System	5379-376 (1)
Component Cooling Water System	5379-376 (2)
Component Cooling Water System	5379-376 (3)
Component Cooling Water System	5379-376 (4)
Chemical Volume and Control System	5379-685 (1)
Chemical Volume and Control System	5379-685 (2)
Chemical Volume and Control System	5379-685 (3)
Chemical Volume and Control System	5379-686 (1)
Liquid Waste Disposal System	5379-920 (3)
Gaseous Waste Disposal System	5379-921 (2)
Safety Injection System	5379-1082 (1)
Safety Injection System	5379-1082 (2)
Safety Injection System	5379-1082 (3)
Safety Injection System	5379-1082 (4)
Safety Injection System	5379-1082 (5)
Residual Heat Removal System	5379-1484 (1)
Reactor Coolant System	5379-1971 (1)
Reactor Coolant System	5379-1971 (2)
Main and Extraction Steam	G-190196 (1)
Feedwater, Condensate and Air Evacuation System	G-190197 (1)
Feedwater, Condensate and Air Evacuation System	G-190197 (4)
Service and Cooling Water System	G-190199 (1)
Service and Cooling Water System	G-190199 (2)
Service and Cooling Water System	G-190199 (4)
Service and Cooling Water System	G-190199 (5)
Service and Cooling Water System	G-190199 (6)
Service and Cooling Water System	G-190199 (7)
Service and Cooling Water System	G-190199 (9)
Service and Cooling Water System	G-190199 (10)

System	P&ID (Sheet)
Instrument and Station Air System	G-190200 (2)
Instrument and Station Air System	G-190200 (3)
Instrument and Station Air System	G-190200 (5)
Instrument and Station Air System	G-190200 (7)
Instrument and Station Air System	G-190200 (9)
Primary and Makeup Water System	G-190202 (3)
Emergency Diesel Generator System	G-190204A (2)
Emergency Diesel Generator System	G-190204A (3)
Fuel Oil System	G-190204D (1)
Fuel Oil System	G-190204D (2)
Steam Generator Blowdown and Wet Lay-up System	G-190234 (1)
Penetration Pressurization System	G-190261 (2)
Isolation Valve Seal Water System	G-190262 (1)
HVAC-Turbine, Fuel, Auxiliary and Reactor Building Systems	G-190304 (1)
Containment Vapor and Pressure Sampling System	HBR2-6490 (1)
Post Accident Containment Venting System	HBR2-6933 (1)
Fire Protection System	HBR2-8255 (2)

Basis for request: Pursuant to 10 CFR 50.55a(a)(3)(i), this alternative provides an acceptable level of quality and safety.

ASME Code Components Affected

Component Identification	Group
BA-XFER-PMP-A, BA-XFER-PMP-B: Boric Acid Transfer Pumps	A
CCW-PMP-A, CCW-PMP-B, CCW-PMP-C: Component Cooling Water Pumps	A
CV-SPRAY-PMP-A, CV-SPRAY-PMP-B: Containment Spray Pumps	B
CHG-PMP-A, CHG-PMP-B, CHG-PMP-C: Chemical Volume Control System Charging Pumps	A
SI-PMP-A, SI-PMP-B, SI-PMP-C: Safety Injection Pumps	B
SWBP-A, SWBP-B: Service Water Booster Pumps	A
SW-PMP-A, SW-PMP-B, SW-PMP-C, SW-PMP-D: Service Water Pumps	A

Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code, 2004 Edition through 2006 Addenda.

Applicable Code Requirement

ISTB-1300, "Supplemental Definitions," defines uniform criteria for designating Group A and Group B pumps.

ISTB-3000, "General Testing Requirements," and Table ISTB 3000-1, "Inservice Test Parameters," define and compare parameters (e.g., pressure flow rate, vibration) measured during Group A, Group B, and Comprehensive pump test.

ISTB-3400 "Frequency of Inservice Tests," states that an inservice test shall be run on each pump specified in Table ISTB 3400-1. This table requires a Group A or Group B test to be performed quarterly and a Comprehensive test to be performed biennially.

Table ISTB-3510-1, "Required Instrument Accuracy," defines the required instrument accuracy for Group A, Group B, Comprehensive test to be performed biennially.

Table ISTB-5121-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," defines the required acceptance criteria for centrifugal pumps, when a Comprehensive test is performed in lieu of a Group A or Group B pump test.

Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," defines the required acceptance criteria for vertical line shaft centrifugal pumps, when a Comprehensive test is performed in lieu of a Group A or Group B pump test.

Specific Relief Requested

Pursuant to 10 CFR 50.55a(a)(3), relief is requested from the requirements of the ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTB, Paragraph ISTB-5323, "Comprehensive Test Procedure." The basis for this relief request is that the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, proposed alternative will provide an acceptable level of quality and safety. Table ISTB-3400-1, "Inservice Test Frequency," specifies that a biennial Comprehensive Pump Test (CPT) be performed on Group A and B pumps. Paragraph ISTB-5323 describes requirements necessary to properly implement a CPT for both centrifugal and vertical line shaft centrifugal pumps. Performance of the biennial CPT on the pumps identified above is unnecessary because the existing Group A quarterly pump tests at the comprehensive test flow rate are sufficient to ensure operational readiness. Routine testing (quarterly) at design flow rates in accordance with the Group A test requirements offers a much better assessment of overall pump capability compared to an infrequent CPT supplemented with a Group A test at reduced flow rates. Quarterly testing at comprehensive test flow conditions also supports more timely detection of degrading pump performance.

The CPT utilizes a reduced upper hydraulic limit of 1.03 of the reference value. This value is overly conservative and does not take into account the aggregate impact of nominally expected test deviations and allowances for instrument accuracy. The end result is a potential overall reduction to safety system availability, a potential to increase unwarranted maintenance, and may create conflicts between surveillance tests when a Group A test and CPT are performed at identical conditions.

HBRSEP, Unit No. 2, proposes to conduct quarterly Group A testing at the CPT designated flow rate using pressure instrumentation accurate to 0.5 percent unless calibrated flow measuring instruments are not available. In addition, the upper hydraulic performance limit will be reduced from 1.10 times the test parameter (flow, pressure, differential pressure) to a value of 1.06 times the test parameter.

Basis for Requesting Relief

The ASME OM ISTB committee has approved Code Case OMN-18, "Alternative Testing Requirements for Pumps Tested Quarterly within ± 20% of Design Flow." This code case has not yet been approved for use in RG 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," June 2003. Although Code Case OMN-18 has not been approved for use, HBRSEP, Unit No. 2, is proposing this alternative for Group A (and Group B tested as Group A pumps), modified to include the periodic verification test (PVT); which ensures that the accident flow rate is achieved.

The increased requirements imposed by the proposed alternative on the parameters to be monitored during every quarterly pump test, and the more accurate instruments that must consistently be used during quarterly testing of pumps classified Group A (and Group B pumps that are tested as Group A pumps), allows HBRSEP, Unit No. 2, to perform better trending of pump performance data due to the more consistent requirements for each of the quarterly tests.

Due to the increased requirements on the parameters imposed by the proposed alternative during all quarterly tests, there is no added value in performing the biennial comprehensive test.

Proposed Alternative

HBRSEP, Unit No. 2, proposes that in lieu of the requirements of Table ISTB- 3400-1, Group A tests will be performed quarterly within ± 20 percent of the pump design flow rate, with instrumentation meeting the instrument accuracy requirements of Table ISTB-3510-1 for the biennial Comprehensive Test, and the Comprehensive Test will not be required. In addition, flow rate will measured to ensure that the required accident required flow rate can be achieved for those pumps tested below the required accident flow rate.

Specifically,

a. Pumps tested quarterly using this alternative must be tested within ± 20 percent of pump design flow, as is required for the biennial Comprehensive Test in ISTB-3300(e)(1) and ISTB-3300(e)(2).

b. The proposed alternative requires the accuracy of instruments used during quarterly Group A tests to meet the more accurate pressure and differential pressure requirements listed for the Comprehensive Test in Table ISTB-3510-1 (an accuracy improvement from ± 2 percent to ± 0.5 percent unless calibrated instruments are not available). Consistent use of these more accurate instruments during each quarterly test provides for improved Group A pump performance trend data evaluation.

c. Pumps that would normally be categorized as Group B pumps, but may be tested as Group A pumps according to provisions of this alternative. As a result, per Table ISTB-3000-1, additional data must be obtained quarterly rather than once every two years on the test parameters of

    - Vibration

Based on the testing strategy proposed, this alternative provides an acceptable level of quality and safety for monitoring the pumps and ensures they are capable of performing their safety function.

Implementation Schedule

This relief will be implemented during the HBRSEP, Unit No. 2, Fifth Ten-Year Inservice Testing Inspection for pumps required by ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTB.

Precedents

The NRC granted Perry Nuclear Power Plant, Unit No. 1's Relief Request PR-3 in a safety evaluation dated October 8, 2009 (TAC NO. ME0820).

Basis for request: Pursuant to 10 CFR 50.55a(a)(3)(i), this alternative provides an acceptable level of quality and safety.

ASME Code Components Affected

Component Identification	Group
CCW-PMP-A, CCW-PMP-B, CCW-PMP-C: Component Cooling Water Pumps	A
SI-PMP-A, SI-PMP-B, SI-PMP-C: Safety Injection Pumps	B
SW-PMP-A, SW-PMP-B: Service Water Pumps	A

Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code, 2004 Edition through 2006 Addenda.

Applicable Code Requirement

Table ISTB-3510-1, "Required Instrument Accuracy", requires digital pump flow-rate instrument accuracy to be ±2% over the calibrated range.

Specific Relief Requested

Pursuant to 10 CFR 50.55a(a)(3), relief is requested from the requirements of the ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTB, Table ISTB-3510-1, relief is requested from the ±2% instrument accuracy requirement over the calibrated range for ultrasonic flow measuring equipment that is used for pump testing in the Inservice Testing (IST) Program in the unlikely event that calibrated instrumentation is rendered inoperable.

Basis for Requesting Relief

Original plant design occurred prior to the issuance of IST requirements. Since most of the systems were not designed with flow measurement instrumentation, ultrasonic flow measuring equipment is installed during testing to obtain flow measurements required by the IST Program. These instruments meet the Code accuracy requirements. Generally, spare instruments are maintained and certified, but may not be available, or rendered inoperable. When calibrated instruments are not available, back-up instruments can be installed and verified in accordance with a detailed procedure in order to provide a high level of assurance relative to the proper operation of the flow rate device.

The NRC has previously granted relief to use ultrasonic flow instruments in the third and fourth IST program intervals. NRC Safety Evaluation, transmitted in NRC letter dated September 16, 1992, accepted the use of ultrasonic flow instruments that have an intrinsic accuracy of ±3% on a temporary basis. Final approval was dependent on the establishment of procedures and controls that ensure measurements are sufficiently repeatable to allow detection of pump degradation. Also required, was a determination of the in-situ accuracy and repeatability in each application.

Subsequently CP&L transmitted, in a letter dated December 6, 1993, confirmation that ultrasonic flow instrumentation data taken during one cycle indicates the equipment has sufficient accuracy and repeatability to permit detection of hydraulic degradation, and supports the evaluation of results using Code allowable ranges. The NRC accepted this additional information in a letter dated, July 15, 1994. This relief request was re-submitted during the Fourth Interval Update and accepted by the NRC via letter dated June 27, 2002.

Previous experience and testing indicates that non-calibrated ultrasonic flow measurements are highly accurate when installed and operated properly. In addition, these instruments are mounted externally, which avoids problems inherently associated with internally installed measuring devices, such as, increased system resistance, flow obstruction, and removing the system from service when instrument maintenance is required.

Calibration of these instruments cannot be accomplished onsite. For large bore pipes, the calibration vendor must arrange for the use of a special test facility. Experience has shown that the expected time period associated with obtaining an emergent instrument calibration is about two to six weeks and is largely dependent on events beyond the control of the site. All ultrasonic flow instruments are calibrated in accordance with ISTB 3510-1 and are validated to be operating properly in accordance with procedural requirements prior to the performance of the scheduled test. The Technical Specification allotted Limiting Condition for Operation (LCO) would not be sufficient to facilitate diagnostics, instrument transport, repairs, calibration and re-installation and certification upon discovery that calibrated instruments are found to be deficient. Based on previous experience, there is high confidence that unsatisfactory pump performance can be determined through the use of non-calibrated ultrasonic flow rate instruments when these instruments are properly installed and verified in accordance with site specific procedures. An acceptable level of quality and safety is maintained and the use of this alternative would be prudent in the unlikely event of this emergent condition.

Proposed Alternative

Non-calibrated ultrasonic flow measuring instruments may be utilized to satisfy the requirements of the OM Code for pump flow rate determinations in the unlikely event that calibrated flow measuring instruments are not available. This relief is not intended to be used repeatedly as a testing convenience. Efforts must be made to obtain an acceptable calibrated instrument for use during the next pump test. Documentation of the measures taken must be available for an onsite NRC review.

Implementation Schedule

This relief will be implemented during the HBRSEP, Unit No. 2, Fifth Ten-Year Inservice Testing Inspection for pumps required by ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTB.

Precedents

The NRC granted relief to HBRSEP, Unit No. 2 for the Third Ten Year Interval via letter dated, July 15, 1994 and the Fourth Ten Year Interval via letter dated June 27, 2002.

Basis for request: Pursuant to 10 CFR 50.55a(a)(3)(i), this alternative provides an acceptable level of quality and safety.

ASME Code Components Affected

Component Identification	Category
IVSW-71, IVSW-72, IVSW-74 thru IVSW-97, IVSW 100A, IVSW-100B, and IVSW-100C	C

Applicable Code Edition and Addenda

American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code, 2004 Edition through 2006 Addenda.

Applicable Code Requirement

ISTC-1300, "Valve Categories" defines uniform criteria for assigning valve categories. Category C valves are defined as valves that are self actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves) for fulfillment of the required function(s).

ISTC-3510, "Exercising Test Frequency" requires Active Category A, Category B, and Category C check valves be exercised nominally every three months.

ISTC-3522(a), "Category C Check Valves" requires that Category C check valves be exercised or examined in a manner that verifies obturator travel by using methods in ISTC-5221. ISTC-3522(a) requires each check valve exercise test shall include open and closed tests.

ISTC-3530, "Valve Obturator Movement" states that the necessary valve obturator movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights that signal the required changes of obturator position, or by observing other evidence, such as changes in system pressure, flow rate, level or temperature, that reflects change of obturator position.

ISTC-5221(a), "Valve Obturator Movement" specifies that the required obturator movement during exercise testing be demonstrated by performing both an open and a close test.

ISTC-5221(a)(2), "Valve Obturator Movement" specifies that check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing the obturator has traveled either to the open position or to the position required to perform its intended function(s) and verify closure.

ISTC-5221(c)(2),"Valve Obturator Movement" specifies that full stroke motion of the obturator shall be verified.

ISTC-5222, "Condition Monitoring Program," requires that the program be implemented in accordance with Mandatory Appendix II, "Check Valve Condition Monitoring Program", Section II-4000 of Appendix II, "Condition Monitoring Activities" specifies that valve obturator movement during applicable test or examination activities be sufficient to determine the bidirectional functionality of the moving parts.

Basis for request: Pursuant to 10 CFR 50.55a(a)(3)(i), this alternative provides an acceptable level of quality and safety.

Specific Relief Requested

Pursuant to 10 CFR 50.55a(a)(3), relief is requested from the requirements of the ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTC 3522(a), ISTC-3530, ISTC-5221(a) , ISTC-5221(a)(2), ISTC-5221(c)(2) and ISTC-5222 that require Category C check valve exercise tests or exams include both open and closed tests (bidirectional functionality).

Specifically, relief is requested from the requirements of ISTC to verify closure and from the requirements of Appendix II to verify bidirectional functionality. The check valves will be forward flow tested and closure verification will not be performed.

Basis for Requesting Relief

These 3/8 inch penetration check valves in the Isolation Valve Seal Water System (IVSW) system have no safety function in the closed direction and are required to open in order to provide seal water to selected containment penetrations during a Design Basis Accident (DBA). The IVSW system operates to limit the release of fission products should leakage occur; however, no credit is actually taken for its operation when calculating off site accident dose. The system has been formally accepted as a qualified seal water system pursuant to 10 CFR 50 Appendix J requirements. IVSW is maintained at a minimum pressure of 1.1 times the peak accident pressure related to the design basis loss of coolant accident. As such, the design and qualification of the system eliminates the need for these valves to close during a DBA in the unlikely event that closure is required.

Disassembly to verify obturator closure or modifications to facilitate inservice testing for closure are impractical based on the large number of valves requiring verification and the insignificance associated with their failure to close. Disassembly may also lead to maintenance-induced errors associated with re-assembly. The small size and construction of these valves prohibits the ability to perform partial disassembly / inspection in a manner representative of its inservice condition (e.g., valve removal and decontamination activities could alter disc position). IVSW is a standby system that is typically operated during refueling outages to facilitate testing. Based on infrequent use, the valve obturator exhibits minimal wear. Bi-directional check valve testing was adopted to counter the effects of a faulty test strategy associated with the inability to detect a detached valve disc. Specifically, a satisfactory forward flow check valve test could be completed when the valve disc is actually detached and laying in the bottom of the valve body. Based on the design and materials of construction associated with these check valves, disc failure with subsequent migration into associated systems is not likely. The size of the disc exceeds the inner diameter of the valve outlet. It is likely that failure of the valve in this manner would be detected by the current test method which, is performed at refueling outages in conjunction with required Appendix J leak rate testing of the associated containment penetration.

Forward flow testing at a refueling interval is warranted since the test boundary must be depressurized to perform leak rate testing. Depressurization of the boundary is assured during the leak rate test conducted at refueling intervals. The location of these valves would make testing, inspection or examination for closure inconsistent with ALARA principles.

Based on the design and qualification of this system, compliance with the Code requirement would result in an unusual hardship without a compensating increase in the level of quality and safety. The proposed alternative provides an acceptable level of quality and safety.

Proposed Alternative

The 3/8-inch penetration check valves installed in the IVSW system will be tested to the open position at refueling intervals. Closure verification will not be performed.

Implementation Schedule

This relief will be implemented during the HBRSEP, Unit No. 2, Fifth Ten-Year Inservice Testing Inspection for pumps required by ASME OM Code, 2004 Edition through 2006 Addenda, Subsection ISTC.

Precedents

The NRC granted relief to HBRSEP, Unit No. 2 for the Fourth Ten Year Interval via letter dated June 27, 2002.

COLD SHUTDOWN JUSTIFICATIONS
CC-VCS-1

Valve ID	Description
CC-716A	COOLING WATER INLET VALVE 'RCP CCW SUPPLY HEADER ISOLATION VALVE
CC-716B	COOLING WATER INLET VALVE 'RCP CCW SUPPLY HEADER ISOLATION VALVE

Function
Component Cooling Water supply to the Reactor Coolant Pumps

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising these valves during power operation would result in a temporary loss of Component Cooling Water flow to all three Reactor Coolant Pump thermal barriers and bearing coolers. This action increases the potential for RCP damage and failure of either valve in the closed position will require that the unit be shutdown and RCPs secured. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
CC-730	RCP BEARING COOLING WATER OUTLET ISOLATION

Function
Allows flow through the Reactor Coolant Pump upper and lower bearing coolers

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising this valve during power operation would result in a temporary loss of Component Cooling Water flow through all three Reactor Coolant Pump bearing coolers. This action increases the potential for RCP damage and valve failure in the closed position will require that the unit be shutdown and RCPs secured. The valve is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
CC-735	RCP BEARING COOLING WATER OUTLET ISOLATION 'CIV'
FCV-626	RCP BEARING COOLING WATER OUTLET ISOLATION

Function
Allows flow through the Reactor Coolant Pump thermal barrier coolers

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising these valves during power operation would result in a temporary loss of Component Cooling Water flow to all three Reactor Coolant Pump thermal barrier coolers. This action increases the potential for RCP damage and failure of either valve in the closed position will require that the unit be shutdown and RCPs secured. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

COLD SHUTDOWN JUSTIFICATIONS
CVC-VCS-1

Valve ID	Description
CVC-204A	CVC LETDOWN LINE
CVC-204B	CVC LETDOWN LINE

Function
CVCS Letdown isolation valves

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising these valves during power operation would isolate CVCS letdown causing pressurizer level to increase, charging flow to decrease and interrupt letdown flow to the regenerative heat exchanger. This would result in abnormal operating conditions and may result in a plant transient or unit trip due to pressurizer level variations, letdown line restoration events and uncontrolled positive reactivity addition as a result of cold water injection. Failure of any valve in the test position would isolate letdown. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
CVC-VCS-2

Valve ID	Description
CVC-381	REACTOR COOLANT PUMP SEAL WATER RETURN ISOLATION

Function
Isolation valve for the cooling water return from the Reactor Coolant Pump seals

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising this valve during power operation would cause a loss of seal water return and probable damage to the Reactor Coolant Pump seals. This would require that the unit be shutdown and RCPs secured. Valve failure in the test position would result in a complete loss of the seal water return flow path and would result in a unit shutdown and potential RCP damage. The valve is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
CVC-310A	CHARGING TO LOOP 'A' HOT LEG ISOLATION

Function
Air operated valve required to open and provide an alternate boration flow pathway to RCS loop "A" hot leg in the event that the normal boration pathway is not available

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising this normally closed valve to the required test position will result in temporary changes in flow to the RCP seals and may induce additional thermal stresses. Due to the passive status related to this section of piping, opening CVC-310A may lead to uncontrolled reactivity additions when this volume of water is injected into the RCS. When restoring the plant to the desired configuration, CVC-310B must be reopened resulting in additional RCP seal perturbation before CVC-310A can be closed. Failure of the valve in the test position would require that the alternate pathway for boron injection remain in service and is not desired.

The valve is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

Valve ID	Description
CVC-387	EXCESS LETDOWN LINE STOP

Function
To isolate flow through the excess letdown heat exchanger

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Testing of this valve while in MODEs 1, 2, 3, or 4 will result in the temporary reduction to the RCS pressure barrier to systems outside of containment. Valve failure in the open position would result in a more permanent adverse condition, and is not desired. Testing in any condition other than MODE 5 or MODE 6 would create unnecessary risks associated with testing a system that is only in service when normal letdown is not available. The valve is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
CVC-VCS-5

Valve ID	Description
CVC-200A	CVC LETDOWN ORIFICE ISOLATION
CVC-200B	CVC LETDOWN ORIFICE ISOLATION
CVC-200C	CVC LETDOWN ORIFICE ISOLATION

Function
Close on demand to provide containment isolation for letdown line

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Operation of these valves during power operations will create temporary disturbances to the letdown flow control system, resulting in a potential challenge to letdown line relief valves, CVC-203A or CVC-203B, in the event of orifice isolation valve problems, switch mis-position events, or controller PCV-145 response errors. These events could lead to an inadvertent relief valve lift, and possible failure to re-close, resulting in an uncontrolled loss of primary coolant. In addition, cycling of these components could lead to temporary pressurizer level perturbations which may invalidate the transient analysis assumptions of UFSAR Chapter 15 as well as unnecessary changes to RCP seal injection flows. Although orifice isolation valve / relief valve discrepancies are not anticipated, the risk involved with exercising these valves is not warranted when performed with the sole purpose of satisfying IST requirements for normally scheduled on line surveillance activities. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
FW-VCS-1

Valve ID	Description
FCV-478	FEEDWATER REGULATING VALVE 'A'
FCV-479	FEEDWATER REGULATING BYPASS VALVE 'A'
FCV-488	FEEDWATER REGULATING VALVE 'B'
FCV-489	FEEDWATER REGULATING BYPASS VALVE 'B'
FCV-498	FEEDWATER REGULATING VALVE 'C'
FCV-499	FEEDWATER REGULATING BYPASS VALVE 'C'
FW-V2-6A	FEEDWATER HEADER SECTION VALVE 'A'
FW-V2-6B	FEEDWATER HEADER SECTION VALVE 'B'
FW-V2-6C	FEEDWATER HEADER SECTION VALVE 'C'

Function
Normal feed water supply to the Steam Generators

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test (FCV-478 through FCV-499)
Quarterly stroke time and full stroke exercise (FW-V2-6A, FW-V2-6B, FW-V2-6C)

Cold Shutdown Test Justification
Exercising the Feed water Regulating or Feed water Header Section valves in MODE 1 will cause a loss of feed water and subsequent steam generator level transient which may result in a unit trip. Failure of these valves in the test position will result in a plant trip. The Feed water Regulating Bypass valves are normally in the required safety position at power, except during plant start up or shut down. Operation of the Bypass valves will induce temporary changes to the feed water flow rate and increase the risk of a plant transient or unit trip. Operation of these valves to complete testing is not consistent with the bases of Technical Specifications as stated in ITS SR 3.7.3.1. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test (FCV-478 through FCV-499)
Stroke time and full stroke exercise (FW-V2-6A, FW-V2-6B, FW-V2-6C)

Valve ID	Description
AFW-105	STEAM DRIVEN AUX FEEDWATER PUMP SUCTION VALVE FROM CONDENSATE STORAGE TANK

Function
Open to admit flow to the Steam Driven Auxiliary Feed water pump. Valve closure is required to maintain the vertical loop of piping water solid when pump operation is terminated.

Deferred Testing
Quarterly full stroke exercise open and closed

Cold Shutdown Test Justification
A full flow exercise test of this valve may result in unwarranted cyclic stresses to the Auxiliary Feed water nozzles, induce SG level transients, require a power reduction, and may lead to a plant transient or unit trip. Performance of a forward flow test at a less frequent interval (e.g., cold shutdowns or reduced power proceeding to or transiting from shutdown) will not impose similar concerns and may be performed in conjunction with the associated comprehensive pump test; which is performed bi-ennially. Reverse flow testing requires that normally locked open valve AFW-4 be unlocked and closed for the duration of this test rendering the SDAFW Pump inoperable. The closure test requires the installation of a test gage, removal of pipe plugs, installation and flush of hoses and cross connection of systems. The net effect of these actions results in unwarranted safety system unavailability for a component that is the only immediate available emergency source of auxiliary feed water to mitigate a station blackout event. Reverse flow testing of the valve when the pump is not required to be Operable at cold Shut down conditions is appropriate.

Cold Shutdown Test
Full stroke exercise open and closed

Valve ID	Description
AFW-9A	STEAM DRIVEN AUX FEEDWATER PUMP RECIRC CHECK

Function
Close to prevent flow from the MDAFW Pumps, the S/G Blow down / Wet Layup Pumps, and / or the condensate hot well Letdown into the discharge of the SDAFW Pump via the recirculation line, as required. Open to provide a recirculation flow path for the SDAFW pump.

Deferred Testing
Quarterly full stroke exercise open and closed

Cold Shutdown Test Justification
Due to limitations in design, quarterly reverse flow testing of this component requires the SDAFW Pump to be taken out of service, installation of test hoses, and manipulation of manual valves. Reverse flow testing cannot be performed on-line using installed plant equipment because the presence of two flow orifices reduce MDAFW pump discharge flow and pressure to values which are inadequate to properly seat the valve. NUREG-1482, Section 4.1.4 states, "...The NRC has determined that the need to install test equipment is adequate justification to defer backflow testing until a refueling outage..." Although NUREG-1482 allows deferral of the reverse flow test to a refueling outage frequency, this test may be performed at a cold shutdown frequency for the convenience of scheduling with other auxiliary feed water tests that are normally performed during cold shutdown. Note: Although forward flow testing is performed at a nominal 92 day frequency, bi-directional test requirements cannot be met until both positions have been verified within the same interval.

Cold Shutdown Test
Full stroke exercise open and closed

COLD SHUTDOWN JUSTIFICATIONS
HVA-VCS-1

Valve ID	Description
V12-12	CONTAINMENT VACUUM RELIEF
V12-13	CONTAINMENT VACUUM RELIEF

Function
Open to relieve vacuum inside containment.

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising these valves during power operation would result in an unnecessary containment release since there is a positive pressure inside containment. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
HVA-VCS-2

Valve ID	Description
V12-6	CONTAINMENT PURGE SUPPLY
V12-7	CONTAINMENT PURGE SUPPLY
V12-8	CONTAINMENT PURGE EXHAUST
V12-9	CONTAINMENT PURGE EXHAUST

Function
Close to isolate the affected containment penetration.

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
These valves are normally closed to provide containment integrity. Therefore, the valves are already in the position required to mitigate the consequences of an accident. Opening of the affected component for the sole purpose of performing closure tests to satisfy quarterly testing requirements is not warranted as stated in Technical Specification Bases ITS SR 3.6.3.4. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test. ITS SR 3.6.3.4 requires these valves to be tested prior to use if not tested in the previous 92 days.

COLD SHUTDOWN JUSTIFICATIONS
MS-VCS-1

Valve ID	Description
IA-3744	INSTRUMENT AIR TO MAIN STEAM 'A' CHECK
IA-3743	INSTRUMENT AIR TO MAIN STEAM 'B' CHECK
IA-3742	INSTRUMENT AIR TO MAIN STEAM 'C' CHECK

Function
Contain air pressure within the MSIV accumulators

Deferred Testing
Quarterly full stroke exercise open and closed

Cold Shutdown Test Justification
Reverse exercising of these valves would require isolating and venting the associated instrument air supply header and stroking the MSIV since pressure indication is not provided for the accumulators. The MSIVs cannot be exercised in MODE 1 since closure would induce a steam flow / feed flow transient and result in a plant trip.

Cold Shutdown Test
Full stroke exercise open and closed

COLD SHUTDOWN JUSTIFICATIONS
MS-VCS-2

Valve ID	Description
MS-V1-3A	MAIN STEAM ISOLATION VALVE 'A'
MS-V1-3B	MAIN STEAM ISOLATION VALVE 'B'
MS-V1-3C	MAIN STEAM ISOLATION VALVE 'C'

Function
Close to limit the reactor coolant system cool down rate following a main steam line break

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Closing these valves in MODE 1 will induce a Steam Generator steam flow / feed flow mismatch and result in a plant trip. A partial stroke exercise test will not be performed since it may lead to the same condition encountered during the performance of a full stroke exercise test if valve failure were to occur during the performance of the part stroke exercise.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
PAV-VCS-1

Valve ID	Description
V12-14	CONTAINMENT HYDROGEN EXHAUST 'A'
V12-15	H_2 PURGE PCV 'A' INLET VALVE
V12-18	CONTAINMENT HYDROGEN EXHAUST 'B'
V12-19	H_2 PURGE PCV 'B' INLET VALVE

Function
Close to provide containment isolation. Open to vent containment during post accident conditions

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising these valves during power operation would require defeating administrative controls put in place to prevent inadvertent operation of these components. The valves are normally closed to provide containment isolation for their respective penetrations. The components are re-positioned approximately 54 days following the onset of a DBA. In order to operate these valves, an administratively controlled key must be obtained in order to operate the control panel. In addition, cycling the inboard valves (V12-14, V12-18) requires that two locked closed manual valves in series must be opened which, effectively removes a separate containment penetration from service. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

COLD SHUTDOWN JUSTIFICATIONS
RCS-VCS-1

Valve ID	Description
PCV-455C	PRESSURIZER POWER OPERATED RELIEF VALVE
PCV-456	PRESSURIZER POWER OPERATED RELIEF VALVE

Function
Open to provide overpressure protection when the RCS is at low temperature conditions

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
These valves are not needed for overpressure protection during power operation. The safety function of these valves is to protect the reactor vessel and the Reactor Coolant System from low temperature overpressure conditions. During power operations, the valves are closed to provide an RCS barrier. Operation of these valves quarterly will reduce the RCS barrier protection when opened and may lead to excessive RCS leakage if the upstream valve is mis-positioned or leaking by.
The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

Valve ID	Description
RC-567	REACTOR HEAD VENT SOLENOID ISOLATION
RC-568	REACTOR HEAD VENT SOLENOID ISOLATION
RC-569	REACTOR HEAD VENT SOLENOID ISOLATION
RC-570	PRESSURIZER VENT SOLENOID ISOLATION
RC-571	PRESSURIZER VENT SOLENOID ISOLATION
RC-572	CV ATMOSPHERE SOLENOID ISOLATION

Function
Opens to vent non-condensable gases from the RCS

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Technical Requirements Manual Specification (TRMS) 3.2 requires RC-567, RC-568, RC-569, and RC-570 be closed and power removed when above MODE 4. TRMS 3.2 requires RC-571 and RC-572 be closed unless needed to depressurize the RCS vent system in case of leakage past RC-567, RC-568, RC-569, or RC-570. During power operations, the valves are closed to provide an RCS barrier to the PRT or containment atmosphere. Opening these valves reduces RCS boundary integrity. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

Valve ID	Description
SI-845A	SAT DISCHARGE
SI-845B	SAT DISCHARGE

Function
Open to admit sodium hydroxide injection during containment spray system actuation

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising these valves during power operation would introduce sodium hydroxide into the safety injection system resulting in unacceptable water chemistry. The closing of other valves in the system to allow quarterly cycling of SI-845A and SI-845B would isolate all Sodium Hydroxide injection flow paths. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
SI-862A	RHR LOOP RWST ISOLATION
SI-862B	RHR LOOP RWST ISOLATION
SI-864A	RWST DISCHARGE
SI-864B	RWST DISCHARGE

Function
Open to allow suction from the RWST to the RHR pumps. Close to provide post-accident long-term recirculation cooling capability.

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising these valves during power operation would result in losing suction from the RWST to both trains of residual heat removal system. The failure of one valve in the non-conservative direction would result in a total loss of system function. In addition, ITS SR 3.5.2.1 requires AC control power be removed from these valves in MODES 1, 2, and 3. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
SI-863A	RHR LOOP RECIRC
SI-863B	RHR LOOP RECIRC
SI-865A	SI ACCUMULATOR 'A' DISCHARGE
SI-865B	SI ACCUMULATOR 'B' DISCHARGE
SI-865C	SI ACCUMULATOR 'C' DISCHARGE
SI-866A	LOOP 'C' HOT LEG INJECTION ISOLATION
SI-866B	LOOP 'B' HOT LEG INJECTION ISOLATION
SI-878A	SI PUMP DISCHARGE HEADER CROSS-CONNECT ISOLATION
SI-878B	SI PUMP DISCHARGE HEADER CROSS-CONNECT ISOLATION

Function
Safety Injection Isolation Valves

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
ITS SR 3.5.1.5 for SI-865A, B, and C and ITS SR 3.5.2.1 for the remainder of applicable valves requires that AC control power be removed from these valves when in MODE 1, 2, or 3 with pressurizer pressure > 1000 psig (SI-865A, B, and C) or when in MODE 1, 2, or 3 (SI-863A and B, SI-866A and B, and SI-878A and B). The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	Description
SI-889A	CV SPRAY EDUCTOR FEED CHECK
SI-889B	CV SPRAY EDUCTOR FEED CHECK

Function
Open to admit sodium hydroxide injection during Containment Spray system actuation. Closes to prevent flow from the Containment Spray Pump minimum flow line from entering the Spray Additive Tank

Deferred Testing
Quarterly full stroke exercise open and closed

Cold Shutdown Test Justification
Reverse flow exercising these valves during power operation would render the entire Spray Additive System inoperable. Forward flow exercising of these valves requires isolation of the Spray Additive Tank in order to perform a line flush if the desired chemistry requirements are not met, as well as imposing additional risk associated with contamination of the RWST with NaOH. The sample and flush alignment renders the Spray Additive System inoperable, and would require manual operator action involving multiple valve operations to restore this essential feature. Forward flow testing of either component renders the Spray Additive System inoperable once SI-892D (manual eductor test line isolation) is opened to facilitate the flow path necessary to open these valves. Additional test equipment set - up is required to complete the test.

Cold Shutdown Test
Full stroke exercise open and closed

Valve ID	Description
SI-856A	SI PUMP RECIRC
SI-856B	SI PUMP RECIRC

Function
Open to provide a mini-flow path back to RWST. Close during the transition from the injection mode of SIS operation to the recirculation mode of operation to prevent the discharge of containment sump water to the RWST and the potential release of activity through the RWST vent line when the SI Pumps are used during the recirculation mode.

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising these valves during power operations with the SI Pumps racked in creates the potential for a pump start and run without a minimum flow path available. This condition increases the potential for possible pump damage and safety system unavailability. Failure in a non-conservative direction will result in total loss of system function. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

Valve ID	Description
SI-851A	SI ACCUMULATOR 'A' MAKE-UP VALVE ACCUMULATOR LIQUID FILL LINE ISOLATION
SI-851B	SI ACCUMULATOR 'B' MAKE-UP VALVE ACCUMULATOR LIQUID FILL LINE ISOLATION
SI-851C	SI ACCUMULATOR 'C' MAKE-UP VALVE ACCUMULATOR LIQUID FILL LINE ISOLATION

Function
Closed to prevent the diversion of Safety Injection flow during hot leg injection

Deferred Testing
Quarterly stroke time, full stroke exercise and fail safe test

Cold Shutdown Test Justification
Exercising these valves while at power creates the potential for valve failure in the non-conservative direction, which would cause a loss of system function during a large break loss of coolant accident as a result of the diversion of flow from the core to the affected Safety Injection accumulator. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time, full stroke exercise and fail safe test

Valve ID	Description
SI-861A	CV SUMP RECIRC SUCTION
SI-861B	CV SUMP RECIRC SUCTION

Function
Open to provide flow path for recirculation phase of RHR. SI-861A closes to provide containment isolation capability for containment penetration P-46 and SI-861B closes to provide containment isolation capability for containment penetration P-47

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Routine cycling of these valves results in fluid being directed to the ECCS sump. When the sump level is above the watertight construction joints, water may flow into the construction joints through cracks or possibly degraded areas that have lost seal integrity. The borated water then flows along the joint at the bottom of the crane wall until other possibly degraded areas of the joint are encountered. At these locations, the borated water flows out onto the floor in the annulus area and follows the path of least resistance to the lowest point of gravity. The typical flow path from the joint at the bottom of the crane wall is along floor construction joints, which originate at the bottom of the crane wall and terminate at the outer CV wall.

Cold Shutdown Test
Stroke time and full stroke exercise

Valve ID	**Description**
V6-16C	SERVICE WATER ISOLATION TO TURBINE BUILDING

Function
Close to isolate service water header from turbine building

Deferred Testing
Quarterly stroke time and full stroke exercise

Cold Shutdown Test Justification
Exercising this valve during power operation would temporarily isolate service water to all components in the turbine building and may result in damage to major plant equipment and a plant trip. Valve failure in the test position would require a plant shutdown or trip and may result in damage to plant equipment. The valve is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Cold Shutdown Test
Stroke time and full stroke exercise

REFUELING SHUTDOWN JUSTIFICATIONS
CC-VRS-1

Valve ID	Description
CC-731	REACTOR COOLANT PUMP BEARING COOLING WATER OUTLET CHECK

Function
Close to prevent emptying the cooling water surge tank upon accident, coincident with failure of upstream containment isolation valve CC-730 to close automatically on phase 'B' containment isolation signal

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
Reverse flow testing of this valve is impractical at power or during cold shutdown. The valve is located in the return flow path from the reactor coolant pumps motor bearing coolers. The inspection cannot be performed unless this section of piping is depressurized and drained. CCW is not isolated to the RCPs unless maintenance is required and is normally conducted during refueling outages. The disassembly of this valve is performed in conjunction with Appendix J local leak rate testing in order to provide a required vent path for testing. The coordination of these two activities minimizes radiation dose and maximizes equipment availability and personnel efficiency. The disassembly of this check valve at a refueling interval is consistent with the requirements of ISTC 4.5.4(c)(3).

Refueling Shutdown Test
Disassembly and examination to verify valve obturator movement to the open and closed positions (full stroke exercise).

Valve ID	Description
CVC-266	VCT TO CHRG PMPS SUCT HDR CHK VLV
LCV-115C	VOLUME CONTROL TANK OUTLET

Function
LCV-115C is a normally open MOV which directs flow from the volume control tank (VCT) to the CVCS charging pump suction and automatically isolates the VCT on a low level signal. CVC-266 is a check valve that is normally open to provide a flow path from the VCT to the charging pumps suction. This component is required to close in the event that it becomes necessary to establish an alternate source from the refueling water storage tank (RWST) or boric acid transfer pumps to the charging pumps suction. Closure of this component prevents backflow into the VCT to ensure that the flow of boric acid is properly directed to the charging pumps

Deferred Testing
CVC-266 - Quarterly and cold shutdown full stroke exercise open and closed
LCV-115C - Quarterly and cold shutdown stroke time and full stroke exercise

Refueling Shutdown Test Justification
Exercising LCV-115C and reverse flow testing of CVC-266 would interrupt the normal flow path from the VCT to the suction of the charging pumps. A suction supply to the charging pumps is required to maintain an adequate pressurizer level and the required RCP seal injection flow. In order to perform this test, the charging pump suction would be redirected to the refueling water storage tank (RWST). The high boron concentration in the RWST would require a reduction in power to maintain core parameters within programmed bands and would deplete the available RWST inventory required for accident mitigation. Failure of either valve in the test position would result in a complete loss of the normal flow path and would result in a unit shutdown. LCV-115C is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test. The conduct of either test at cold shutdown intervals may challenge the proper seating and operation of the Reactor Coolant Pump (RCP) seals and should be performed in a refueling outage when a similar challenge to the RCP seals can be avoided.

Refueling Shutdown Test
CVC-266 - Full stroke exercise open and closed
LCV-115C - Stroke time and full stroke exercise

REFUELING SHUTDOWN JUSTIFICATIONS
CVC-VRS-2

Valve ID	Description
CVC-351	BORIC ACID TO CHARGING PUMP SUCTION ISOLATION CHECK
CVC-357	RWST TO CHARGING PUMPS SUCTION CHECK

Function
The function of CVC-351 is to open and allow flow from the Boric Acid Pumps for emergency boration. CVC-357 opens to allow flow from the RWST for emergency boration.

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
Exercising these valves during power operation will cause undesirable RCS temperature and/or boron concentration changes which may result in an uncontrolled reactivity excursion, plant transient or trip. Operating a charging pump at full flow during cold shutdown with the reactor vessel head in place could result in a low temperature over pressurization of the RCS. For CVC-351, a flow rate of 60 gpm would be required to satisfy the full stroke open position verification. For CVC-357, a flow rate of 138 gpm would be required to satisfy the full stroke open position verification. The valves are not credited for closure to mitigate a design basis accident; however, are tested for this attribute to satisfy check valve bi-directional testing requirements. The reverse flow test of CVC-351 requires that all charging pumps, boric acid pumps and primary water pumps to be secured and all suction paths on the suction side of the charging pumps to be isolated. This results in a loss of seal injection to the RCPs and a loss of make-up capability that would be necessary to maintain an adequate level in the pressurizer. The reverse flow test of CVC-357 requires that LCV-115B, EMERGENCY MAKEUP TO CHARGING PUMP SUCTION CONTROL valve be opened a sufficient period of time to facilitate a proper assessment of closure. This action would result in excessive boration of the RCS

Refueling Shutdown Test
Full stroke exercise open and closed

REFUELING SHUTDOWN JUSTIFICATIONS
FW-VRS-1

Valve ID	Description
FW-8A	STEAM GENERATOR 'A' INLET STOP CHECK
FW-8B	STEAM GENERATOR 'B' INLET STOP CHECK
FW-8C	STEAM GENERATOR 'C' INLET STOP CHECK

Function
Close to isolate the main feedwater system, as required.

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
These valves are normally open at power. The check valves cannot be exercised closed during power operation without isolating the main feedwater flow to the Steam Generators, which would result in a plant trip. Reverse flow testing during cold shutdown is impractical. In order to perform the test, the steam generators must be filled, main feedwater system must be re-aligned and portions of the system opened and depressurized. Arranging for special processes would be impractical during cold shutdowns based on the complexity of the test and large size of the valves. Although these valves are open as demonstrated by routine power operations, bi-directional testing of check valves cannot be considered complete until both safety positions have been verified. Both tests must be performed within the same interval.

Refueling Shutdown Test
Full stroke exercise open and closed

Valve ID	Description
IA-525	AIR DRYER TO INSTRUMENT AIR LOOP CHECK VALVE ISOLATION
PCV-1716	INSTRUMENT AIR ISOLATION TO CV

Function
Close to provide containment isolation per 10CFR50, Appendix J.

Deferred Testing
IA-525 - Quarterly and cold shutdown full stroke exercise open and closed
PCV-1716 - Quarterly and cold shutdown stroke time, full stroke exercise and fail safe test

Refueling Shutdown Test Justification
These valves are normally open to provide instrument air to components located in containment. Exercising these valves during power operation or cold shutdown would isolate instrument air from components inside containment which could result in a plant trip or reduce the level of safety in order to maintain stable plant operation. The valves are tested closed via seat leakage measurement to meet the requirements of 10 CFR 50, Appendix J. Additionally, IA-525 must be proven to close and open in order to fulfill the bi-directional test requirements of the Code. These tests must be performed within the same interval. The leak rate test for this valve is performed at a refueling interval; therefore, the bi-directional test requirement of the Code for testing within the same interval is more appropriate at a refueling interval. Additional tests to verify closure for IA-525 quarterly or at cold shutdown intervals would involve tests that are considered to be impractical since it would involve complex test lineups or non intrusive measures. PCV-1716 is not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test.

Refueling Shutdown Test
IA-525 - Full stroke exercise open and closed
PCV-1716 - Stroke time, full stroke exercise and fail safe test

REFUELING SHUTDOWN JUSTIFICATIONS
RHR-VRS-1

Valve ID	Description
RHR-750	LOOP 'B' HOT LEG TO RHR SYSTEM
RHR-751	LOOP 'B' HOT LEG TO RHR SYSTEM

Function
RHR shutdown cooling suction line from RCS loop "B" hot leg to the RHR pumps suction and reactor coolant pressure boundary isolation.

Deferred Testing
Quarterly and cold shutdown full stroke exercise and stroke time

Refueling Shutdown Test Justification
These valves cannot be stroked quarterly because they are interlocked to prevent operation when Reactor Coolant System pressure is greater than 474 psig. RCS pressure during plant operation is approximately 2235 psig; therefore, these valves cannot be exercised unless interlocks are defeated. Control power is removed from RHR-751 prior to entering MODE 3 to provide increased assurance related to RCS barrier integrity. Operation of either valve with fuel in the vessel will remove the entire RHR system from service when the system is required for operation and failure of either one of these valve to re-open would cause a loss of shutdown cooling and is not desired. The valves are not designed to facilitate a part stroke exercise. Therefore, a partial stroke exercise test will not be performed since it may result in the same condition that would be encountered during the performance of a full stroke exercise test. The valves will be tested in refueling conditions when RHR cooling is not required.

Refueling Shutdown Test
Full stroke exercise and stroke time

Valve ID	Description
SI-909	SI ACCUMULATORS N_2 SUPPLY CHECK

Function
Closes to prevent a backflow of Nitrogen from the SI Accumulators and provides isolation of the associated containment penetration per 10CFR50, Appendix J.

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
Testing of this valve would require the isolation of the nitrogen supply to the Safety Injection Accumulators. This would represent a challenge to safety equipment to perform its intended function. Although this valve is an active component, it is normally closed and opened only when it is necessary to re-pressurize the SI accumulators. The valve is tested closed via seat leakage measurement to meet the requirements of 10 CFR 50, Appendix J. Additionally, the valve must be proven to close and open in order to fulfill the bi-directional test requirements of the Code. These tests must be performed within the same interval. The use of radiography to verify closure requires the use of outside services in order to complete the task. Due to the expense and limitations associated with performance of this examination, it is not warranted at a quarterly interval. In addition, system realignment to perform inservice testing or radiography is not warranted at a cold shutdown interval when a more definitive test can be performed at a refueling interval. Forward flow testing of the valve is normally completed in refueling outages when preparing to restore the SI accumulators to standby service. The leak rate test for this valve is performed at a refueling interval; therefore, the bi-directional test requirement of the Code for testing within the same interval is more appropriate at a refueling interval

Refueling Shutdown Test
Full stroke exercise open and closed

Valve ID	Description
SI-879A	SI PUMP 'A' DISCHARGE CHECK
SI-879B	SI PUMP 'B' DISCHARGE CHECK
SI-879C	SI PUMP 'C' DISCHARGE CHECK

Function
Open to permit full flow from the respective Safety Injection pump to the cold leg or hot leg injection pathways. Close to prevent the diversion of flow through an idle pump.

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
Quarterly testing (forward flow) is not practical since the RCS pressure exceeds the discharge pressure of the Safety Injection pumps. Full flow testing at cold shutdown conditions is not practical due to the increased probability of a low temperature over pressurization event; therefore, testing at a refueling interval with the reactor vessel head removed is appropriate. Although reverse flow testing is performed at a quarterly test interval, check valve bi-directional test requirements cannot be considered completed until both positions have been verified within the same interval.

Refueling Shutdown Test
Full stroke exercise open and closed

Valve ID	Description
SI-873A	BORON INJECTION TO RCS CHECK
SI-873D	BORON INJECTION TO RCS CHECK
SI-873E	BORON INJECTION TO RCS CHECK
SI-873F	BORON INJECTION TO RCS CHECK

Function
Close to provide isolation of high pressure RCS from a lower pressure rated safety injection system.

Deferred Testing
Quarterly and cold shutdown full stroke exercise open and closed

Refueling Shutdown Test Justification
Forward flow testing of these valves can only be performed by injecting water into the RCS utilizing the RWST as the supply source. The SI pumps discharge pressure cannot overcome normal RCS system pressure; therefore, the forward flow testing cannot be performed unless the reactor coolant system is depressurized and vented. Injecting with the RCS depressurized and not vented may result in a low temperature over pressurization of the RCS due to the small expansion volume. For this reason, the full flow test is conducted when filling or draining the refueling canal in conjunction with refueling outages.

Reverse flow testing of these valves requires the cold leg injection flow paths to be isolated one at a time. In addition to reducing safety system availability, the closure test requires that manual valves inside the Class 1 and 2 pressure boundaries be opened in order to provide a flow path for any seat leakage. This is an undesirable practice since the RCS pressure boundary is normally maintained by closed valves or valves capable of automatic closure. This evolution requires entry into containment and into Locked High Radiation Areas, increasing personnel exposure and the potential for personnel contamination. The activity is scheduled during critical plant evolutions based on the conditions necessary to facilitate testing. Portable testing equipment (pumps, hoses, fittings, containers, etc.) is required. Staging and installation of portable test equipment (hoses, fittings, gages, containers, etc.) inside containment to perform this test increases the probability for incidents to occur due to activities performed on hot, pressurized systems.

Check valve tests must be performed by verifying the open and closed positions. The tests are to be performed at an interval when it is practicable to perform both tests. These components are required to be leak rate tested IAW ITS SR 3.4.14.1at cold shutdowns of greater than 48 hours in duration, provided the test has not been completed in the previous 9 months (276 days). The leak test satisfies the requirement for closure verification. The forward flow test is performed at a refueling interval. The combination of these two activities satisfies the OM Code requirement for bi-directional testing and the interval extension to refueling is warranted.

Refueling Shutdown Test
Full flow exercise at refueling intervals and reverse flow verification via seat leakage testing at cold shutdown intervals - greater than 48 hours in duration and prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months and within 24 hours following valve actuation due to automatic or manual action or flow through the valve.

ATTACHMENT 10.5
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PUMP TABLE

Pump	P&ID (SHT)	Coord	Group	Type	Speed	Test Type	Test Freq	OST	Notes
AFW-PMP-A	G-190197 (4)	C-3	B	C-H	Fixed	Comp. – Q, dP, V	Bi	207	
						Group B – Q, Dp	Q	201-1	
AFW-PMP-B	G-190197 (4)	A-3	B	C-H	Fixed	Comp. – Q, dP, V	Bi	207	
						Group B – Q, Dp	Q	201-2	
SDAFW-PMP	G-190197 (4)	D-2	B	C-H	Variable	Comp. – N, Q, dP, V	Bi	206	
						Group B – N, Q, Dp	Q	202	
BA-XFER-PMP-A	5379-685 (3)	B-6	A	C-H	Fixed	Comp. – Q, dP, V	Bi	108-3	IST-RR-1
						Group A – Q, Dp, V	Q	108-1	
BA-XFER-PMP-B	5379-685 (3)	B-5	A	C-H	Fixed	Comp. – Q, dP, V	Bi	108-4	IST-RR-1
						Group A – Q, Dp, V	Q	108-2	
CCW-PMP-A	5379-376 (1)	D-7	A	C-H	Fixed	Comp. – Q, dP, V	Bi	908-1	IST-RR-1 IST-RR-2
						Group A – Q, Dp, V	Q	908	
CCW-PMP-B	5379-376 (1)	C-7	A	C-H	Fixed	Comp. – Q, dP, V	Bi	908-1	IST-RR-1 IST-RR-2
						Group A – Q, Dp, V	Q	908	
CCW-PMP-C	5379-376 (1)	A-7	A	C-H	Fixed	Comp. – Q, dP, V	Bi	908-1	IST-RR-1 IST-RR-2
						Group A – Q, Dp, V	Q	908	
CV-SPRAY-PMP-A	5379-1082 (3)	C-3	B	C-H	Fixed	Comp. – Q, dP, V	Bi	352-3	IST-RR-1
						Group B – Q, Dp	Q	352-1	
CV-SPRAY-PMP-B	5379-1082 (3)	E-3	B	C-H	Fixed	Comp. – Q, dP, V	Bi	352-4	IST-RR-1
						Group B – Q, Dp	Q	352-2	
CHG-PMP-A	5379-685 (2)	B-7	A	PD	Variable	Comp. – N, Q, P, V	Bi	101-6	IST-RR-1
						Group A – N, Q, P, V	Q	101-1	
CHG-PMP-B	5379-685 (2)	C-7	A	PD	Variable	Comp. – N, Q, P, V	Bi	101-7	IST-RR-1
						Group A – N, Q, P, V	Q	101-2	
CHG-PMP-C	5379-685 (2)	C-7	A	PD	Variable	Comp. – N, Q, P, V	Bi	101-8	IST-RR-1
						Group A – N, Q, P, V	Q	101-3	

PUMP TABLE

Pump	P&ID (SHT)	Coord	Group	Type	Speed	Test Type	Test Freq	OST	Notes
FO-XFER-PMP-A	G-190204D (2)	D-7	A	PD	Fixed	Aug. – Q, P, V	Q	402-1	Augmented
FO-XFER-PMP-B	G-190204D (2)	D-8	A	PD	Fixed	Aug. – Q, P, V	Q	402-2	Augmented
RHR-PMP-A	5379-1484 (1)	D-4	A	C-V	Fixed	Comp. – Q, dP, V	Bi	253	
						Group A – Q, Dp, V	Q	251-1	
RHR-PMP-B	5379-1484 (1)	F-4	A	C-V	Fixed	Comp. – Q, dP, V	Bi	253	
						Group A – Q, Dp, V	Q	251-2	
SI-PMP-A	5379-1082 (2)	C-6	B	C-H	Fixed	Comp. – Q, dP, V	Bi	151-4	IST-RR-1 IST-RR-2
						Group B – Q, Dp	Q	151-1	
SI-PMP-B	5379-1082 (2)	E-6	B	C-H	Fixed	Comp. – Q, dP, V	Bi	151-5	Normally OOS IST-RR-1 IST-RR-2
						Group B – Q, Dp	Q	151-2	
SI-PMP-C	5379-1082 (2)	F-6	B	C-H	Fixed	Comp. – Q, dP, V	Bi	151-6	IST-RR-1 IST-RR-2
						Group B – Q, Dp	Q	151-3	
SW-PMP-A	G-190199 (2)	B-7	A	VLS	Fixed	Comp. – Q, dP, V	Bi	302-3	IST-RR-1 IST-RR-2
						Group A – Q, Dp, V	Q	302-1	
SW-PMP-B	G-190199 (2)	B-7	A	VLS	Fixed	Comp. – Q, dP, V	Bi	302-3	IST-RR-1 IST-RR-2
						Group A – Q, Dp, V	Q	302-1	
SW-PMP-C	G-190199 (2)	B-6	A	VLS	Fixed	Comp. – Q, dP, V	Bi	302-4	IST-RR-1
						Group A – Q, Dp, V	Q	302-2	
SW-PMP-D	G-190199 (2)	B-6	A	VLS	Fixed	Comp. – Q, dP, V	Bi	302-4	IST-RR-1
						Group A – Q, Dp, V	Q	302-2	
SWBP-A	G-190199 (7)	E-6	A	C-H	Fixed	Comp. – Q, dP, V	Bi	303-3	IST-RR-1
						Group A – Q, Dp, V	Q	303-1	
SWBP-B	G-190199 (7)	F-6	A	C-H	Fixed	Comp. – Q, dP, V	Bi	303-4	IST-RR-1
						Group A – Q, Dp, V	Q	303-2	

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
A TURBO CHARGER INLET	G-190204A (1)	C-6	C	Act	20	CK	SA	N	C	O/C	NA	N	N	FF	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													RF	Q		OST-401-1 OST-409-1 OST-410
AFW-1	G-190197 (1)	B-7	B	Act	6	GA	M	N	LO	O/C	N/A	N	N	FS	Bi		OST-702-3
AFW-104	G-190197 (1)	B-7	B	Act	6	GA	M	N	LO	O/C	N/A	N	N	FS	Bi		OST-702-3
AFW-105	G-190197 (4)	C-3	C	Act	6	CK	SA	N	C	O/C	N/A	N	N	FF	CS	FW-VCS-2	CM-134 OST-206 PM-302
														RF	CS	FW-VCS-2	CM-134 OST-702-3 PM-302
AFW-13	G-190197 (4)	D-2	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
AFW-24	G-190197 (4)	B-2	B	Act	6	GA	M	N	LC	O	N/A	N	N	FS	Bi		OST-701-6
AFW-24A	G-190197 (4) AUG	B-2	B	Act	1	GL	M	N	O	C	N/A	N	N	FS AUG	Bi		OST-701-6

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
AFW-32	G-190197 (4)	C-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
AFW-33	G-190197 (4)	B-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
AFW-40	G-190197 (4)	C-4	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	RF	App. II		CM-140 OST-202 OST-207 PM-307
														FF	App. II		CM-140 OST-207 PM-307
AFW-41	G-190197 (4)	B-4	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	RF	App. II		CM-140 OST-202 OST-207 PM-307
														FF	App. II		CM-140 OST-207 PM-307
AFW-68	G-190197 (4)	B-6	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-140 OST-207 PM-307
														RF	App. II		CM-140 OST-201-1 OST-207 PM-307

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
AFW-69	G-190197 (4)	C-6	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-140 OST-207 PM-307
														RF	App. II		CM-140 OST-201-1 OST-207 PM-307
AFW-70	G-190197 (4)	B-6	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-140 OST-207 PM-307
														RF	App. II		CM-140 OST-201-1 OST-207 PM-307
AFW-79	G-190197 (4)	D-2	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
AFW-8	G-190197 (4)	D-2	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
AFW-84	G-190197 (4)	D-4	C	Act	6	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-206 PM-307
														RF	App. II		OST-202 OST-206 PM-307
AFW-9	G-190197 (4)	C-2	C	Act	2	CK	SA	N	C	C	N/A	N	N	OV	App. II		CM-139 PM-304
														RF	App. II		CM-139 OST-202 OST-206 PM-304

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
AFW-9A	G-190197 (4)	D-4	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	RF	CS	FW-VCS-3	CM-149 OST-201-1 OST-702-3 PM-320
														FF	CS	FW-VCS-3	CM-149 OST-202 OST-206 PM-320
AFW-V2-14A	G-190197 (4)	G-4	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														TM (C)	Q		OST-202 OST-206
														PI	Bi		OST-206
AFW-V2-14B	G-190197 (4)	F-4	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														TM (C)	Q		OST-202 OST-206
														PI	Bi		OST-206
AFW-V2-14C	G-190197 (4)	E-4	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														TM (C)	Q		OST-202 OST-206
														PI	Bi		OST-206

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
AFW-V2-16A	G-190197 (4)	B-5	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-201-1 OST-207
	GL 89-10, GL 96-05													TM (O)	Q		OST-201-1 OST-207
														TM (C)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
AFW-V2-16B	G-190197 (4)	C-5	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-201-1 OST-207
	GL 89-10, GL 96-05													TM (O)	Q		OST-201-1 OST-207
														TM (C)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
AFW-V2-16C	G-190197 (4)	B-5	B	Act	4	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-201-1 OST-207
	GL 89-10, GL 96-05													TM (O)	Q		OST-201-1 OST-207
														TM (C)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
AFW-V2-20A	G-190197 (4)	C-5	B	Act	4	GA	MO	N	O	C	AI	N	Y	FS	Q		OST-201-1 OST-207
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
AFW-V2-20B	G-190197 (4)	B-5	B	Act	4	GA	MO	N	O	C	AI	N	Y	FS	Q		OST-201-1 OST-207
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-201-1 OST-207
														PI	Bi		OST-207

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
B TURBO CHARGER INLET	G-190204A (1)	F-6	C	Act	20	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													RF	Q		OST-401-2 OST-409-2 OST-411
C-411	G-190197 (1)	B-7	B	Act	6	GA	M	N	O	C	N/A	N	N	FS AUG	BI		OST-701-6
	AUG																
CC-702A	5379-376 (1)	D-6	C	Act	16	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-908 OST-908-1
														RF	Q		OST-908 OST-908-1
CC-702B	5379-376 (1)	C-6	C	Act	16	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-908 OST-908-1
														RF	Q		OST-908 OST-908-1
CC-702C	5379-376 (1)	B-6	C	Act	16	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-908 OST-908-1
														RF	Q		OST-908 OST-908-1
CC-707	5379-376 (1)	G-7	C	Act	3	RV	SA	N	C	O	C	N	N	RL	App. I		EST-112

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-715	5379-376 (3)	B-2	C	Act	3	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
CC-716A	5379-376 (3)	D-8	B	Act	6	GA	MO	N	O	C	AI	N	Y	FS	CS	CC-VCS-1	OST-703-4
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	CS	CC-VCS-1	OST-703-4
														PI	Bi		OST-703-4
CC-716B	5379-376 (3)	D-8	A	Act	6	GA	MO	N	O	C	AI	Y	Y	FS	CS	CC-VCS-1	OST-703-4
	GL 89-10, GL 96-05													TM (C)	CS	CC-VCS-1	OST-703-4
														PI	Bi		OST-703-4
														LJ	App. J		OST-933-26
CC-721A	5379-376 (3)	C-6	C	Act	1.5	CK	SA	N	O	C	N/A	N	N	OV	App. II		CM-143 EST-152 PM-312
														RF	App. II		CM-143 PM-312
CC-721B	5379-376 (3)	F-6	C	Act	1.5	CK	SA	N	O	C	N/A	N	N	OV	App. II		CM-143 EST-152 PM-312
														RF	App. II		CM-143 PM-312
CC-721C	5379-376 (3)	D-6	C	Act	1.5	CK	SA	N	O	C	N/A	N	N	OV	App. II		CM-143 EST-152 PM-312
														RF	App. II		CM-143 PM-312

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-722A	5379-376 (3)	B-5	C	Act	0.75	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
CC-722B	5379-376 (3)	E-5	C	Act	0.75	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
CC-722C	5379-376 (3)	D-5	C	Act	0.75	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
CC-729	5379-376 (3)	F-2	C	Act	3	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
CC-730	5379-376 (3)	F-1	A	Act	6	GL	MO	N	O	C	AI	Y	Y	FS	CS	CC-VCS-2	OST-703-4
	GL 89-10, GL 96-05													TM (C)	CS	CC-VCS-2	OST-703-4
														PI	Bi		OST-703-4
														LJ	App. J		OST-933-27
CC-731	5379-376 (2)	C-6	C	Act	6	CK	SA	N	O	C	N/A	N	N	DA	R	CC-VRS-1	EST-132
CC-735	5379-376 (2)	C-5	A	Act	3	GA	MO	N	O	C	AI	Y	Y	FS	CS	CC-VCS-3	OST-703-4
	GL 89-10, GL 96-05													TM (C)	CS	CC-VCS-3	OST-703-4
														PI	Bi		OST-703-4
														LJ	App. J		OST-933-9

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-736	5379-376 (2) AUG	C-5	B	Pass	3	GA	M	N	O	O	N/A	N	N	FS AUG	Bi		OST-933-9
CC-737A	5379-376 (3)	B-8	B	Act	3	GA	M	N	O	C	N/A	N	N	FS	Bi		OST-701-6
CC-738	5379-376 (3)	B-7	C	Act	3	CK	SA	N	O	C	N/A	N	N	OV	App. II		CM-131 EST-132 EST-152 PM-308
														RF	App. II		CM-131 EST-132 PM-308
CC-739	5379-376 (3)	B-1	B	Act	3	GA	AO	N	O	C	C	N	Y	FS	Q		OST-701-3
														FC	Q		OST-701-3
														TM (C)	Q		OST-701-3
														PI	Bi		OST-707-3
CC-747A	5379-376 (2) Thermal Relief Valve - Code Case OMN-2	F-6	C	Act	1	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		
CC-747B	5379-376 (2) Thermal Relief Valve - Code Case OMN-2	F-5	C	Act	1	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-749A	5379-376 (2)	E-7	B	Act	16	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-1
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-1
														PI	Bi		OST-258-1
CC-749B	5379-376 (2)	E-5	B	Act	16	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-2
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-2
														PI	Bi		OST-258-2
CC-774	5379-376 (4)	C-1	B	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		
	Thermal Relief Valve - Code Case OMN-2																
CC-791A	5379-376 (4)	C-7	C	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2.																
CC-791B	5379-376 (2)	B-3	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2. This valve is listed as part of a system that is removed from service and will not be used to support plant operation.																
CC-791C	5379-376 (2)	F-2	C	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		EST-112
	Thermal Relief Valve - Code Case OMN-2																
CC-791D	5379-376 (4)	B-4	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2																

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-791E	5379-376 (2)	C-3	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2. This valve is listed as part of a system that is removed from service and will not be used to support plant operation.																
CC-791F	5379-376 (2)	C-3	C	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2. This valve is listed as part of a system that is removed from service and will not be used to support plant operation.																
CC-791G	5379-376 (1)	E-1	C	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		
	Thermal Relief Valve - Code Case OMN-2																
CC-791H	5379-376 (2)	E-2	C	Act	.75	RV	SA	N	C	N/A	N/A	N	N	RL	App. I		EST-112
	Thermal Relief Valve - Code Case OMN-2																
CC-791J	5379-376 (4)	G-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2. This valve is listed as part of a system that is removed from service and will not be used to support plant operation.																
CC-791K	5379-376 (4)	F-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2. This valve is listed as part of a system that is removed from service and will not be used to support plant operation.																
CC-791L	5379-376 (4)	C-4	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I	IST-RR-5	EST-112
	Thermal Relief Valve - Code Case OMN-2																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CC-832	5379-376 (1)	F-8	B	Pass	3	GL	MO	N	C	C	AI	N	Y	PI	Bi		OST-707-3
CC-926	5379-376 (4)	F-4	C	Act	0.75	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-149 EST-152 PM-320
														RF	App. II		CM-149 PM-320
CC-927	5379-376 (4)	C-2	B	Act	1	GL	M	N	O	O/C	N/A	N	N	FS	Bi		OST-701-6A
CC-928	5379-376 (4)	C-2	B	Act	1	GL	M	N	O	O/C	N/A	N	N	FS	Bi		OST-701-6B
CC-931	5379-376 (4)	E-4	C	Act	0.75	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-149 EST-152 PM-320
														RF	App. II		CM-149 PM-320
CC-932	5379-376 (2)	B-6	A	Pass	3	GA	M	N	LC	LC	N/A	N	N	LJ	App. J		OST-933-9
CC-948	5379-376 (1)	G-8	C	Act	1	VB	SA	N	C	O	N/A	N	N	RL	App. I		EST-130

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CDR-78	HBR2-09005 SH00004 AUG	D-7	B	Act	4	BF	M	N	O	C	N/A	N	N	FS AUG	Bi		OST-701-6
CDR-86	G-190197 SH00001 AUG	C-8	B	Act	2	GA	M	N	C	O	N/A	N	N	FS AUG	Bi		OST-701-6
CVC-1118A	5379-686 (1) AUG	G-6	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-1118B	5379-686 (1) AUG	E-6	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-1118C	5379-686 (1) AUG	C-6	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-200A	5379-685 (1)	F-6	B	Act	2	GL	AO	N	O/C	C	C	N	Y	FS	CS	CVC-VCS-5	OST-703-5
														FC	CS	CVC-VCS-5	OST-703-5
														TM (C)	CS	CVC-VCS-5	OST-703-5
														PI	Bi		OST-703-5
CVC-200B	5379-685 (1)	G-6	B	Act	2	GL	AO	N	O/C	C	C	N	Y	FS	CS	CVC-VCS-5	OST-703-5
														FC	CS	CVC-VCS-5	OST-703-5
														TM (C)	CS	CVC-VCS-5	OST-703-5
														PI	Bi		OST-703-5

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-200C	5379-685 (1)	G-6	B	Act	2	GL	AO	N	O/C	C	C	N	Y	FS	CS	CVC-VCS-5	OST-703-5
														FC	CS	CVC-VCS-5	OST-703-5
														TM (C)	CS	CVC-VCS-5	OST-703-5
														PI	Bi		OST-703-5
CVC-202A	5379-685 (1)	F-4	A	Act	3	GA	M	N	O	C	N/A	Y	N	FS	Bi		OST-933-2
														LJ	App. J		OST-933-2
CVC-203A	5379-685 (1)	G-5	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-203B	5379-685 (1)	G-5	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-204A	5379-685 (1)	G-4	A	Act	2	GL	AO	N	O	C	C	Y	Y	FS	CS	CVC-VCS-1	OST-703-5
														FC	CS	CVC-VCS-1	OST-703-5
														TM (C)	CS	CVC-VCS-1	OST-703-5
														PI	Bi		OST-703-5
														LJ	App. J		OST-933-20
CVC-204B	5379-685 (1)	G-4	A	Act	2	GL	AO	N	O	C	C	Y	Y	FS	CS	CVC-VCS-1	OST-703-5
														FC	CS	CVC-VCS-1	OST-703-5
														TM (C)	CS	CVC-VCS-1	OST-703-5
														PI	Bi		OST-703-5
														LJ	App. J		OST-933-20

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-2080	5379-685 (2)	B-5	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-2081	5379-685 (2)	C-5	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-2082	5379-685 (2)	D-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-209	5379-685 (2)	G-4	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-239A	5379-685 (2)	F-4	C	Act	2	CK	SA	N	O	C	N/A	N	N	OV	App. II		CM-143 EST-152 PM-312
														RF	App. II		CM-143 EST-153 PM-312
CVC-257	5379-685 (2)	F-5	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-258	5379-685 (2)	F-7	B	Pass	0.375	GL	SO	N	C	C	C	N	Y	PI	Bi		OP-918

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-263	5379-685 (2)	E-5	C	Act	1	CK	SA	N	O/C	C	N/A	N	N	OV	App. II		CM-143 EST-152 PM-312
														RF	App. II		CM-143 EST-153 PM-312
CVC-266	5379-685 (2)	D-5	C	Act	4	CK	SA	N	O	C	N/A	N	N	OV	R	CVC-VRS-1	OST-101-1 OST-101-6
														RF	R	CVC-VRS-1	OST-109
CVC-282	5379-685 (1)	F-4	A	Act	3	GL	M	N	O	C	N/A	Y	N	FS	Bi		OST-933-2
														LJ	App. J		OST-933-2
CVC-283A	5379-685 (2)	D-7	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-283B	5379-685 (2)	C-7	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-283C	5379-685 (2)	B-7	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
CVC-292A	5379-685 (1)	A-2	B	Act	0.75	GL	M	N	O	C	N/A	N	N	FS	Bi		OST-933-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-293A	5379-685 (1)	C-3	A	Act	2	GL	M	N	O/C	O/C	N/A	Y	N	FS	Bi		OST-933-3
														LJ	App. J		OST-933-3
CVC-293C	5379-685 (1)	B-3	A	Act	2	GL	M	N	O/C	O/C	N/A	Y	N	FS	Bi		OST-933-3
														LJ	App. J		OST-933-3
CVC-295	5379-685 (1)	A-2	A	Pass	3	GA	M	N	C	C	N/A	Y	N	LJ	App. J		OST-933-3
CVC-295A	5379-685 (1)	A-3	A	Pass	0.75	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		OST-933-3
CVC-297A	5379-685 (1)	B-8	A	Act	1	ND	M	N	O	O/C	N/A	Y	N	FS	Bi		OST-933-3
														LJ	App. J		OST-933-3
CVC-297B	5379-685 (1)	B-6	A	Act	1	ND	M	N	O	O/C	N/A	Y	N	FS	Bi		OST-933-3
														LJ	App. J		OST-933-3
CVC-297C	5379-685 (1)	B-5	A	Act	1	ND	M	N	O	O/C	N/A	Y	N	FS	Bi		OST-933-3
														LJ	App. J		OST-933-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-298A	5379-685 (1)	C-8	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-1 PM-312
CVC-298B	5379-685 (1)	C-6	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-2 PM-312
CVC-298C	5379-685 (1)	C-5	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-3 PM-312
CVC-298D	5379-685 (1)	B-8	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-1 PM-312
CVC-298E	5379-685 (1)	B-6	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-2 PM-312

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-298F	5379-685 (1)	B-5	C	Act	2	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-143 OST-101-1 OST-101-6 PM-312
														RF	App. II		CM-143 OST-112-3 PM-312
CVC-307	5379-685 (1)	E-3	B	Pass	.75	GL	AO	N	C	N/A	C	N	N	FS AUG	R		OST-933-10
	AUG													FC AUG	R		OST-933-10
CVC-309A	5379-685 (1)	F-3	A	Pass	2	GL	M	N	C	C	N/A	Y	N	LJ	App. J		OST-933-2
														FS AUG	Bi		OST-933-2
CVC-310A	5379-685 (1)	F-7	B	Act	3	GL	AO	N	C	O	O	N	Y	FS	CS	CVC-VCS-3	OST-703-5
														FO	CS	CVC-VCS-3	OST-703-5
														TM (O)	CS	CVC-VCS-3	OST-703-5
														PI	Bi		OST-703-5
CVC-310B	5379-685 (1)	F-7	B	Pass	3	GL	AO	N	O	O	O	N	Y	PI	Bi		OST-703-5
														FO AUG	Bi		OST-703-5
														TM (C) AUG	Bi		OST-703-5
														FS AUG	Bi		OST-703-5
CVC-311	5379-685 (1)	E-7	B	Pass	2	GL	AO	N	C	N/A	C	N	N	FS AUG	R		OST-933-2
	AUG													FC AUG	R		OST-933-2

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-312A	5379-685 (1)	F-8	C	Act	3	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-135 OST-101-5 PM-310
														RF	App. II		CM-135 OST-167-3 PM-310
CVC-312B	5379-685 (1)	F-8	C	Act	3	CK	SA	N	O/C	O/C	N/A	N	N	FF	App. II		CM-135 OST-101-5 PM-310
														RF	App. II		CM-135 OST-167-4 PM-310
CVC-312C	5379-685 (1)	F-6	C	Act	3	CK	SA	N	O	O/C	N/A	N	N	FF	App. II		CM-131 OST-101-5 PM-301
														RF	App. II		CM-143 OST-112-4 PM-312
CVC-313	5379-685 (1)	F-8	C	Pass	2	CK	SA	N	C	C	N/A	N	N	OV	App. II		CM-143 GP-007 PM-312
														RF	App. II		CM-143 OST-167-5 PM-312
CVC-341	5379-685 (3)	C-5	B	Act	2	DA	M	N	O/C	O/C	N/A	N	N	FS	Bi		OST-108-4
CVC-342	5379-685 (3)	B-6	B	Act	2	DA	M	N	O/C	O/C	N/A	N	N	FS	Bi		OST-108-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-351	5379-685 (2)	B-2	C	Act	2	CK	SA	N	C	O	N/A	N	N	FF	R	CVC-VRS-2	GP-007
														CV	R	CVC-VRS-2	OST-109
CVC-357	5379-685 (2)	C-4	C	Act	4	CK	SA	N	C	O	N/A	N	N	FF	R	CVC-VRS-2	GP-009
														CV	R	CVC-VRS-2	OST-109
CVC-358	5379-685 (2)	C-5	B	Act	4	BF	M	N	C	O	N/A	N	N	FS	Bi		OST-701-6
CVC-365A	5379-685 (2) AUG	D-3	B	Pass	2	DA	M	N	C	C	N/A	N	N	FS	Bi		OST-703-5
CVC-365B	5379-685 (2) AUG	D-2	B	Pass	2	DA	M	N	C	C	N/A	N	N	FS	Bi		OST-703-5
CVC-381	5379-685 (1) GL 89-10, GL 96-05	E-2	A	Act	3	GA	MO	N	O	C	AI	Y	Y	FS	CS	CVC-VCS-2	OST-703-5
														TM (C)	CS	CVC-VCS-2	OST-703-5
														PI	Bi		OST-703-5
														LJ	App. J		OST-933-10
CVC-382	5379-685 (1)	E-3	C	Act	2	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
CVC-387	5379-685 (1)	E-7	B	Act	0.75	GL	AO	N	O/C	C	C	N	Y	FS	CS	CVC-VCS-4	OST-703-5
														FC	CS	CVC-VCS-4	OST-703-5
														PI	BI		OST-703-5
														TM (C)	CS	CVC-VCS-4	OST-703-5
CVC-397A	5379-685 (3)	B-5	C	Act	2	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-108-1 OST-108-3
														CV	Q		OST-108-2 OST-108-4
CVC-397B	5379-685 (3)	B-5	C	Act	2	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-108-2 OST-108-4
														CV	Q		OST-108-1 OST-108-3
CVC-454	5379-685 (1)	B-7		Act	.75	CK	SA	N	O	N/A	N/A	N	N	OV	R		OST-167-6
	AUG													CV	R		OST-167-6
DA-11A	G-190204A (1)	B-4	C	Act	0.5	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																
DA-11B	G-190204A (1)	E-4	C	Act	0.5	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
DA-19A	G-190204A (1)	B-6	B	Act	1.5	TW	SO	N	C	O	O	N	N	FS	Q		OP-604 OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													FO	Q		OP-604 OST-401-1 OST-409-1 OST-410
DA-19B	G-190204A (1)	E-6	B	Act	1.5	TW	SO	N	C	O	O	N	N	FS	Q		OP-604 OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													FO	Q		OP-604 OST-401-2 OST-409-2 OST-411
DA-23A	G-190204A (1)	B-6	B	Act	1.5	TW	SO	N	C	O	O	N	N	FS	Q		OP-604 OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													FO	Q		OP-604 OST-401-1 OST-409-1 OST-410
DA-23B	G-190204A (1)	E-6	B	Act	1.5	TW	SO	N	C	O	O	N	N	FS	Q		OP-604 OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													FO	Q		OP-604 OST-401-2 OST-409-2 OST-411
DA-33A	G-190204A (1)	C-4	C	Act	0.75	CK	SA	N	O/C	C	N/A	N	N	RF	Q		OST-701-4
	AUG DA-9A and DA-33A are tested as a unit																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
DA-33B	G-190204A (1) AUG DA-9B and DA-33B are tested as a unit	E-4	C	Act	0.75	CK	SA	N	O/C	C	N/A	N	N	RF	Q		OST-701-4
DA-9A	G-190204A (1) AUG DA-9A and DA-33A are tested as a unit	B-4	C	Act	0.75	CK	SA	N	O/C	C	N/A	N	N	RF	Q		OST-701-4
DA-9B	G-190204A (1) AUG DA-9B and DA-33B are tested as a unit	E-4	C	Act	0.75	CK	SA	N	O/C	C	N/A	N	N	RF	Q		OST-701-4
DG-20A	G-190204A (2) AUG Skid mounted	E-5	C	Act	1.5	CK	SA	N	C	C	N/A	N	N	RF	Q		OST-401-1 OST-409-1 OST-410
DG-20B	G-190204A (3) AUG Skid mounted	E-5	C	Act	1.5	CK	SA	N	C	C	N/A	N	N	RF	Q		OST-401-2 OST-409-2 OST-411
DG-24A	G-190204A (2) AUG Skid mounted	B-5	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
DG-24B	G-190204A (3)	B-5	C	Act	4	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted																
DG-32A	G-190204A (2)	E-4	C	Act	1	RV	SA	N	C	N/A	N/A	N	N	FV	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted																
DG-32B	G-190204A (3)	E-4	C	Act	1	RV	SA	N	C	N/A	N/A	N	N	FV	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted																
DG-45A	G-190204A (2)	D-6	C	Act	0.75	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													RF	Q		OST-401-1 OST-409-1 OST-410
DG-45B	G-190204A (3)	D-6	C	Act	0.75	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													RF	Q		OST-401-2 OST-409-2 OST-411

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
DG-46A	G-190204A (2) AUG Skid mounted	E-4	C	Act	0.5	RV	SA	N	C	N/A	N/A	N	N	FV	Q		OST-401-1 OST-409-1 OST-410
DG-46B	G-190204A (3) AUG Skid mounted	D-6	C	Act	0.5	RV	SA	N	C	N/A	N/A	N	N	FV	Q		OST-401-2 OST-409-2 OST-411
DG-4A	G-190204A (2)	F-2	C	Act	5	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													RF	Q		OST-401-1 OST-409-1 OST-410
DG-4B	G-190204A (3)	F-2	C	Act	5	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													RF	Q		OST-401-2 OST-409-2 OST-411
DG-5A	G-190204A (2) AUG Skid mounted	F-2	C	Act	5	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
DG-5B	G-190204A (3) AUG Skid mounted	F-2	C	Act	5	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
DW-19	G-190202 (3) AUG	H-3	B	Act	6	GA	M	N	LC	O	N/A	N	N	FS	Bi		OST-701-6
DW-20	G-190202 SH00003 AUG	H-3	B	Act	0.5	GL	M	N	O	C	N/A	N	N	FS AUG	Bi		OST-701-6
DW-21	G-190202 (3)	H-3	B	Act	6	GA	M	N	LC	O	N/A	N	N	FS	Bi		OST-701-6
DW-22	G-190202 SH00003 AUG	G-4	B	Act	6	GA	M	N	O	C	N/A	N	N	FS AUG	Bi		OST-701-6
DW-27	G-190202 SH00003 AUG	H-4	B	Act	2	GL	M	N	C	O	N/A	N	N	FS AUG	Bi		OST-701-6
EV-1963A-1	G-190204D (2) AUG	C-5	B	Act	1	GL	SO	Y	C	O	C	N	N	FS FC	Q Q		OST-402-1 OST-402-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
EV-1963A-2	G-190204D (2)	C-5	B	Act	1	GL	SO	Y	C	O	C	N	N	FS	Q		OST-402-1
	AUG													FC	Q		OST-402-1
EV-1963B-1	G-190204D (2)	B-5	B	Act	1	GL	SO	Y	C	O	C	N	N	FS	Q		OST-402-2
	AUG													FC	Q		OST-402-2
EV-1963B-2	G-190204D (2)	B-5	B	Act	1	GL	SO	Y	C	O	C	N	N	FS	Q		OST-402-2
	AUG													FC	Q		OST-402-2
FCV-113B	5379-685 (2)	D-4	B	Act	2	DA	AO	N	O/C	C	C	N	Y	FS	Q		OST-102
														FC	Q		OST-102
														TM (C)	Q		OST-102
														PI	Bi		OST-111
FCV-1424	G-190197 (4)	C-4	B	Act	4	GL	HYD	N	C	O	C	N	Y	FS	Q		OST-201-1 OST-207
														FC	Q		OST-201-1 OST-207
														TM (O)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
FCV-1425	G-190197 (4)	B-4	B	Act	4	GL	HYD	N	C	O	C	N	Y	FS	Q		OST-201-2 OST-207
														FC	Q		OST-201-2 OST-207
														TM (O)	Q		OST-201-2 OST-207
														PI	Bi		OST-207

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FCV-1608A	G-190199 (2)	E-7	B	Act	3	BL	AO	N	O/C	C	C	N	N	FS	Q		OST-302-1 OST-302-3
	AUG													FC	Q		OST-302-1 OST-302-3
														TM (C)	Q		OST-302-1 OST-302-3
FCV-1608B	G-190199 (2)	E-6	B	Act	3	BL	AO	N	O/C	C	C	N	N	FS	Q		OST-302-2 OST-302-4
	AUG													FC	Q		OST-302-2 OST-302-4
														TM (C)	Q		OST-302-2 OST-302-4
FCV-1625A	G-190199 (1)	B-2	B	Act	3	GA	SO	N	O/C	C	C	N	N	FS	Q		OST-302-1 OST-302-3
	AUG													FC	Q		OST-302-1 OST-302-3
														TM (C)	Q		OST-302-1 OST-302-3
FCV-1625B	G-190199 (1)	D-2	B	Act	3	GA	SO	N	O/C	C	C	N	N	FS	Q		OST-302-1 OST-302-3
	AUG													FC	Q		OST-302-1 OST-302-3
														TM (C)	Q		OST-302-1 OST-302-3
FCV-1625C	G-190199 (1)	F-2	B	Act	3	GA	SO	N	O/C	C	C	N	N	FS	Q		OST-302-1 OST-302-3
	AUG													FC	Q		OST-302-1 OST-302-3
														TM (C)	Q		OST-302-1 OST-302-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FCV-1930A	G-190234 (1)	F-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-19
FCV-1930B	G-190234 (1)	F-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-19
FCV-1931A	G-190234 (1)	D-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-17
FCV-1931B	G-190234 (1)	D-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-17
FCV-1932A	G-190234 (1)	C-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-18

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FCV-1932B	G-190234 (1)	C-7	A	Act	3	GA	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-18
FCV-1933A	G-190234 (1)	F-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-21
FCV-1933B	G-190234 (1)	F-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-21
FCV-1934A	G-190234 (1)	D-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-23
FCV-1934B	G-190234 (1)	D-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-23

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FCV-1935A	G-190234 (1)	B-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-22
FCV-1935B	G-190234 (1)	B-7	A	Act	0.75	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-9
														FC	Q		OST-701-9
														TM (C)	Q		OST-701-9
														PI	Bi		OST-707-9
														LJ	App. J		OST-933-22
FCV-478	G-190197 (4)	G-3	B	Act	12	GL	AO	N	O	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FCV-479	G-190197 (4)	G-3	B	Act	4	GL	AO	N	O/C	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FCV-488	G-190197 (4)	F-3	B	Act	12	GL	AO	N	O	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FCV-489	G-190197 (4)	F-3	B	Act	4	GL	AO	N	O/C	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FCV-498	G-190197 (4)	E-3	B	Act	12	GL	AO	N	O	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FCV-499	G-190197 (4)	E-3	B	Act	4	GL	AO	N	O/C	C	C	N	Y	FS	CS	FW-VCS-1	OST-702-2
														FC	CS	FW-VCS-1	OST-702-2
														TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FCV-605	5379-1484 (1)	D-7	B	Pass	12	BF	AO	N	C	C	C	N	Y	PI	Bi		GP-007
FCV-626	5379-376 (3)	D-1	A	Act	3	GA	MO	N	O	C	AI	Y	Y	FS	CS	CC-VCS-3	OST-703-4
	GL 89-10, GL 96-05													TM (C)	CS	CC-VCS-3	OST-703-4
														PI	Bi		OST-703-4
														LJ	App. J		OST-933-9
FCV-6416	G-190197 (4)	D-4	B	Pass	6	GA	HYD	N	O	O	O	N	Y	FS AUG	Q		OST-202 OST-206
	Control Valve													FO	Q		OST-202 OST-206
														PI AUG	Bi		OST-206

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FO-182A	G-190204D (2)	E-6	C	Act	0.625	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted													RF	Q		OST-401-1 OST-409-1 OST-410
FO-182B	G-190204D (2)	E-4	C	Act	0.625	CK	SA	N	C	O/C	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted													RF	Q		OST-401-2 OST-409-2 OST-411
FO-183A	G-190204D (2)	D-5	C	Act	1	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-401-1 OST-409-1 OST-410
	AUG Skid mounted																
FO-183B	G-190204D (2)	D-3	C	Act	1	CK	SA	N	C	O	N/A	N	N	FF	Q		OST-401-2 OST-409-2 OST-411
	AUG Skid mounted																
FO-22A	G-190204D (2)	C-7	B	Act	2	GL	M	N	O	O/C	N/A	N	N	FS	Bi		OST-402-1
	AUG																
FO-22B	G-190204D (2)	C-8	B	Act	2	GL	M	N	O	O/C	N/A	N	N	FS	Bi		OST-402-2
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FO-32A	G-190204D (2) AUG Skid mounted	E-5	C	Act	0.5	RV	SA	N	C	O/C	N/A	N	N	FV	Q		OST-401-1 OST-409-1 OST-410
FO-32B	G-190204D (2) AUG Skid mounted	E-3	C	Act	0.5	RV	SA	N	C	O/C	N/A	N	N	FV	Q		OST-401-2 OST-409-2 OST-411
FO-33A	G-190204D (2) AUG Skid mounted	E-5	C	Act	0.625	CK	SA	N	C	C	N/A	N	N	RF	Q		OST-401-1 OST-409-1 OST-410
FO-33B	G-190204D (2) AUG Skid mounted	E-4	C	Act	0.625	CK	SA	N	C	C	N/A	N	N	RF	Q		OST-401-2 OST-409-2 OST-411
FP-248	HBR2-8255 (2) GL 89-10, GL 96-05	E-7	A	Act	4	GA	MO	N	O	C	AI	Y	Y	FS TM (C) PI LJ	Q Q Bi App. J		OST-701-10 OST-701-10 OST-707-10 EST-063
FP-249	HBR2-8255 (2) GL 89-10, GL 96-05	E-7	A	Act	4	GA	MO	N	O	C	AI	Y	Y	FS TM (C) PI LJ	Q Q Bi App. J		OST-701-10 OST-701-10 OST-707-10 EST-063

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FP-256	HBR2-8255 (2)	F-7	A	Act	4	GA	MO	N	O	C	AI	Y	Y	FS	Q		OST-701-10
	GL 89-10, GL 96-05													TM (C)	Q		OST-701-10
														PI	Bi		OST-707-10
														LJ	App. J		EST-063
FP-258	HBR2-8255 (2)	F-7	A	Act	4	GA	MO	N	O	C	AI	Y	Y	FS	Q		OST-701-10
	GL 89-10, GL 96-05													TM (C)	Q		OST-701-10
														PI	Bi		OST-707-10
														LJ	App. J		EST-063
FW-8A	G-190197 (4)	G-6	C	Act	16	SCK	SA	N	O	C	N/A	N	N	RF	R	FW-VRS-1	OST-928
														OV	R	FW-VRS-1	EST-152
FW-8B	G-190197 (4)	E-6	C	Act	16	SCK	SA	N	O	C	N/A	N	N	RF	R	FW-VRS-1	OST-928
														OV	R	FW-VRS-1	EST-152
FW-8C	G-190197 (4)	D-6	C	Act	16	SCK	SA	N	O	C	N/A	N	N	RF	R	FW-VRS-1	OST-928
														OV	R	FW-VRS-1	EST-152
FW-V2-6A	G-190197 (4)	G-2	B	Act	16	GA	MO	N	O	C	AI	N	Y	FS	CS	FW-VCS-1	OST-702-2
	GL 89-10, GL 96-05													TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2
FW-V2-6B	G-190197 (4)	F-2	B	Act	16	GA	MO	N	O	C	AI	N	Y	FS	CS	FW-VCS-1	OST-702-2
	GL 89-10, GL 96-05													TM (C)	CS	FW-VCS-1	OST-702-2
														PI	Bi		OST-702-2

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
FW-V2-6C	G-190197 (4)	E-2	B	Act	16	GA	MO	N	O	C	AI	N	Y	FS	CS	FW-VCS-1	OST-702-2
	GL 89-10, GL 96-05													TM (C)	CS	FW-VCS-1	OST-702-2
														PI	BI		OST-702-2
HCV-105	5379-685 (3)	C-5	B	Act	2	GL	AO	N	O/C	C	C	N	N	FC	Q		OST-108-2 OST-108-4
	Control Valve													FS	Q		OST-108-2 OST-108-4
HCV-110	5379-685 (3)	C-6	B	Act	2	GL	AO	N	O/C	C	C	N	N	FC	Q		OST-108-1 OST-108-3
	Control Valve													FS	Q		OST-108-1 OST-108-3
HCV-758	5379-1484 (1)	E-8	B	Pass	12	BF	AO	N	C	C	C	N	Y	PI	BI		GP-007
IA-297	G-190200 (5)	C-5	B	Act	2	GL	M	N	O	C	N/A	N	N	FS AUG	BI		OST-906
	AUG																
IA-3742	G-190200 (5)	C-4	C	Act	0.25	CK	SA	N	O	C	N/A	N	N	RF	CS	MS-VCS-1	EST-134
														OV	CS	MS-VCS-1	EST-134
IA-3743	G-190200 (5)	C-4	C	Act	0.25	CK	SA	N	O	C	N/A	N	N	RF	CS	MS-VCS-1	EST-134
														OV	CS	MS-VCS-1	EST-134

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IA-3744	G-190200 (5)	C-4	C	Act	0.25	CK	SA	N	O	C	N/A	N	N	RF	CS	MS-VCS-1	EST-134
														OV	CS	MS-VCS-1	EST-134
IA-423	HBR2-8606 (2)	F-4	B	Act	.75	GL	M	N	LC	O	N/A	N	N	FS AUG	Bi		OST-906
	AUG																
IA-525	G-190200 (2)	G-7	A/C	Act	2	CK	SA	N	O	C	N/A	Y	N	RF	R	IA-VRS-1	EST-062
														OV	R	IA-VRS-1	OST-703-7
														LJ	App. J		EST-062
IVSW-100A	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-19
IVSW-100B	G-190262 (1)	D-6	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-17
IVSW-100C	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-18
IVSW-11	G-190262 (1)	F-4	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-14	G-190262 (1) AUG	B-1	C	Act	0.375	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
IVSW-16	G-190262 (1) AUG	C-2	B	Act	0.5	GL	M	N	C	O	N/A	N	N	FS	Bi		OST-933-2
IVSW-16A	G-190262 (1) AUG	C-2	B	Act	0.5	GL	M	N	C	O	N/A	N	N	FS	Bi		OST-933-3
IVSW-16E	G-190262 (1) AUG	B-2	B	Act	0.5	GL	M	N	C	O	N/A	N	N	FS	Bi		OST-933-5
IVSW-16F	G-190262 (1) AUG	B-2	B	Act	0.5	GL	M	N	C	O	N/A	N	N	FS	Bi		OST-933-6
IVSW-23	G-190262 (1) AUG	B-4	C	Act	0.375	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
IVSW-27	G-190262 (1) AUG	B-7	C	Act	0.375	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-31	G-190262 (1) AUG	E-7	C	Act	0.375	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
IVSW-66A	G-190262 (1) AUG	F-2	C	Act	0.375	CK	SA	N	O	C	N/A	N	N	DA	R		OST-933-1
IVSW-66B	G-190262 (1) AUG	F-2	C	Act	0.375	CK	SA	N	O	C	N/A	N	N	RF	R		OST-933-1
IVSW-68A	G-190262 (1) AUG	F-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R		OST-933-1
IVSW-68B	G-190262 (1) AUG	F-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R		OST-933-1
IVSW-68C	G-190262 (1) AUG	F-3	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R		OST-933-1
IVSW-68D	G-190262 (1) AUG	F-3	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R		OST-933-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-71	G-190262 (1)	C-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-2
IVSW-72	G-190262 (1)	C-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-3
IVSW-74	G-190262 (1)	B-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-5
IVSW-75	G-190262 (1)	B-2	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-6
IVSW-76	G-190262 (1)	C-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-8
IVSW-77	G-190262 (1)	C-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-9
IVSW-78	G-190262 (1)	C-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-10

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-79	G-190262 (1)	C-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-11
IVSW-80	G-190262 (1)	B-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-12
IVSW-81	G-190262 (1)	B-4	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-13
IVSW-82	G-190262 (1)	E-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-14
IVSW-83	G-190262 (1)	E-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-15
IVSW-84	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-16
IVSW-85	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-19

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-86	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-17
IVSW-87	G-190262 (1)	D-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-18
IVSW-88	G-190262 (1)	C-7	C	Act	0.75	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-20
IVSW-89	G-190262 (1)	C-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-24
IVSW-90	G-190262 (1)	C-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-21
IVSW-91	G-190262 (1)	C-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-23
IVSW-92	G-190262 (1)	B-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-22

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
IVSW-93	G-190262 (1)	F-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-25
IVSW-94	G-190262 (1)	F-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-26
IVSW-95	G-190262 (1)	F-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-27
IVSW-96	G-190262 (1)	G-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-28
IVSW-97	G-190262 (1)	G-7	C	Act	0.375	CK	SA	N	C	O	N/A	N	N	FF	R	IST-RR-3	OST-933-29
IVSW-99	G-190262 (1) AUG	G-2	C	Act	.25	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
LCV-115B	5379-685 (2)	C-5	B	Act	4	BF	AO	N	C	O	C	N	Y	FS	Q		OST-102
														FC	Q		OST-102
														TM (O)	Q		OST-102
														PI	Bi		OST-111

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
LCV-115C	5379-685 (2)	D-5	A	Act	4	GA	MO	N	O	C	AI	N	Y	FS	R	CVC-VRS-1	OST-703-5
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	R	CVC-VRS-1	OST-703-5
														PI	Bi		OST-703-5
														LK	Bi		OST-109
MOV-350	5379-685 (2)	B-2	B	Act	2	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-102
	Full stroke exercise and stroke time measurement are augmented tests													TM (O)	Q		OST-102
														PI	Bi		OST-111
MS-261A	G-190196 (1)	C-4	C	Act	26	CK	SA	N	O	C	N/A	N	N	OV	App. II		DELETED EST-152 PM-314
														RF	App. II		DELETED PM-314
MS-261B	G-190196 (1)	E-4	C	Act	26	CK	SA	N	O	C	N/A	N	N	OV	App. II		DELETED EST-152 PM-314
														RF	App. II		DELETED PM-314
MS-261C	G-190196 (1)	G-4	C	Act	26	CK	SA	N	O	C	N/A	N	N	OV	App. II		DELETED EST-152 PM-314
														RF	App. II		DELETED PM-314
MS-262A	G-190196 (1)	C-5	B	Act	2	GA	M	N	LO	O/C	N/A	N	N	FS	Bi		OST-701-6

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
MS-262B	G-190196 (1)	E-5	B	Act	2	GA	M	N	LO	O/C	N/A	N	N	FS	Bi		OST-701-6
MS-262C	G-190196 (1)	G-5	B	Act	2	GA	M	N	LO	O/C	N/A	N	N	FS	Bi		OST-701-6
MS-263A	G-190196 (1)	C-5	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-142 OST-202 OST-206 PM-311
														RF	App. II		CM-142 PM-311
MS-263B	G-190196 (1)	D-5	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-142 OST-202 OST-206 PM-311
														RF	App. II		CM-142 PM-311
MS-263C	G-190196 (1)	F-5	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-142 OST-202 OST-206 PM-311
														RF	App. II		CM-142 PM-311
MS-353A	G-190196 (1)	C-4	B	Pass	2	GA	MO	N	C	C	AI	N	Y	PI	Bi		GP-002

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
MS-353B	G-190196 (1)	E-4	B	Pass	2	GA	MO	N	C	C	AI	N	Y	PI	Bi		GP-002
MS-353C	G-190196 (1)	F-4	B	Pass	2	GA	MO	N	C	C	AI	N	Y	PI	Bi		GP-002
MS-V1-3A	G-190196 (1)	C-4	B	Act	26	SCK	AO	N	O	C	C	N	Y	FS	CS	MS-VCS-2	OST-702-1
														FC	CS	MS-VCS-2	OST-702-1
														TM (C)	CS	MS-VCS-2	OST-702-1
														PI	Bi		OST-702-1
MS-V1-3B	G-190196 (1)	E-4	B	Act	26	SCK	AO	N	O	C	C	N	Y	FS	CS	MS-VCS-2	OST-702-1
														FC	CS	MS-VCS-2	OST-702-1
														TM (C)	CS	MS-VCS-2	OST-702-1
														PI	Bi		OST-702-1
MS-V1-3C	G-190196 (1)	G-4	B	Act	26	SCK	AO	N	O	C	C	N	Y	FS	CS	MS-VCS-2	OST-702-1
														FC	CS	MS-VCS-2	OST-702-1
														TM (C)	CS	MS-VCS-2	OST-702-1
														PI	Bi		OST-702-1
MS-V1-8A	G-190196 (1)	B-4	B	Act	2	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														PI	Bi		OST-206

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
MS-V1-8B	G-190196 (1)	D-4	B	Act	2	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														PI	Bi		OST-206
MS-V1-8C	G-190196 (1)	F-4	B	Act	2	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-202 OST-206
	GL 89-10, GL 96-05													TM (O)	Q		OST-202 OST-206
														PI	Bi		OST-206
OPP-10	G-190200 (9)	C-5	C	Act	0.5	CK	SA	N	O/C	C	N/A	N	N	RF	R		OST-930
	AUG													FF	R		OST-930
OPP-12	G-190200 (9)	C-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																
OPP-13	G-190200 (9)	D-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																
OPP-14	G-190200 (9)	C-4	C	Act	0.5	CK	SA	N	C	O	N/A	N	N	FF	R		OST-930
	AUG																
OPP-15	G-190200 (9)	D-4	C	Act	0.5	CK	SA	N	C	O	N/A	N	N	FF	R		OST-930
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
OPP-16	G-190200 (9) AUG	C-4	C	Act	0.5	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
OPP-17	G-190200 (9) AUG	D-4	C	Act	0.5	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
OPP-32	G-190200 (9) AUG	D-4	C	Act	0.25	RV	SA	N	C	O	N/A	N	N	FV	R		OP-006
OPP-33	G-190200 (9) AUG	D-5	C	Act	0.25	RV	SA	N	C	O	N/A	N	N	FV	R		OP-006
OPP-7	G-190200 (9) AUG	D-4	C	Act	0.75	CK	SA	N	O	C	N/A	N	N	RF	R		OST-930
OPP-8	G-190200 (9) AUG	C-4	C	Act	0.75	CK	SA	N	O	C	N/A	N	N	RF	R		OST-930
OPP-9	G-190200 (9) AUG	D-5	C	Act	0.5	CK	SA	N	O/C	C	N/A	N	N	RF FF	R R		OST-930 OST-930

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
PAS-1	HBR2-6490 (1)	C-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAS-2	HBR2-6490 (1)	B-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAS-3	HBR2-6490 (1)	D-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAS-4	HBR2-6490 (1)	C-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAS-5	HBR2-6490 (1)	E-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAS-6	HBR2-6490 (1)	D-6	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
														FS AUG	Bi		EST-046
PAV-31	HBR2-6933 (1)	D-7	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
PAV-32	HBR2-6933 (1) AUG	D-6	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-33	HBR2-6933 (1)	B-7	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-34	HBR2-6933 (1) AUG	B-6	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-35	HBR2-6933 (1)	D-7	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-36	HBR2-6933 (1) AUG	D-6	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-37	HBR2-6933 (1)	B-7	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
PAV-38	HBR2-6933 (1) AUG	B-6	B	Act	0.375	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
PCV-1716	G-190200 (2)	G-7	A	Act	2	GL	AO	N	O	C	C	Y	Y	FS	R	IA-VRS-1	OST-703-8
														FC	R	IA-VRS-1	OST-703-8
														TM (C)	R	IA-VRS-1	OST-703-8
														PI	Bi		OST-703-8
														LJ	App. J		EST-062
PCV-1922A	G-190262 (1)	E-5	B	Act	0.375	GA	AO	Y	C	O	O	N	Y	FS	CS		OST-703-6
	AUG													FO	CS		OST-703-6
														TM (O)	CS		OST-703-6
														PI	Bi		OST-703-6
PCV-1922B	G-190262 (1)	D-5	B	Act	0.375	GA	AO	Y	C	O	O	N	Y	FS	CS		OST-703-6
	AUG													FO	CS		OST-703-6
														TM (O)	CS		OST-703-6
														PI	Bi		OST-703-6
PCV-455C	5379-1971 (2)	F-2	B	Act	3	GL	AO	N	C	O/C	C	N	Y	FS	CS	RCS-VCS-1	OP-006 OST-930
	GL-90-06													FC	CS	RCS-VCS-1	OP-006 OST-930
														TM (O)	CS	RCS-VCS-1	OP-006 OST-930
														TM (C)	CS	RCS-VCS-1	OP-006 OST-930
														PI	Bi		OST-930
PCV-456	5379-1971 (2)	F-2	B	Act	3	GL	AO	N	C	O/C	C	N	Y	FS	CS	RCS-VCS-1	OP-006 OST-930
	GL-90-06													FC	CS	RCS-VCS-1	OP-006 OST-930
														TM (O)	CS	RCS-VCS-1	OP-006 OST-930
														TM (C)	CS	RCS-VCS-1	OP-006 OST-930
														PI	Bi		OST-930

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
PP-274D	G-190261 (2)	C-4	A	Pass	0.375	GL	M	N	C	C	N/A	Y	N	LJ	App. J		EST-138
PP-275D	G-190261 (2)	C-4	A	Pass	0.375	GL	M	N	C	C	N/A	Y	N	LJ	App. J		EST-138
PS-956A	5379-353 (1)	G-6	A	Pass	0.375	GL	AO	Y	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-11
PS-956B	5379-353 (1)	G-6	A	Pass	0.375	GL	AO	N	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-11
PS-956C	5379-353 (1)	F-6	A	Pass	0.375	GL	AO	N	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-12
PS-956D	5379-353 (1)	F-6	A	Pass	0.375	GL	AO	Y	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-12
PS-956E	5379-353 (1)	E-6	A	Pass	0.375	GL	AO	Y	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-13

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
PS-956F	5379-353 (1)	E-6	A	Pass	0.375	GL	AO	N	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-13
PS-956G	5379-353 (1)	E-6	A	Pass	0.375	GL	AO	Y	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-29
PS-956H	5379-353 (1)	E-6	A	Pass	0.375	GL	AO	N	C	C	C	Y	Y	PI	Bi		OST-707-1
														LJ	App. J		OST-933-29
PS-959	5379-353 (1)	D-7	B	Pass	0.375	GL	AO	N	C	C	C	N	Y	PI	Bi		OST-707-1
RC-516	5379-1971 (2)	G-8	A	Act	0.375	GL	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-5
														FC	Q		OST-701-5
														TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
														LJ	App. J		OST-933-14
RC-518	5379-1971 (2)	F-7	A/C	Act	0.75	CK	SA	N	C	C	N/A	Y	N	OV	App. II		CM-143 PM-312
														LJ	App. J		EST-060
														RF	App. II		EST-060

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RC-519A	5379-1971 (2)	F-8	A	Act	3	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-5
														FC	Q		OST-701-5
														TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
														LJ	App. J		OST-933-15
RC-519B	5379-1971 (2)	F-8	A	Act	3	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-5
														FC	Q		OST-701-5
														TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
														LJ	App. J		OST-933-15
RC-535	5379-1971 (2)	F-2	B	Act	3	GA	MO	N	O	C	AI	N	Y	FS	Q		OST-701-5
	GL 89-10, GL 96-05													TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
RC-536	5379-1971 (2)	F-2	B	Act	3	GA	MO	N	O	C	AI	N	Y	FS	Q		OST-701-5
	GL 89-10, GL 96-05													TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
RC-550	5379-1971 (2)	F-7	A	Act	0.75	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-5
														FC	Q		OST-701-5
														TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
														LJ	App. J		EST-060
RC-551A	5379-1971 (2)	G-2	C	Act	4	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-027

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RC-551B	5379-1971 (2)	G-3	C	Act	4	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-027
RC-551C	5379-1971 (2)	G-4	C	Act	4	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-027
RC-553	5379-1971 (2)	G-8	A	Act	0.375	GL	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-5
														FC	Q		OST-701-5
														TM (C)	Q		OST-701-5
														PI	Bi		OST-707-5
														LJ	App. J		OST-933-14
RC-567	5379-1971 (1)	D-3	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3
RC-568	5379-1971 (1)	C-3	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3
RC-569	5379-1971 (1)	C-3	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RC-570	5379-1971 (1)	C-3	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3
RC-571	5379-1971 (1)	D-2	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3
RC-572	5379-1971 (1)	D-1	B	Act	1	GL	SO	Y	C	O	C	N	Y	FS	CS	RCS-VCS-2	OST-703-3
														PI	Bi		GP-001
														TM (O)	CS	RCS-VCS-2	OST-703-3
														FC	CS	RCS-VCS-2	OST-703-3
RHR-706	5379-1484 (1)	B-8	C	Act	2	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-112
RHR-743	5379-1484 (1)	C-7	B	Act	2	GL	M	N	LC	C	N/A	N	N	FS	Bi		OST-253
RHR-744A	5379-1484 (1)	B-8	B	Act	10	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-1
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-1
														PI	Bi		OST-258-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RHR-744B	5379-1484 (1)	B-8	B	Act	10	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-2
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-2
														PI	Bi		OST-258-2
RHR-750	5379-1484 (1)	B-2	B	Act	14	GA	MO	N	C	O/C	AI	N	Y	FS	R	RHR-VRS-1	OST-257
	GL 89-10, GL 96-05													TM (O)	R	RHR-VRS-1	OST-257
														TM (C)	R	RHR-VRS-1	OST-257
														PI	Bi		OST-257
RHR-751	5379-1484 (1)	B-2	B	Act	14	GA	MO	N	C	O/C	AI	N	Y	FS	R	RHR-VRS-1	OST-257
	GL 89-10, GL 96-05													TM (O)	R	RHR-VRS-1	OST-257
														TM (C)	R	RHR-VRS-1	OST-257
														PI	Bi		OST-257
RHR-752A	5379-1484 (1)	D-3	B	Act	14	GA	MO	N	O	O/C	AI	N	Y	FS	Q		OST-252-1
	GL 89-10, GL 96-05													TM (C)	Q		OST-252-1
														PI	Bi		OST-258-1
RHR-752B	5379-1484 (1)	F-3	B	Act	14	GA	MO	N	O	O/C	AI	N	Y	FS	Q		OST-252-2
	GL 89-10, GL 96-05													TM (C)	Q		OST-252-2
														PI	Bi		OST-258-2
RHR-753A	5379-1484 (1)	D-5	C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-130 OST-253 PM-300
														RF	App. II		CM-130 OST-253 PM-300

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RHR-753B	5379-1484 (1)	F-5	C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-130 OST-253 PM-300
														RF	App. II		CM-130 OST-253 PM-300
RHR-757C	5379-1484 (1)	E-5	B	Act	10	GA	M	N	LC	C	N/A	N	N	FS	Bi		OST-253
RHR-757D	5379-1484 (1)	F-5	B	Act	10	GA	M	N	LC	C	N/A	N	N	FS	Bi		OST-253
RHR-759A	5379-1484 (1)	D-7	B	Act	10	GA	MO	N	O	O/C	AI	N	Y	FS	Q		OST-252-1
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-1
														TM (C)	Q		OST-252-1
														PI	Bi		OST-258-1
RHR-759B	5379-1484 (1)	F-7	B	Act	10	GA	MO	N	O	O/C	AI	N	Y	FS	Q		OST-252-2
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-2
														TM (C)	Q		OST-252-2
														PI	Bi		OST-258-2
RHR-760	5379-1484 (1)	E-7	B	Act	2	GL	M	N	LC	C	N/A	N	N	FS	Bi		OST-253

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RHR-782	5379-1484 (1)	D-7	C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-253 PM-129
														RF	App. II		OST-251-2 OST-253 PM-129
RHR-783	5379-1484 (1)	F-7	C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-253 PM-129
														RF	App. II		OST-251-1 OST-253 PM-129
RMS-1	G-190304 (1)	C-2	A	Act	1	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-11
														FC	Q		OST-701-11
														TM (C)	Q		OST-701-11
														PI	Bi		OST-707-11
														LJ	App. J		EST-137-3
RMS-2	G-190304 (1)	C-2	A	Act	1	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-11
														FC	Q		OST-701-11
														TM (C)	Q		OST-701-11
														PI	Bi		OST-707-11
														LJ	App. J		EST-137-3
RMS-3	G-190304 (1)	C-2	A	Act	1	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-11
														FC	Q		OST-701-11
														TM (C)	Q		OST-701-11
														PI	Bi		OST-707-11
														LJ	App. J		EST-137-2

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
RMS-4	G-190304 (1)	C-2	A	Act	1	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-701-11
														FC	Q		OST-701-11
														TM (C)	Q		OST-701-11
														PI	Bi		OST-707-11
														LJ	App. J		EST-137-2
RV1-1	G-190196 (1)	C-6	B	Pass	8	GL	AO	N	C	C	C	N	Y	FS AUG	CS		OST-702-5
														FC AUG	CS		OST-702-5
														PI	Bi		OST-702-5
RV1-2	G-190196 (1)	E-6	B	Pass	8	GL	AO	N	C	C	C	N	Y	FS AUG	CS		OST-702-5
														FC AUG	CS		OST-702-5
														PI	Bi		OST-702-5
RV1-3	G-190196 (1)	G-6	B	Pass	8	GL	AO	N	C	C	C	N	Y	FS AUG	CS		OST-702-5
														FC AUG	CS		OST-702-5
														PI	Bi		OST-702-5
SA-42	G-190200 (3) AUG	D-5	B	Act	2	DA	M	N	LC	O	N/A	N	N	FS	Bi		OST-703-7
SA-43	G-190200 (3)	D-5	A	Act	2	DA	M	N	LC	O/C	N/A	Y	N	FS	Bi		OST-703-7
														LJ	App. J		EST-137-4
SA-44	G-190200 (3)	D-5	A	Act	2	DA	M	N	LC	O/C	N/A	Y	N	FS	Bi		OST-703-7
														LJ	App. J		EST-137-4

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SA-80	G-190200 (3) AUG	D-5	C	Act	2	CK	SA	N	C	O	N/A	N	N	OV	Bi		OST-703-7
SDN-13	HBR2-8606 (2) AUG	F-3	B	Act	0.5	GL	M	N	C	O	N/A	Y	N	FS AUG	Bi		OST-906
SDN-28	HBR2-8606 (2) AUG	F-4	B	Act	1	GL	M	N	LC	O	N/A	N	N	FS AUG	Bi		OST-906
SDN-29	HBR2-8606 (2) AUG	F-4	B	Pass	.75	GL	M	N	LO	C	N/A	N	N	FS AUG	Bi		OST-906
SI-844A	5379-1082 (3)	C-2	B	Pass	8	GA	MO	N	O	O	AI	N	Y	PI	Bi		OST-352-3
SI-844B	5379-1082 (3)	E-2	B	Pass	8	GA	MO	N	O	O	AI	N	Y	PI	Bi		OST-352-4
SI-845A	5379-1082 (3) GL 89-10, GL 96-05	F-6	B	Act	2	GL	MO	N	C	O	AI	N	Y	FS TM (O) PI	CS CS Bi	SI-VCS-1 SI-VCS-1	OST-703-1 OST-703-1 OST-703-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-845B	5379-1082 (3) GL 89-10, GL 96-05	E-6	B	Act	2	GL	MO	N	C	O	AI	N	Y	FS TM (O) PI	CS CS Bi	SI-VCS-1 SI-VCS-1	OST-703-1 OST-703-1 OST-703-1
SI-845C	5379-1082 (3) AUG GL 89-10, GL 96-05	F-6	B	Pass	2	GL	MO	N	O	O	AI	N	Y	PI	Bi		OST-703-1
SI-851A	5379-1082 (5)	E-5	B	Act	1	GL	AO	N	C	C	C	N	Y	FS FC TM (C) PI	CS CS CS Bi	SI-VCS-6 SI-VCS-6 SI-VCS-6	OST-703-1 OST-703-1 OST-703-1 OST-703-1
SI-851B	5379-1082 (5)	D-5	B	Act	1	GL	AO	Y	C	C	C	N	Y	FS FC TM (C) PI	CS CS CS Bi	SI-VCS-6 SI-VCS-6 SI-VCS-6	OST-703-1 OST-703-1 OST-703-1 OST-703-1
SI-851C	5379-1082 (5)	B-5	B	Act	1	GL	AO	Y	C	C	C	N	Y	FS FC TM (C) PI	CS CS CS Bi	SI-VCS-6 SI-VCS-6 SI-VCS-6	OST-703-1 OST-703-1 OST-703-1 OST-703-1
SI-853A	5379-1082 (5)	G-6	B	Pass	1	GL	AO	N	C	C	C	N	Y	PI	Bi		OST-703-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-853B	5379-1082 (5)	E-6	B	Pass	1	GL	AO	N	C	C	C	N	Y	PI	Bi		OST-703-1
SI-853C	5379-1082 (5)	C-6	B	Pass	1	GL	AO	N	C	C	C	N	Y	PI	Bi		OST-703-1
SI-855	5379-1082 (5)	F-3	A	Act	1	GL	AO	N	O	C	C	Y	Y	FS	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														FC	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														TM (C)	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														PI	Bi		OST-151-4 OST-151-5
														LJ	App. J		EST-059
SI-856A	5379-1082 (2)	E-3	A	Act	2	GL	AO	N	O	O/C	O	N	Y	FS	CS	SI-VCS-5	OST-703-1
	IN 91-056													FO	CS	SI-VCS-5	OST-703-1
														TM (O)	CS	SI-VCS-5	OST-703-1
														TM (C)	CS	SI-VCS-5	OST-703-1
														PI	Bi		OST-703-1
														LK	Bi		EST-140
SI-856B	5379-1082 (2)	E-3	A	Act	2	GL	AO	N	O	O/C	O	N	Y	FS	CS	SI-VCS-5	OST-703-1
	IN 91-056													FO	CS	SI-VCS-5	OST-703-1
														TM (O)	CS	SI-VCS-5	OST-703-1
														TM (C)	CS	SI-VCS-5	OST-703-1
														PI	Bi		OST-703-1
														LK	Bi		EST-140

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-857A	5379-1082 (1)	F-7	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-857B	5379-1082 (4)	E-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-858A	5379-1082 (5)	F-6	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-858B	5379-1082 (5)	E-6	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-858C	5379-1082 (5)	C-6	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-859	5379-1082 (4)	F-8	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-860A	5379-1082 (5)	C-2	B	Act	14	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-1
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-1
														TM (C)	Q		OST-252-1
														PI	Bi		OST-258-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-860B	5379-1082 (5)	B-2	B	Act	14	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-252-2
	GL 89-10, GL 96-05													TM (O)	Q		OST-252-2
														TM (C)	Q		OST-252-2
														PI	Bi		OST-258-2
SI-861A	5379-1082 (5)	C-2	B	Act	14	GA	MO	N	C	O	AI	N	Y	FS	CS	SI-VCS-7	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-7	OST-703-2
														TM (C)	CS	SI-VCS-7	OST-703-2
														PI	Bi		OST-703-2
SI-861B	5379-1082 (5)	B-2	B	Act	14	GA	MO	N	C	O	AI	N	Y	FS	CS	SI-VCS-7	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-7	OST-703-2
														TM (C)	CS	SI-VCS-7	OST-703-2
														PI	Bi		OST-703-2
SI-862A	5379-1082 (2)	C-3	B	Act	14	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-2	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-2	OST-703-2
														TM (C)	CS	SI-VCS-2	OST-703-2
														PI	Bi		OST-703-2
SI-862B	5379-1082 (2)	C-3	B	Act	14	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-2	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-2	OST-703-2
														TM (C)	CS	SI-VCS-2	OST-703-2
														PI	Bi		OST-703-2
SI-863A	5379-1082 (2)	C-3	B	Act	8	GA	MO	N	LC	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-3	OST-703-2
														TM (C)	CS	SI-VCS-3	OST-703-2
														PI	Bi		OST-703-2

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-863B	5379-1082 (2)	C-3	B	Act	8	GA	MO	N	LC	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-2
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-3	OST-703-2
														TM (C)	CS	SI-VCS-3	OST-703-2
														PI	Bi		OST-703-2
SI-864A	5379-1082 (2)	E-4	A	Act	16	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-2	OST-703-1
	IN 91-56 GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-2	OST-703-1
														TM (C)	CS	SI-VCS-2	OST-703-1
														PI	Bi		OST-703-1
														LK	Bi		EST-140
SI-864B	5379-1082 (2)	E-4	A	Act	16	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-2	OST-703-1
	IN 91-56 GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-2	OST-703-1
														TM (C)	CS	SI-VCS-2	OST-703-1
														PI	Bi		OST-703-1
														LK	Bi		EST-140
SI-865A	5379-1082 (4)	F-2	B	Act	10	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-161
	Full stroke exercise and stroke time measurement are augmented tests													TM (O)	CS	SI-VCS-3	OST-161
														TM (C)	CS	SI-VCS-3	OST-161
														PI	Bi		OST-161
SI-865B	5379-1082 (4)	D-2	B	Act	10	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-161
	Full stroke exercise and stroke time measurement are augmented tests													TM (O)	CS	SI-VCS-3	OST-161
														TM (C)	CS	SI-VCS-3	OST-161
														PI	Bi		OST-161

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-865C	5379-1082 (4)	C-2	B	Act	10	GA	MO	N	O	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-161
	Full stroke exercise and stroke time measurement are augmented tests													TM (O)	CS	SI-VCS-3	OST-161
														TM (C)	CS	SI-VCS-3	OST-161
														PI	Bi		OST-161
SI-866A	5379-1082 (4)	D-7	B	Act	2	GL	MO	N	C	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-1
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-3	OST-703-1
														TM (C)	CS	SI-VCS-3	OST-703-1
														PI	Bi		OST-703-1
SI-866B	5379-1082 (4)	D-7	B	Act	2	GL	MO	N	C	O/C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-1
	GL 89-10, GL 96-05													TM (O)	CS	SI-VCS-3	OST-703-1
														TM (C)	CS	SI-VCS-3	OST-703-1
														PI	Bi		OST-703-1
SI-867A	5379-1082 (1)	D-3	B	Pass	4	GA	MO	N	O	O	AI	N	Y	PI	Bi		OST-151-4 OST-151-5
SI-867B	5379-1082 (1)	C-3	B	Pass	4	GA	MO	N	O	O	AI	N	Y	PI	Bi		OST-151-5 OST-151-6
SI-868A	5379-1082 (1)	B-7	B	Pass	2	GA	M	N	O	O	AI	N	N	FS	Bi		OST-160
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-868B	5379-1082 (1) AUG	B-7	B	Pass	2	GA	M	N	O	O	AI	N	N	FS	Bi		OST-160
SI-868C	5379-1082 (1) AUG	B-7	B	Pass	2	GA	M	N	O	O	AI	N	N	FS	Bi		OST-160
SI-869	5379-1082 (1)	F-8	B	Act	3	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
	GL 89-10, GL 96-05													TM (O)	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														TM (C)	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														PI	Bi		OST-151-4 OST-151-5
SI-870A	5379-1082 (1)	D-8	B	Act	3	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
	GL 89-10, GL 96-05													TM (O)	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														TM (C)	Q		OST-151-1 OST-151-2 OST-151-4 OST-151-5
														PI	Bi		OST-151-4 OST-151-5

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-870B	5379-1082 (1)	D-7	B	Act	3	GA	MO	N	C	O/C	AI	N	Y	FS	Q		OST-151-2 OST-151-3 OST-151-5 OST-151-6
	GL 89-10, GL 96-05													TM (O)	Q		OST-151-2 OST-151-3 OST-151-5 OST-151-6
														TM (C)	Q		OST-151-2 OST-151-3 OST-151-5 OST-151-6
														PI	Bi		OST-151-5 OST-151-6
SI-871	5379-1082 (3)	E-2	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-872	5379-1082 (3)	G-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SI-873A	5379-1082 (4)	C-6	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-3	OST-154
	SI-873A and SI-873D are tested as a unit (ISTC 4.5.7)													LK	Bi		OST-160
														RF	R	SI-VRS-3	OST-160
SI-873B	5379-1082 (4)	C-6	C	Act	2	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-143 OST-154 PM-312
														CV	App. II		CM-143 OST-167-1 PM-312

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-873C	5379-1082 (4)	C-5	C	Act	2	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-143 OST-154 PM-312
														CV	App. II		CM-143 OST-167-2 PM-312
SI-873D	5379-1082 (4)	B-6	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-3	OST-154
	SI-873A and SI-873D are tested as a unit (ISTC 4.5.7)													LK	Bi		OST-160
														RF	R	SI-VRS-3	OST-160
SI-873E	5379-1082 (4)	B-6	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-3	OST-154
														LK	Bi		OST-160
														RF	R	SI-VRS-3	OST-160
SI-873F	5379-1082 (4)	C-5	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-3	OST-154
														LK	Bi		OST-160
														RF	R	SI-VRS-3	OST-160
SI-874A	5379-1082 (4)	C-7	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-143 OST-154 PM-312
														LK	Bi		OST-160
														RF	App. II		CM-143 OST-160 PM-312

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-874B	5379-1082 (4)	C-7	A/C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-143 OST-154 PM-312
														LK	Bi		OST-160
														RF	App. II		CM-143 OST-160 PM-312
SI-875A	5379-1082 (4)	B-6	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-875B	5379-1082 (4)	B-7	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-875C	5379-1082 (4)	A-7	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-875D	5379-1082 (4)	F-3	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-161 PM-306
														LK	App. II		OST-160
														RF	App. II		OST-160

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-875E	5379-1082 (4)	D-3	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-161 PM-306
														LK	App. II		OST-160
														RF	App. II		OST-160
SI-875F	5379-1082 (4)	C-3	A/C	Act	10	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		EST-096 OST-161 PM-306
														LK	App. II		OST-160
														RF	App. II		OST-160
SI-876A	5379-1082 (4)	F-3	A/C	Act	8	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-876B	5379-1082 (4)	D-4	A/C	Act	8	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-876C	5379-1082 (4)	C-3	A/C	Act	8	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		OST-253 PM-306
														LK	Bi		OST-160
														RF	App. II		OST-160
SI-878A	5379-1082 (2)	D-7	B	Act	4	GA	MO	N	O	C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	CS	SI-VCS-3	OST-703-1
														PI	Bi		OST-703-1

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-878B	5379-1082 (2)	E-7	B	Act	4	GA	MO	N	O	C	AI	N	Y	FS	CS	SI-VCS-3	OST-703-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	CS	SI-VCS-3	OST-703-1
														PI	Bi		OST-703-1
SI-879A	5379-1082 (2)	D-7	C	Act	3	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-2	OST-151-4
														RF	R	SI-VRS-2	OST-151-2 OST-151-3 OST-151-5 OST-151-6
SI-879B	5379-1082 (2)	E-7	C	Act	3	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-2	OST-151-5
														RF	R	SI-VRS-2	OST-151-1 OST-151-3 OST-151-4 OST-151-6
SI-879C	5379-1082 (2)	F-7	C	Act	3	CK	SA	N	C	O/C	N/A	N	N	FF	R	SI-VRS-2	OST-151-6
														RF	R	SI-VRS-2	OST-151-1 OST-151-2 OST-151-4 OST-151-5
SI-880A	5379-1082 (3)	C-5	B	Act	6	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-352-1 OST-352-3
	GL 89-10, GL 96-05													TM (O)	Q		OST-352-1 OST-352-3
														PI	Bi		OST-352-3
SI-880B	5379-1082 (3)	C-5	B	Act	6	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-352-1 OST-352-3
	GL 89-10, GL 96-05													TM (O)	Q		OST-352-1 OST-352-3
														PI	Bi		OST-352-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-880C	5379-1082 (3)	E-5	B	Act	6	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-352-2 OST-352-4
	GL 89-10, GL 96-05													TM (O)	Q		OST-352-2 OST-352-4
														PI	Bi		OST-352-4
SI-880D	5379-1082 (3)	E-5	B	Act	6	GA	MO	N	C	O	AI	N	Y	FS	Q		OST-352-2 OST-352-4
	GL 89-10, GL 96-05													TM (O)	Q		OST-352-2 OST-352-4
														PI	Bi		OST-352-4
SI-889A	5379-1082 (3)	D-3	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	CS	SI-VCS-4	OST-357
														RF	CS	SI-VCS-4	OST-357
SI-889B	5379-1082 (3)	D-3	C	Act	2	CK	SA	N	C	O/C	N/A	N	N	FF	CS	SI-VCS-4	OST-357
														RF	CS	SI-VCS-4	OST-357
SI-890A	5379-1082 (3)	C-5	A/C	Act	6	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-130 OST-357 PM-300
														LK	Bi		OST-357
														RF	App. II		OST-357
SI-890B	5379-1082 (3)	E-6	A/C	Act	6	CK	SA	N	C	O/C	N/A	N	N	FF	App. II		CM-130 OST-357 PM-300
														LK	Bi		OST-357
														RF	App. II		OST-357

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-891A	5379-1082 (3)	C-8	A	Act	6	GA	M	N	LO	O/C	N/A	Y	N	FS	Bi		OST-357
														LJ	App. J		OST-933-5
SI-891B	5379-1082 (3)	E-8	A	Act	6	GA	M	N	LO	O/C	N/A	Y	N	FS	Bi		OST-357
														LJ	App. J		OST-933-6
SI-893A	5379-1082 (2)	D-6	C	Act	0.75	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-143 OST-151-1 OST-151-4 PM-312
														CV	App. II		OST-151-2 OST-151-3 OST-151-5 OST-151-6
SI-893B	5379-1082 (2)	E-6	C	Act	0.75	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-143 OST-151-2 OST-151-5 PM-312
														CV	App. II		OST-151-1 OST-151-3 OST-151-4 OST-151-6
SI-893C	5379-1082 (2)	G-6	C	Act	0.75	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-143 OST-151-3 OST-151-6 PM-312
														CV	App. II		OST-151-1 OST-151-2 OST-151-4 OST-151-5

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-895V	5379-1082 (1)	G-7	A	Pass	0.75	GL	M	N	LC	C	N/A	Y	N	FS AUG	Bi		OST-933-28
														LJ	App. J		OST-933-28
SI-898F	5379-1082 (1)	G-7	A	Pass	0.75	GL	M	N	LC	C	N/A	Y	N	FS AUG	Bi		OST-933-28
														LJ	App. J		OST-933-28
SI-899D	5379-1082 (3)	G-7	C	Act	0.75	VB	SA	N	C	O	N/A	N	N	RL	App. I		EST-068
SI-899E	5379-1082 (3)	G-7	C	Act	0.75	VB	SA	N	C	O	N/A	N	N	RL	App. I		EST-068
SI-909	5379-1082 (5)	F-3	A/C	Act	1	CK	SA	N	C	C	N/A	Y	N	LJ	App. J		EST-059
														OV	R	SI-VRS-1	EST-152
														RF	R	SI-VRS-1	EST-059
SI-915	5379-1082 (2) AUG	D-1	B	Pass	4	GL	M	N	LO	O	N/A	N	N	FS AUG	Bi		OST-253
SI-916	5379-1082 (2) AUG	C-1	B	Pass	4	GL	M	N	LO	O	N/A	N	N	FS AUG	Bi		OST-253

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SI-925	5379-1082 (3)	B-3	A	Pass	4	GA	M	N	LC	C	N/A	N	N	LK	Bi		EST-140
SI-928	5379-1082 (3)	F-3	A	Pass	4	GA	M	N	LC	C	N/A	N	N	LK	Bi		EST-140
SI-932	5379-1082 (2)	C-7	A	Pass	2	GA	M	N	LC	C	N/A	N	N	LK	Bi		EST-140
SI-935	5379-1082 (2)	D-7	A	Pass	2	GA	M	N	LC	C	N/A	N	N	LK	Bi		EST-140
SI-938	5379-1082 (2)	F-7	A	Pass	2	GA	M	N	LC	C	N/A	N	N	LK	Bi		EST-140
SV1-1A	G-190196 (1)	C-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-1B	G-190196 (1)	E-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SV1-1C	G-190196 (1)	G-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-2A	G-190196 (1)	C-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-2B	G-190196 (1)	E-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-2C	G-190196 (1)	G-6	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-3A	G-190196 (1)	C-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-3B	G-190196 (1)	E-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-3C	G-190196 (1)	G-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SV1-4A	G-190196 (1)	C-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-4B	G-190196 (1)	E-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SV1-4C	G-190196 (1)	G-5	C	Act	6	RV	SA	N	C	O/C	N/A	N	N	RL	App. I		EST-028
SW-118	G-190199 (10)	C-4	B	Act	6	GA	M	N	LC	O	N/A	N	N	FS	Bi		OST-701-6
SW-18	G-190199 (9)	D-7	B	Act	24	BF	M	N	O	O/C	N/A	N	N	FS	Bi		OST-701-6
SW-19	G-190199 (9)	E-7	B	Act	24	BF	M	N	O	O/C	N/A	N	N	FS	Bi		OST-701-6
SW-200	G-190199 (7) AUG	D-3	B	Act	1	GL	M	N	LC	O	N/A	N	N	FS	Bi		OST-701-6

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SW-202	G-190199 (7) AUG	D-3	B	Act	1	GL	M	N	C	O	N/A	N	N	FS	Bi		OST-701-6
SW-261	G-190199 (10)	F-2	C	Act	1	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-146 OST-202 PM-317
														CV	App. II		CM-146 PM-317
SW-272	G-190199 (10)	E-1	C	Act	1	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-131 OST-202 PM-322
														CV	App. II		CM-131 PM-322
SW-374	G-190199 (2)	C-8	C	Act	18	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-302-1 OST-302-3
														RF	Q		OST-302-1 OST-302-3
SW-375	G-190199 (2)	C-6	C	Act	18	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-302-2 OST-302-4
														RF	Q		OST-302-2 OST-302-4
SW-376	G-190199 (2)	C-7	C	Act	18	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-302-1 OST-302-3
														RF	Q		OST-302-1 OST-302-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SW-377	G-190199 (2)	C-6	C	Act	18	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-302-2 OST-302-4
														RF	Q		OST-302-2 OST-302-4
SW-541	G-190199 (9)	G-5	C	Act	30	CK	SA	N	O	O/C	N/A	N	N	FF	Q		OST-302-2 OST-302-4
														RF	Q		OST-302-2 OST-302-4
SW-545	G-190199 (10)	B-3	C	Act	30	CK	SA	N	O	O/C	N/A	N	N	FF	Q		OST-302-1 OST-302-3
														RF	Q		OST-302-1 OST-302-3
SW-546	G-190199 (4)	F-3	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SW-547	G-190199 (5)	E-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SW-548	G-190199 (5)	D-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
SW-549	G-190199 (5)	C-6	C	Act	0.75	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SW-559	G-190199 (7)	D-3	C	Act	1	CK	SA	N	C	O	N/A	N	N	FF	App. II		CM-131 PM-322
	AUG													CV	App. II		CM-131 PM-322
SW-560	G-190199 (7)	F-5	C	Act	12	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-303-2 OST-303-4
														RF	Q		OST-303-1 OST-303-3
SW-561	G-190199 (7)	E-5	C	Act	12	CK	SA	N	O/C	O/C	N/A	N	N	FF	Q		OST-303-1 OST-303-3
														RF	Q		OST-303-2 OST-303-4
SW-562	G-190199 (9)	D-6	C	Act	1	CK	SA	N	O/C	O	N/A	N	N	FF	Q		OST-201-1 OST-207
	AUG																
SW-563	G-190199 (9)	E-6	C	Act	1	CK	SA	N	O/C	O	N/A	N	N	FF	Q		OST-201-2 OST-207
	AUG																
SW-83	G-190199 (6)	G-6	B	Pass	6	GA	M	N	C	C	N/A	N	N	FS	Bi		OST-410
	AUG																
SW-837	G-190199 (2)	F-6	C	Act	0.5	CK	SA	N	C	C	N/A	N	N	RF	App. II		OST-305
														OV	App. II		PMID 16360

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SW-843	G-190199 (2)	F-6	C	Act	0.5	CK	SA	N	C	C	N/A	N	N	RF	App. II		OST-305
														OV	App. II		PMID 16361
SW-849	G-190199 (2)	F-7	C	Act	0.5	CK	SA	N	C	C	N/A	N	N	RF	App. II		OST-305
														OV	App. II		PMID 16362
SW-855	G-190199 (2)	F-7	C	Act	0.5	CK	SA	N	C	C	N/A	N	N	RF	App. II		OST-305
														OV	App. II		PMID 16363
SW-906	G-190199 (5)	B-2	B	Act	3	GA	M	N	O	O/C	N/A	N	N	FS	BI		OST-927-2
SW-907	G-190199 (5)	B-4	B	Act	2	GA	M	N	O	O/C	N/A	N	N	FS	BI		OST-927-1
SW-911	G-190199 (10)	F-6	C	Act	2	CK	SA	N	O	C	N/A	N	N	RF	App. II		CM-143 OST-927-2 PM-312
														OV	App. II		CM-143 EST-153 PM-312
SW-924	G-190199 (10)	F-7	C	Act	2	CK	SA	N	O	C	N/A	N	N	RF	App. II		CM-143 OST-927-1 PM-312
														OV	App. II		CM-143 EST-153 PM-312

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
SW-931	G-190199 (7)	E-5	C	Act	0.5	CK	SA	N	O	C	N/A	N	N	RF	App. II		CM-131 OST-303-2 OST-303-4 PM-322
	AUG													OV	App. II		CM-131 PM-322
SW-932	G-190199 (7)	F-5	C	Act	0.5	CK	SA	N	O	C	N/A	N	N	RF	App. II		CM-131 OST-303-1 OST-303-3 PM-322
	AUG													OV	App. II		CM-131 PM-322
SW-933	G-190199 (7)	D-4	C	Act	1	CK	SA	N	C	C	N/A	N	N	RF	App. II		CM-131 PM-322
	AUG													OV	App. II		CM-131 PM-322
SW-949	G-190199 (7)	E-4	C	Act	6	CK	SA	N	O/C	C	N/A	N	N	RF	Q		SPP-038
	System normally out of service													OV	Q		SPP-038
SW-950	G-190199 (7)	E-4	C	Act	6	CK	SA	N	O/C	C	N/A	N	N	RF	Q		SPP-038
	System normally out of service													OV	Q		SPP-038
SW-969	G-190199 (12)	A-5	B	Act	16	BF	M	N	LO	C	N/A	N	N	FS AUG	Bi		OST-702-4
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
TCV-1660	G-190199 (6)	C-1	B	Act	4	GL	AO	N	C	O	O	N	N	FS	Q		OST-401-1 OST-409-1 OST-410
														FO	Q		OST-401-1 OST-409-1 OST-410
														TM (O)	Q		OST-401-1 OST-409-1 OST-410
TCV-1661	G-190199 (6)	C-5	B	Act	4	GL	AO	N	C	O	O	N	N	FS	Q		OST-401-2 OST-409-2 OST-411
														FO	Q		OST-401-2 OST-409-2 OST-411
														TM (O)	Q		OST-401-2 OST-409-2 OST-411
TCV-1903A	G-190199 (9)	C-5	B	Act	1	GL	AO	Y	C	O	O	N	Y	FS	Q		OST-201-1 OST-207
														FO	Q		OST-201-1 OST-207
														TM (O)	Q		OST-201-1 OST-207
														PI	Bi		OST-207
TCV-1903B	G-190199 (9)	F-5	B	Act	1	GL	AO	Y	C	O	O	N	Y	FS	Q		OST-201-2 OST-207
														FO	Q		OST-201-2 OST-207
														TM (O)	Q		OST-201-2 OST-207
														PI	Bi		OST-207

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V12-10	G-190304 (1)	D-2	A	Act	6	BF	AO	Y	O/C	C	C	Y	Y	FS	Q		OST-701-8
														FC	Q		OST-701-8
														TM (C)	Q		OST-701-8
														PI	Bi		OST-707-8
														LJ	App. J		EST-137-6
V12-11	G-190304 (1)	D-3	A	Act	6	BF	AO	Y	O/C	C	C	Y	Y	FS	Q		OST-701-8
														FC	Q		OST-701-8
														TM (C)	Q		OST-701-8
														PI	Bi		OST-707-8
														LJ	App. J		EST-137-6
V12-12	G-190304 (1)	C-6	A	Act	6	BF	AO	Y	O/C	C	C	Y	Y	FS	CS	HVA-VCS-1	OST-703-9
														FC	CS	HVA-VCS-1	OST-703-9
														TM (C)	CS	HVA-VCS-1	OST-703-9
														PI	Bi		OST-703-9
														LJ	App. J		EST-135-2
V12-13	G-190304 (1)	C-6	A	Act	6	BF	AO	Y	O/C	C	C	Y	Y	FS	CS	HVA-VCS-1	OST-703-9
														FC	CS	HVA-VCS-1	OST-703-9
														TM (C)	CS	HVA-VCS-1	OST-703-9
														PI	Bi		OST-703-9
														LJ	App. J		EST-135-2
V12-14	HBR2-6933 (1)	F-8	A	Act	3	DA	AO	N	C	O/C	C	Y	Y	FS	CS	PAV-VCS-1	OST-703-7
														FC	CS	PAV-VCS-1	OST-703-7
														TM (O)	CS	PAV-VCS-1	OST-703-7
														TM (C)	CS	PAV-VCS-1	OST-703-7
														PI	Bi		OST-703-7
														LJ	App. J		EST-137-6

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V12-15	HBR2-6933 (1)	G-6	A	Act	3	DA	AO	N	C	O/C	C	Y	Y	FS	CS	PAV-VCS-1	OST-703-7
														FC	CS	PAV-VCS-1	OST-703-7
														TM (O)	CS	PAV-VCS-1	OST-703-7
														TM (C)	CS	PAV-VCS-1	OST-703-7
														PI	Bi		OST-703-7
														LJ	App. J		EST-137-6
V12-16	HBR2-6933 (1) AUG	G-5	B	Act	3	DA	M	N	C	O	N/A	N	N	FS	Bi		OST-907
V12-17	HBR2-6933 (1) AUG	G-4	B	Act	3	DA	M	N	C	O	N/A	N	N	FS	Bi		OST-907
V12-18	HBR2-6933 (1)	E-8	A	Act	3	DA	AO	N	C	O/C	C	Y	Y	FS	CS	PAV-VCS-1	OST-703-7
														FC	CS	PAV-VCS-1	OST-703-7
														TM (O)	CS	PAV-VCS-1	OST-703-7
														TM (C)	CS	PAV-VCS-1	OST-703-7
														PI	Bi		OST-703-7
														LJ	App. J		EST-137-7
V12-19	HBR2-6933 (1)	E-7	A	Act	3	DA	AO	N	C	O/C	C	Y	Y	FS	CS	PAV-VCS-1	OST-703-7
														FC	CS	PAV-VCS-1	OST-703-7
														TM (O)	CS	PAV-VCS-1	OST-703-7
														TM (C)	CS	PAV-VCS-1	OST-703-7
														PI	Bi		OST-703-7
														LJ	App. J		EST-137-7
V12-20	HBR2-6933 (1) AUG	E-6	B	Act	3	DA	M	N	C	O	N/A	N	N	FS	Bi		OST-907

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V12-21	HBR2-6933 (1) AUG	E-5	B	Act	3	DA	M	N	C	O	N/A	N	N	FS	Bi		OST-907
V12-24A	G-190200 (9) AUG	F-4	B	Act	2	DA	AO	N	C	O	C	N	Y	FS FC TM (O) PI	Bi Bi Bi Bi		OST-703-7 OST-703-7 OST-703-7 OST-703-7
V12-24B	G-190200 (3) AUG	E-5	B	Act	2	DA	AO	N	C	O	C	N	Y	FS FC TM (O) PI	Bi Bi Bi Bi		OST-703-7 OST-703-7 OST-703-7 OST-703-7
V12-25	G-190200 (3) AUG	C-5	B	Act	2	DA	AO	N	C	O	O	N	Y	FS FO TM (O) PI	Bi Bi Bi Bi		OST-703-7 OST-703-7 OST-703-7 OST-703-7
V12-6	G-190304 (1)	C-6	A	Act	42	BF	AO	Y	O/C	C	C	Y	Y	FS FC TM (C) PI LJ	CS CS CS Bi App. J	HVA-VCS-2 HVA-VCS-2 HVA-VCS-2	OST-704 OST-704 OST-704 OST-704 EST-135-1
V12-61	HBR2-6933 (1) AUG	G-5	B	Act	2	GA	M	N	C	O	N/A	N	N	FS	Bi		OST-907

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V12-63	HBR2-6933 (1)	E-6	B	Act	2	GA	M	N	C	O	N/A	N	N	FS	Bi		OST-907
	AUG																
V12-7	G-190304 (1)	C-6	A	Act	42	BF	AO	Y	O/C	C	C	Y	Y	FS	CS	HVA-VCS-2	OST-704
														FC	CS	HVA-VCS-2	OST-704
														TM (C)	CS	HVA-VCS-2	OST-704
														PI	Bi		OST-704
														LJ	App. J		EST-135-1
V12-8	G-190304 (1)	E-2	A	Act	42	BF	AO	Y	O/C	C	C	Y	Y	FS	CS	HVA-VCS-2	OST-704
														FC	CS	HVA-VCS-2	OST-704
														TM (C)	CS	HVA-VCS-2	OST-704
														PI	Bi		OST-704
														LJ	App. J		EST-137-5
V12-9	G-190304 (1)	D-3	A	Act	42	BF	AO	Y	O/C	C	C	Y	Y	FS	CS	HVA-VCS-2	OST-704
														FC	CS	HVA-VCS-2	OST-704
														TM (C)	CS	HVA-VCS-2	OST-704
														PI	Bi		OST-704
														LJ	App. J		EST-137-5
V6-12A	G-190199 (2)	D-7	B	Act	30	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-1 OST-302-3
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-302-1 OST-302-3
														PI	Bi		OST-302-3

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V6-12B	G-190199 (2)	C-7	B	Act	30	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-1 OST-302-3
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-302-1 OST-302-3
														PI	Bi		OST-302-3
V6-12C	G-190199 (2)	C-6	B	Act	30	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-2 OST-302-4
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-302-2 OST-302-4
														PI	Bi		OST-302-4
V6-12D	G-190199 (2)	D-6	B	Act	30	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-2 OST-302-4
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-302-2 OST-302-4
														PI	Bi		OST-302-4
V6-16A	G-190199 (10)	B-3	B	Act	16	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-2 OST-302-4
	GL 89-10, GL 96-05													TM (C)	Q		OST-302-2 OST-302-4
														PI	Bi		OST-302-4
V6-16B	G-190199 (10)	C-3	B	Act	16	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-302-1 OST-302-3
	GL 89-10, GL 96-05													TM (C)	Q		OST-302-1 OST-302-3
														PI	Bi		OST-302-3
V6-16C	G-190199 (10)	B-2	B	Act	16	BF	MO	N	O	C	AI	N	Y	FS	CS	SW-VCS-1	OST-702-4
	GL 89-10, GL 96-05													TM (C)	CS	SW-VCS-1	OST-702-4
														PI	Bi		OST-702-4

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V6-33A	G-190199 (7)	E-3	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925
V6-33B	G-190199 (7)	E-3	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925
V6-33C	G-190199 (7)	G-3	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-33D	G-190199 (7)	F-3	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-33E	G-190199 (7)	E-4	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-33F	G-190199 (7)	F-4	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V6-34A	G-190199 (5)	C-6	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925
V6-34B	G-190199 (5)	D-6	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925
V6-34C	G-190199 (5)	E-6	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-34D	G-190199 (5)	F-6	B	Act	6	BF	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-35A	G-190199 (4)	G-3	B	Act	1	GL	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925
V6-35B	G-190199 (4)	G-4	B	Act	1	GL	MO	N	O	C	AI	N	Y	FS	Q		OST-902-1
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-1
														PI	Bi		OST-925

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
V6-35C	G-190199 (4)	G-3	B	Act	1	GL	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
V6-35D	G-190199 (4)	G-3	B	Act	1	GL	MO	N	O	C	AI	N	Y	FS	Q		OST-902-2
	Full stroke exercise and stroke time measurement are augmented tests													TM (C)	Q		OST-902-2
														PI	Bi		OST-925
VCT-13	HBR2-6490 (1)	C-8	A	Pass	2	GA	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-009
VCT-18	HBR2-6490 (1)	C-7	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
VCT-19	HBR2-6490 (1)	D-7	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
VCT-20	HBR2-6490 (1)	E-8	A	Pass	0.375	GL	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-046
WD-1621	5379-921 (2)	F-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
	AUG																

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
WD-1622	5379-921 (2) AUG	G-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
WD-1623	5379-921 (2) AUG	D-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
WD-1624	5379-921 (2) AUG	E-3	C	Act	1	RV	SA	N	C	O	N/A	N	N	RL	App. I		EST-112
WD-1713	5379-920 (3)	E-7	A/C	Pass	1	CK	SA	N	C	C	N/A	Y	N	LJ	App. J		EST-061
WD-1721	5379-920 (3)	C-6	A	Act	3	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-8
WD-1722	5379-920 (3)	C-7	A	Act	3	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-8

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
WD-1723	5379-920 (3)	B-7	A	Act	2	DA	AO	Y	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-24
WD-1728	5379-920 (3)	B-7	A	Act	2	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-24
WD-1786	5379-920 (3)	D-6	A	Act	1	DA	AO	Y	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-16
WD-1787	5379-920 (3)	D-7	A	Act	1	DA	AO	Y	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-16
WD-1789	5379-920 (3)	D-7	A	Act	0.75	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-25

Valve Table

Valve Number	P&ID (SHT) Remarks	Coord	Cat	Act Pass	Size	Valve Type	Act Type	Rap Act	Norm Pos	Safe Pos	Fail Pos	App J Type C	Pos Ind	Test Type	Test Freq	Test Deferral	Surveillance Test
WD-1793	5379-920 (3)	E-6	A	Pass	1	DA	M	N	LC	C	N/A	Y	N	LJ	App. J		EST-061
WD-1794	5379-920 (3)	D-6	A	Act	0.75	DA	AO	N	O/C	C	C	Y	Y	FS	Q		OST-701-2
														FC	Q		OST-701-2
														TM (C)	Q		OST-701-2
														PI	Bi		OST-707-2
														LJ	App. J		OST-933-25

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
5379-1082 (1)	SI-841A	No safety function
	SI-841B	No safety function
	SI-877D	Exempt - test valve
	SI-883L	Category B passive manual valve
	SI-883W	Category B passive manual valve
	SI-894	Line blocked by MOD-888
	SI-895K	Category B passive manual valve
	SI-895N	Exempt - drain valve
	SI-895P	Category B passive manual valve
	SI-895T	No safety function
	SI-895U	Category B passive manual valve
	SI-899B	Category B passive manual valve
	SI-977	Exempt - vent valve
5379-1082 (2)	SI-878C	Exempt - vent valve
	SI-889C	Exempt - test valve
	SI-891C	Category B passive manual valve
	SI-891D	Category B passive manual valve
	SI-897G	Category B passive manual valve
	SI-898D	Category B passive manual valve
	SI-898G	Category B passive manual valve
	SI-898H	Category B passive manual valve
	SI-898J	Category B passive manual valve
	SI-968	Exempt - vent valve
	SI-969	Exempt - vent valve
	SI-970	Exempt - vent valve
	SI-971	Exempt - vent valve
	SI-972	Exempt - vent valve
	SI-973	Exempt - vent valve
	SI-974	Exempt - vent valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	SI-975	Exempt - vent valve
5379-1082 (3)	SI-883M	Category B passive manual valve
	SI-883N	Category B passive manual valve
	SI-889F	No safety function
	SI-892A	Category B passive manual valve
	SI-892C	Category B passive manual valve
	SI-892D	Category B passive manual valve
	SI-892E	Category B passive manual valve
	SI-892F	Category B passive manual valve
	SI-892G	Category B passive manual valve
	SI-892H	Category B passive manual valve
	SI-896E	Category B passive manual valve
	SI-897H	Category B passive manual valve
	SI-897J	Category B passive manual valve
5379-1082 (4)	SI-850A	Exempt - test valve
	SI-850B	Exempt - test valve
	SI-850C	Exempt - test valve
	SI-850D	Exempt - test valve
	SI-850E	Exempt - test valve
	SI-850F	Exempt - test valve
	SI-877A	Exempt - test valve
	SI-877B	Exempt - test valve
	SI-877C	Exempt - test valve
	SI-883R	Exempt - maintenance valve
	SI-884A	Exempt - test valve
	SI-884B	Exempt - test valve
	SI-884C	Exempt - test valve
	SI-884D	Exempt - test valve
	SI-884E	Exempt - test valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	SI-976	Category B passive manual valve
5379-1082 (5)	HCV-936	Exempt - control valve
	SI-852A	Exempt - drain valve
	SI-852B	Exempt - drain valve
	SI-852C	Exempt - drain valve
	SI-882A	Exempt - drain valve
	SI-882B	Exempt - drain valve
	SI-882C	Exempt - drain valve
	SI-883B	Exempt - maintenance valve
	SI-883C	Exempt - maintenance valve
	SI-883E	Exempt - maintenance valve
	SI-883F	Exempt - maintenance valve
	SI-883H	Exempt - maintenance valve
	SI-883J	Exempt - maintenance valve
	SI-912	No safety function
5379-1484 (1)	RHR-754A	Category B passive manual valve
	RHR-754B	Category B passive manual valve
	RHR-755A	No safety function
	RHR-755B	No safety function
	RHR-757A	Category B passive manual valve
	RHR-757B	Category B passive manual valve
	RHR-762A	Exempt - maintenance valve
	RHR-762B	Exempt - maintenance valve
	RHR-764	Category B passive manual valve
	RHR-774	No safety function
	RHR-775	No safety function
	RHR-784	Exempt - vent valve
	RHR-785	Exempt - vent valve
	RHR-789	Exempt - vent valve

P&ID	Valve No.	Reason For Exclusion
	RHR-790	Exempt - vent valve
	RHR-791	Exempt - vent valve
	RHR-792	Exempt - vent valve
	RHR-793	Exempt - vent valve
5379-1485	SFPC-836A	No safety function
	SFPC-836B	No safety function
	SFPC-837	No safety function
5379-1485 (1)	SFPC-742	No safety function
	SFPC-783	No safety function
	SFPC-793	No safety function
	SFPC-796	No safety function
	SFPC-797	No safety function
	SFPC-798A	No safety function
	SFPC-798B	No safety function
	SFPC-799A	No safety function
	SFPC-799B	No safety function
	SFPC-799C	No safety function
	SFPC-799D	No safety function
	SFPC-800A	No safety function
	SFPC-800B	No safety function
	SFPC-801	No safety function
	SFPC-802A	No safety function
	SFPC-802B	No safety function
	SFPC-802C	Category B Passive manual valve
	SFPC-803	No safety function
	SFPC-804	Category B Passive manual valve
	SFPC-805A	No safety function
	SFPC-805B	No safety function
	SFPC-806	No safety function

P&ID	Valve No.	Reason For Exclusion
	SFPC-808	No safety function
	SFPC-809	No safety function
	SFPC-810	No safety function
	SFPC-811	No safety function
	SFPC-812	No safety function
	SFPC-813A	No safety function
	SFPC-813B	No safety function
	SFPC-813C	No safety function
	SFPC-813D	No safety function
	SFPC-814A	No safety function
	SFPC-814B	No safety function
	SFPC-815	No safety function
	SFPC-816A	No safety function
	SFPC-816B	No safety function
	SFPC-817	No safety function
	SFPC-818	No safety function
	SFPC-819	No safety function
	SFPC-820	No safety function
	SFPC-821A	No safety function
	SFPC-821B	No safety function
	SFPC-821C	No safety function
	SFPC-824J	No safety function
	SFPC-838A	No safety function
	SFPC-838B	No safety function
	SFPC-843	No safety function
	SFPC-848	No safety function
5379-1971 (1)	RC-501	Category B passive manual valve
	RC-502	Category B passive manual valve
	RC-505A	Exempt - drain valve

P&ID	Valve No.	Reason For Exclusion
	RC-505B	Exempt - drain valve
	RC-508A	Exempt - drain valve
	RC-508B	Exempt - drain valve
	RC-515A	Exempt - drain valve
	RC-515B	Exempt - drain valve
	RC-542	Category B passive manual valve
	RC-586	Category B passive manual valve
	RC-601	Category B passive manual valve
5379-1971 (2)	PCV-455A	Exempt - control valve
	PCV-455B	Exempt - control valve
	RC-524	No safety function
	RC-525	No safety function
	RC-582	No safety function
5379-353 (1)	PS-951	Exempt - maintenance valve
	PS-953	Exempt - maintenance valve
	PS-955A	Exempt - maintenance valve
	PS-955B	Exempt - maintenance valve
	PS-955C	Exempt - maintenance valve
	PS-955D	Exempt - maintenance valve
	PS-955E	Exempt - maintenance valve
	PS-969B	No safety function
	PS-974A	No safety function
	PS-974B	No safety function
	PS-975	No safety function
	PS-976	No safety function
	PS-977	No safety function
	PS-988	No safety function
	PS-989D	No safety function
5379-376 (1)	CC-701A	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	CC-701B	Category B passive manual valve
	CC-701C	Category B passive manual valve
	CC-703A	Category B passive manual valve
	CC-703B	Category B passive manual valve
	CC-703C	Category B passive manual valve
	CC-705A	Category B passive manual valve
	CC-705B	Category B passive manual valve
	CC-705C	Category B passive manual valve
	CC-710	Category B passive manual valve
	CC-711	Category B passive manual valve
	CC-712A	Category B passive manual valve
	CC-712B	Category B passive manual valve
	CC-713A	Category B passive manual valve
	CC-713B	Category B passive manual valve
	CC-733A	Category B passive manual valve
	CC-733B	Category B passive manual valve
	CC-737C	Category B passive manual valve
	CC-737D	Category B passive manual valve
	CC-786A	Category B passive manual valve
	CC-786B	Category B passive manual valve
	CC-788A	Category B passive manual valve
	CC-788AA	Category B passive manual valve
	CC-788B	Category B passive manual valve
	CC-788BB	Category B passive manual valve
	CC-788C	Category B passive manual valve
	CC-788CC	Category B passive manual valve
	CC-788D	Category B passive manual valve
	CC-788DD	Category B passive manual valve
	CC-788E	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	CC-788EE	Category B passive manual valve
	CC-788F	Category B passive manual valve
	CC-788FF	Category B passive manual valve
	CC-788G	Category B passive manual valve
	CC-788GG	Category B passive manual valve
	CC-825A	Category B passive manual valve
	CC-825B	Category B passive manual valve
	CC-825C	Category B passive manual valve
	CC-825D	Category B passive manual valve
	CC-825E	Category B passive manual valve
	CC-825F	Category B passive manual valve
	CC-861	Exempt - vent valve
	CC-940	Exempt - instrument valve
	CC-941	Exempt - instrument valve
	CC-942	Exempt - vent valve
	CC-943	Exempt - vent valve
	CC-944	Exempt - vent valve
	CC-945	Exempt - vent valve
	CC-946	Exempt - vent valve
	CC-947	Exempt - vent valve
	RCV-609	Exempt - vent valve
	TCV-659A	Exempt - control valve
	TCV-659B	Exempt - control valve
	TCV-659C	Exempt - control valve
5379-376 (2)	CC-732	Category B passive manual valve
	CC-737B	Category B passive manual valve
	CC-746A	Category B passive manual valve
	CC-746B	Category B passive manual valve
	CC-748A	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	CC-748B	Category B passive manual valve
	CC-777	Category B passive manual valve
	CC-780	Category B passive manual valve
	CC-781	Category B passive manual valve
	CC-784	Category B passive manual valve
	CC-785	Category B passive manual valve
	CC-792A	Category B passive manual valve
	CC-792B	Category B passive manual valve
	CC-830A	Category B passive manual valve
	CC-833	Category B passive manual valve
	CC-834	Category B passive manual valve
	TCV-144	Exempt - control valve
5379-376 (3)	CC-717	No safety function
	CC-718A	Category B passive manual valve
	CC-718B	Category B passive manual valve
	CC-718C	Category B passive manual valve
	CC-719A	Category B passive manual valve
	CC-719B	Category B passive manual valve
	CC-719C	Category B passive manual valve
	CC-719D	Category B passive manual valve
	CC-719D1	Category B passive manual valve
	CC-719D2	Category B passive manual valve
	CC-719D3	Category B passive manual valve
	CC-719E	Category B passive manual valve
	CC-720A	Category B passive manual valve
	CC-720B	Category B passive manual valve
	CC-720C	Category B passive manual valve
	CC-723A	Category B passive manual valve
	CC-723B	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	CC-723C	Category B passive manual valve
	CC-724A	Category B passive manual valve
	CC-724B	Category B passive manual valve
	CC-724C	Category B passive manual valve
	CC-724D	Category B passive manual valve
	CC-727A	Category B passive manual valve
	CC-727B	Category B passive manual valve
	CC-727C	Category B passive manual valve
	CC-728A	Category B passive manual valve
	CC-728B	Category B passive manual valve
	CC-728C	Category B passive manual valve
5379-376 (4)	CC-728D	Category B passive manual valve
	CC-769A	Category B passive manual valve
	CC-769B	Category B passive manual valve
	CC-772	Category B passive manual valve
	CC-775	Category B passive manual valve
	CC-776	Category B passive manual valve
	CC-792C	Category B passive manual valve
	CC-792D	Category B passive manual valve
	CC-794A	Category B passive manual valve
	CC-794B	Category B passive manual valve
	CC-795A	Category B passive manual valve
	CC-795B	Category B passive manual valve
	CC-795C	Category B passive manual valve
	CC-795D	Category B passive manual valve
	CC-795E	Category B passive manual valve
	CC-795F	Category B passive manual valve
	CC-795G	Category B passive manual valve
	CC-795H	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	CC-795J	Category B passive manual valve
	CC-795K	Category B passive manual valve
	CC-826A	Category B passive manual valve
	CC-826B	Category B passive manual valve
	CC-826C	Category B passive manual valve
	CC-826D	Category B passive manual valve
	CC-826E	Category B passive manual valve
	CC-826F	Category B passive manual valve
	CC-827A	Category B passive manual valve
	CC-827B	Category B passive manual valve
	CC-830B	Category B passive manual valve
5379-684 (1)	CVC-1102	No safety function
	CVC-1161	No safety function
5379-685 (1)	CVC-202B	Category B passive manual valve
	CVC-205A	Category B passive manual valve
	CVC-205B	Category B passive manual valve
	CVC-293B	No safety function
	CVC-293D	No safety function
	CVC-302A	No safety function
	CVC-302B	No safety function
	CVC-302C	No safety function
	CVC-303A	No safety function
	CVC-303B	No safety function
	CVC-303C	No safety function
	CVC-304A	Category B passive manual valve
	CVC-304B	Category B passive manual valve
	CVC-304C	Category B passive manual valve
	CVC-304D	Category B passive manual valve
	CVC-304E	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	CVC-304F	Category B passive manual valve
	CVC-304G	Category B passive manual valve
	CVC-304H	Category B passive manual valve
	CVC-304J	Category B passive manual valve
	CVC-304K	Category B passive manual valve
	CVC-304L	Category B passive manual valve
	CVC-304M	Category B passive manual valve
	CVC-306A	Category B passive manual valve
	CVC-306B	Category B passive manual valve
	CVC-306C	Category B passive manual valve
	CVC-308	Category B passive manual valve
	CVC-309D	No safety function
	CVC-312	Category B passive manual valve
	CVC-318	No safety function
	CVC-320	No safety function
	CVC-380	No safety function
	CVC-389	No safety function
	CVC-474	Category B passive manual valve
	HCV-121	Exempt - control valve
	HCV-137	Exempt - control valve
	HCV-142	Exempt - control valve
	LCV-460A	No safety function
	LCV-460B	No safety function
5379-685 (2)	CVC-249	No safety function
	CVC-250	No safety function
	CVC-253	No safety function
	CVC-254	No safety function
	CVC-256	Category B passive with no remote position indication

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	CVC-259A	No safety function
	CVC-259C	No safety function
	CVC-264	Category B passive manual valve
	CVC-267	Category B passive manual valve
	CVC-268	Category B passive manual valve
	CVC-269	Category B passive manual valve
	CVC-270	Category B passive manual valve
	CVC-271	No safety function
	CVC-272	Category B passive manual valve
	CVC-275A	No safety function
	CVC-275B	No safety function
	CVC-275C	No safety function
	CVC-277A	Category B passive manual valve
	CVC-277B	Category B passive manual valve
	CVC-277C	Category B passive manual valve
	CVC-286	Category B passive manual valve
	CVC-287	Category B passive manual valve
	CVC-288	Category B passive manual valve
	CVC-289	Category B passive manual valve
	CVC-290	Category B passive manual valve
	CVC-291	Category B passive manual valve
	CVC-309B	No safety function
	CVC-309C	No safety function
	CVC-309E	No safety function
	CVC-321	No safety function
	CVC-352	No safety function
	CVC-353	Category B passive manual valve
	CVC-354	No safety function
	CVC-355	No safety function

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	CVC-356	Category B passive manual valve
	CVC-361	No safety function
	CVC-362	No safety function
	CVC-364	No safety function
	CVC-366	No safety function
	CVC-368	No safety function
	CVC-600	Category B passive manual valve
	FCV-113A	No safety function
	FCV-114A	No safety function
	FCV-114B	No safety function
	LCV-115A	Exempt - control valve
	PCV-117	Exempt - control valve
	PCV-118	Exempt - control valve
	PCV-119	Exempt - control valve
	PCV-145	Exempt - control valve
	TCV-143	No safety function
5379-685 (3)	CVC-1237	No safety function
	CVC-226B	Category B passive manual valve
	CVC-227A	Category B passive manual valve
	CVC-239B	No safety function
	CVC-244	No safety function
	CVC-245	No safety function
	CVC-247A	No safety function
	CVC-247B	No safety function
	CVC-284A	Category B passive manual valve
	CVC-284B	Category B passive manual valve
	CVC-328	No safety function
	CVC-329	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	CVC-331	Category B passive manual valve
	CVC-332	Category B passive manual valve
	CVC-334	Category B passive manual valve
	CVC-335	Category B passive manual valve
	CVC-336	Category B passive manual valve
	CVC-337	Category B passive manual valve
	CVC-338	Category B passive manual valve
	CVC-340	Category B passive manual valve
	CVC-343A	No safety function
	CVC-344	Category B passive manual valve
	CVC-345	Category B passive manual valve
	CVC-347	Category B passive manual valve
	CVC-348	Category B passive manual valve
	CVC-375	Category B passive manual valve
	CVC-379	Category B passive manual valve
	CVC-398A	No safety function
	CVC-398B	No safety function
5379-686 (1)	CVC-1100	No safety function
	CVC-1101	No safety function
	CVC-1103	No safety function
	CVC-1104	No safety function
	CVC-1105	No safety function
	CVC-1106	No safety function
	CVC-1107	No safety function
	CVC-1108	No safety function
	CVC-1109	No safety function
	CVC-1111	No safety function
	CVC-1114A	No safety function
	CVC-1114B	No safety function

P&ID	Valve No.	Reason For Exclusion
	CVC-1114C	No safety function
	CVC-1115	No safety function
	CVC-1116A	No safety function
	CVC-1116B	No safety function
	CVC-1116C	No safety function
	CVC-1122	No safety function
	CVC-1123	No safety function
	CVC-1124	No safety function
	CVC-1125	No safety function
	CVC-1129	No safety function
	CVC-1130	No safety function
	CVC-1131	No safety function
	CVC-1241A	No safety function
	CVC-1241B	No safety function
	CVC-1241C	No safety function
5379-920 (1)	WD-3316	No safety function
5379-921 (2)	WD-1676	No safety function
	WD-1677	No safety function
	WD-1679	No safety function
	WD-3332	No safety function
	WD-3335	No safety function
G-190196 (1)	MS-10A	Category B passive manual valve
	MS-11A	Category B passive manual valve
	MS-12A	Category B passive manual valve
	MS-13	Exempt - instrument valve
	MS-14	Exempt - instrument valve
	MS-154	Category B passive manual valve
	MS-155	Category B passive manual valve
	MS-156	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	MS-158	Category B passive manual valve
	MS-159	No safety function
	MS-16	Exempt - instrument valve
	MS-160	Category B passive manual valve
	MS-161	Category B passive manual valve
	MS-17	Exempt - instrument valve
	MS-19	Category B passive manual valve
	MS-20	Category B passive manual valve
	MS-21	Category B passive manual valve
	MS-22	Exempt - instrument valve
	MS-23	Exempt - instrument valve
	MS-25	Exempt - instrument valve
	MS-26	Exempt - instrument valve
	MS-28	Category B passive manual valve
	MS-29	Category B passive manual valve
	MS-30	Category B passive manual valve
	MS-31	Exempt - instrument valve
	MS-32	Exempt - instrument valve
	MS-34	Exempt - instrument valve
	MS-35	Exempt - instrument valve
	MS-37	Category B passive manual valve
	MS-38	Category B passive manual valve
	MS-39	Category B passive manual valve
G-190197 (4)	AFW-120	No safety function
	AFW-121	No safety function
	AFW-15	Exempt - instrument valve
	AFW-20	Category B passive manual valve
	AFW-22	Category B passive manual valve
	AFW-28	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	AFW-29	Category B passive manual valve
	AFW-4	Category B passive manual valve
	AFW-42	Category B passive manual valve
	AFW-43	Category B passive manual valve
	AFW-51	Exempt - drain valve
	AFW-53	Category B passive manual valve
	AFW-54	Category B passive manual valve
	AFW-55	Category B passive manual valve
	AFW-62	Category B passive manual valve
	AFW-63	Category B passive manual valve
	AFW-64	Category B passive manual valve
	FW-201	Category B passive manual valve
	FW-203	Category B passive manual valve
	FW-205	Category B passive manual valve
	FW-5A	Category B passive manual valve
	FW-5B	Category B passive manual valve
	FW-5C	Category B passive manual valve
	FW-6A	Category B passive manual valve
	FW-6B	Category B passive manual valve
	FW-6C	Category B passive manual valve
	FW-7A	Exempt - maintenance valve
	FW-7B	Exempt - maintenance valve
	FW-7C	Exempt - maintenance valve
G-190199 (1)	SW-197	Exempt - maintenance valve
	SW-198	Exempt - maintenance valve
	SW-199	Exempt - maintenance valve
G-190199 (10)	SW-106	Exempt - maintenance valve
	SW-243	Exempt - maintenance valve
	SW-246	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	SW-252	Category B passive manual valve
	SW-253	Category B passive manual valve
	SW-259	Category B passive manual valve
	SW-542	No safety function
	SW-543	No safety function
	SW-75	Category B passive manual valve
	SW-76	Category B passive manual valve
	SW-77	Category B passive manual valve
	SW-78	Category B passive manual valve
	SW-900	Exempt - maintenance valve
	SW-914	Exempt - maintenance valve
	SW-922	Category B passive manual valve
	SW-927	Category B passive manual valve
	TCV-1902A	No safety function
	V6-146A	Exempt - vent valve
	V6-146B	Exempt - vent valve
G-190199 (2)	SW-187	Category B passive manual valve
	SW-188	Category B passive manual valve
	SW-190	Category B passive manual valve
	SW-203	Category B passive manual valve
	SW-204	Category B passive manual valve
	SW-205	Category B passive manual valve
	SW-206	Category B passive manual valve
	SW-5	Category B passive manual valve
	SW-6	Category B passive manual valve
	SW-7	Category B passive manual valve
	SW-8	Category B passive manual valve
	SW-839	Category B passive manual valve
	SW-845	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	SW-851	Category B passive manual valve
	SW-857	Category B passive manual valve
	SW-963	Exempt - instrument valve
	SW-964	Exempt - instrument valve
G-190199 (4)	SW-630	Category B passive manual valve
	SW-632	Category B passive manual valve
	SW-634	Category B passive manual valve
	SW-636	Category B passive manual valve
G-190199 (5)	SW-79A	Category B passive manual valve
	SW-81	Category B passive manual valve
G-190199 (6)	SW-85	Category B passive manual valve
	SW-86	Category B passive manual valve
	SW-87	Category B passive manual valve
	SW-88	Category B passive manual valve
	SW-89	Category B passive manual valve
	SW-90	Category B passive manual valve
	SW-91	Category B passive manual valve
	SW-92	Category B passive manual valve
	SW-93	Category B passive manual valve
	SW-965	Category B passive manual valve
	SW-966	Category B passive manual valve
	SW-967	Category B passive manual valve
	SW-968	Category B passive manual valve
G-190199 (7)	SW-24	Category B passive manual valve
	SW-25	Category B passive manual valve
	SW-26	Category B passive manual valve
	SW-27	Category B passive manual valve
	SW-28	Category B passive manual valve
	SW-284	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	SW-29	Category B passive manual valve
	SW-307	Category B passive manual valve
	SW-311	Category B passive manual valve
	SW-32	Category B passive manual valve
	SW-33	Category B passive manual valve
	SW-503	Category B passive manual valve
	SW-948	Exempt - maintenance valve
	SW-958	Exempt - maintenance valve
	SW-959	Exempt - maintenance valve
	SW-960	Exempt - drain valve
G-190199 (8)	SW-54	No safety function
	SW-61	No safety function
	SW-68	Category B passive manual valve
G-190199 (9)	FCV-4701	Exempt - control valve
	FCV-4702	Exempt - control valve
	SW-100	Category B passive manual valve
	SW-102	Category B passive manual valve
	SW-109	Category B passive manual valve
	SW-110	Category B passive manual valve
	SW-112	Category B passive manual valve
	SW-113	Category B passive manual valve
	SW-20	Category B passive manual valve
	SW-21	Category B passive manual valve
	SW-260	Exempt - instrument valve
	SW-270	Category B passive manual valve
	SW-52	Category B passive manual valve
	SW-53	Category B passive manual valve
	SW-739	Category B passive manual valve
	SW-740	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	SW-866	Category B passive manual valve
	SW-869	Category B passive manual valve
	SW-871	Category B passive manual valve
	SW-873	Category B passive manual valve
	SW-875	Category B passive manual valve
	SW-877	Category B passive manual valve
G-190204A (1)	DA-28	Category B passive manual valve
	DA-3A	No safety function
	DA-3B	No safety function
	DA-40	Category B passive manual valve
	DA-45	Category B passive manual valve
G-190204D (2)	FO-13	Category B passive manual valve
	FO-14	Category B passive manual valve
	FO-176A	Category B passive manual valve
	FO-176B	Category B passive manual valve
	FO-177A	Category B passive manual valve
	FO-177B	Category B passive manual valve
	FO-178A	Category B passive manual valve
	FO-178B	Category B passive manual valve
	FO-179A	Category B passive manual valve
	FO-179B	Category B passive manual valve
	FO-191A	Category B passive manual valve
	FO-191B	Category B passive manual valve
	FO-192A	Category B passive manual valve
	FO-192B	Category B passive manual valve
	FO-193A	Exempt - maintenance valve
	FO-193B	Exempt - maintenance valve
	FO-194A	Exempt - test valve
	FO-194B	Exempt - test valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	FO-195A	Exempt - maintenance valve
	FO-195B	Exempt - maintenance valve
	FO-196A	Category B passive manual valve
	FO-196B	Category B passive manual valve
	FO-197A	Category B passive manual valve
	FO-197B	Category B passive manual valve
	FO-19A	Category B passive manual valve
	FO-19B	Category B passive manual valve
	FO-20A	Exempt - instrument valve
	FO-20B	Exempt - instrument valve
	FO-23A	Category B passive manual valve
	FO-23B	Category B passive manual valve
	FO-24	Category B passive manual valve
	FO-25A	Category B passive manual valve
	FO-25B	Category B passive manual valve
	FO-26A	No safety function
	FO-26B	No safety function
	FO-28A	Category B manual passive valve
	FO-28B	Category B manual passive valve
G-190234 (1)	SGB-30	No safety function
	SGB-31	No safety function
	SGB-32	No safety function
G-190261 (1)	PP-100B	Category B passive manual valve
	PP-101B	Category B passive manual valve
	PP-102B	Category B passive manual valve
	PP-103B	Category B passive manual valve
	PP-104B	Category B passive manual valve
	PP-105B	Category B passive manual valve
	PP-106B	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-107B	Category B passive manual valve
	PP-108B	Category B passive manual valve
	PP-109B	Category B passive manual valve
	PP-110B	Category B passive manual valve
	PP-111B	Category B passive manual valve
	PP-112B	Category B passive manual valve
	PP-113B	Category B passive manual valve
	PP-14B	Category B passive manual valve
	PP-15B	Category B passive manual valve
	PP-16A	Category B passive manual valve
	PP-16B	Category B passive manual valve
	PP-17A	Category B passive manual valve
	PP-17B	Category B passive manual valve
	PP-18A	Category B passive manual valve
	PP-18B	Category B passive manual valve
	PP-19A	Category B passive manual valve
	PP-19B	Category B passive manual valve
	PP-20A	Category B passive manual valve
	PP-20B	Category B passive manual valve
	PP-21A	Category B passive manual valve
	PP-21B	Category B passive manual valve
	PP-22B	Category B passive manual valve
	PP-23B	Category B passive manual valve
	PP-24B	Category B passive manual valve
	PP-25B	Category B passive manual valve
	PP-26B	Category B passive manual valve
	PP-27B	Category B passive manual valve
	PP-28B	Category B passive manual valve
	PP-29B	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	PP-300B	Category B passive manual valve
	PP-301B	Category B passive manual valve
	PP-302B	Category B passive manual valve
	PP-303B	Category B passive manual valve
	PP-304B	Category B passive manual valve
	PP-305B	Category B passive manual valve
	PP-306B	Category B passive manual valve
	PP-307B	Category B passive manual valve
	PP-30B	Category B passive manual valve
	PP-31A	Category B passive manual valve
	PP-31B	Category B passive manual valve
	PP-32A	Category B passive manual valve
	PP-32B	Category B passive manual valve
	PP-33A	Category B passive manual valve
	PP-33B	Category B passive manual valve
	PP-34A	Category B passive manual valve
	PP-34B	Category B passive manual valve
	PP-35A	Category B passive manual valve
	PP-35B	Category B passive manual valve
	PP-36A	Category B passive manual valve
	PP-36B	Category B passive manual valve
	PP-37B	Category B passive manual valve
	PP-38B	Category B passive manual valve
	PP-39B	Category B passive manual valve
	PP-40B	Category B passive manual valve
	PP-41B	Category B passive manual valve
	PP-42B	Category B passive manual valve
	PP-43B	Category B passive manual valve
	PP-44B	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-45B	Category B passive manual valve
	PP-46B	Category B passive manual valve
	PP-47B	Category B passive manual valve
	PP-48B	Category B passive manual valve
	PP-49B	Category B passive manual valve
	PP-50B	Category B passive manual valve
	PP-51B	Category B passive manual valve
	PP-52B	Category B passive manual valve
	PP-53B	Category B passive manual valve
	PP-54B	Category B passive manual valve
	PP-55B	Category B passive manual valve
	PP-56B	Category B passive manual valve
	PP-57B	Category B passive manual valve
	PP-58B	Category B passive manual valve
	PP-59B	Category B passive manual valve
	PP-60B	Category B passive manual valve
	PP-61B	Category B passive manual valve
	PP-62B	Category B passive manual valve
	PP-63B	Category B passive manual valve
	PP-64B	Category B passive manual valve
	PP-65B	Category B passive manual valve
	PP-66B	Category B passive manual valve
	PP-67B	Category B passive manual valve
	PP-68B	Category B passive manual valve
	PP-69B	Category B passive manual valve
	PP-70B	Category B passive manual valve
	PP-71B	Category B passive manual valve
	PP-72B	Category B passive manual valve
	PP-73B	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-74B	Category B passive manual valve
	PP-75B	Category B passive manual valve
	PP-76B	Category B passive manual valve
	PP-77B	Category B passive manual valve
	PP-78B	Category B passive manual valve
	PP-79B	Category B passive manual valve
	PP-80B	Category B passive manual valve
	PP-81B	Category B passive manual valve
	PP-82B	Category B passive manual valve
	PP-83B	Category B passive manual valve
	PP-84B	Category B passive manual valve
	PP-85B	Category B passive manual valve
	PP-86B	Category B passive manual valve
	PP-87B	Category B passive manual valve
	PP-88B	Category B passive manual valve
	PP-89B	Category B passive manual valve
	PP-90B	Category B passive manual valve
	PP-91B	Category B passive manual valve
	PP-92B	Category B passive manual valve
	PP-93B	Category B passive manual valve
	PP-94B	Category B passive manual valve
	PP-95B	Category B passive manual valve
	PP-96B	Category B passive manual valve
	PP-97B	Category B passive manual valve
	PP-98B	Category B passive manual valve
	PP-99B	Category B passive manual valve
G-190261 (2)	PP-14C	Category B passive manual valve
	PP-15C	Category B passive manual valve
	PP-16C	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-17C	Category B passive manual valve
	PP-18C	Category B passive manual valve
	PP-19C	Category B passive manual valve
	PP-20C	Category B passive manual valve
	PP-21C	Category B passive manual valve
	PP-22C	Category B passive manual valve
	PP-23C	Category B passive manual valve
	PP-24C	Category B passive manual valve
	PP-254C	Category B passive manual valve
	PP-255C	Category B passive manual valve
	PP-256C	Category B passive manual valve
	PP-257C	Category B passive manual valve
	PP-25C	Category B passive manual valve
	PP-26C	Category B passive manual valve
	PP-276D	Category B passive manual valve
	PP-27C	Category B passive manual valve
	PP-284D	No safety function
	PP-285D	No safety function
	PP-286D	No safety function
	PP-28C	Category B passive manual valve
	PP-29C	Category B passive manual valve
	PP-30C	Category B passive manual valve
	PP-31C	Category B passive manual valve
	PP-32C	Category B passive manual valve
	PP-33C	Category B passive manual valve
	PP-34C	Category B passive manual valve
	PP-35C	Category B passive manual valve
	PP-38C	Category B passive manual valve
	PP-40C	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-41C	Category B passive manual valve
	PP-42C	Category B passive manual valve
	PP-44C	Category B passive manual valve
	PP-45C	Category B passive manual valve
	PP-46C	Category B passive manual valve
	PP-47C	Category B passive manual valve
	PP-48C	Category B passive manual valve
	PP-54C	Category B passive manual valve
	PP-55C	Category B passive manual valve
	PP-56C	Category B passive manual valve
	PP-57C	Category B passive manual valve
	PP-58C	Category B passive manual valve
	PP-59C	Category B passive manual valve
	PP-60C	Category B passive manual valve
	PP-61C	Category B passive manual valve
	PP-62C	Category B passive manual valve
	PP-63C	Category B passive manual valve
	PP-64C	Category B passive manual valve
	PP-65C	Category B passive manual valve
	PP-66C	Category B passive manual valve
	PP-67C	Category B passive manual valve
	PP-68C	Category B passive manual valve
	PP-69C	Category B passive manual valve
	PP-70C	Category B passive manual valve
	PP-71C	Category B passive manual valve
	PP-72C	Category B passive manual valve
	PP-73C	Category B passive manual valve
	PP-74C	Category B passive manual valve
	PP-75C	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-78C	Category B passive manual valve
	PP-80C	Category B passive manual valve
	PP-81C	Category B passive manual valve
	PP-82C	Category B passive manual valve
	PP-84C	Category B passive manual valve
	PP-85C	Category B passive manual valve
	PP-86C	Category B passive manual valve
	PP-87C	Category B passive manual valve
	PP-88C	Category B passive manual valve
G-190261 (3)	PP-100D	Category B passive manual valve
	PP-101D	Category B passive manual valve
	PP-102D	Category B passive manual valve
	PP-103D	Category B passive manual valve
	PP-104D	Category B passive manual valve
	PP-105D	Category B passive manual valve
	PP-106D	Category B passive manual valve
	PP-107D	Category B passive manual valve
	PP-114D	Category B passive manual valve
	PP-115D	Category B passive manual valve
	PP-116D	Category B passive manual valve
	PP-117D	Category B passive manual valve
	PP-118D	Category B passive manual valve
	PP-119D	Category B passive manual valve
	PP-120D	Category B passive manual valve
	PP-121D	Category B passive manual valve
	PP-122D	Category B passive manual valve
	PP-123D	Category B passive manual valve
	PP-124D	Category B passive manual valve
	PP-125D	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-126D	Category B passive manual valve
	PP-127D	Category B passive manual valve
	PP-128D	Category B passive manual valve
	PP-129D	Category B passive manual valve
	PP-130D	Category B passive manual valve
	PP-131D	Category B passive manual valve
	PP-132D	Category B passive manual valve
	PP-133D	Category B passive manual valve
	PP-134D	Category B passive manual valve
	PP-135D	Category B passive manual valve
	PP-136D	Category B passive manual valve
	PP-137D	Category B passive manual valve
	PP-138D	Category B passive manual valve
	PP-139D	Category B passive manual valve
	PP-140D	Category B passive manual valve
	PP-141D	Category B passive manual valve
	PP-142D	Category B passive manual valve
	PP-143D	Category B passive manual valve
	PP-144D	Category B passive manual valve
	PP-145D	Category B passive manual valve
	PP-146D	Category B passive manual valve
	PP-147D	Category B passive manual valve
	PP-148D	Category B passive manual valve
	PP-149D	Category B passive manual valve
	PP-14D	Category B passive manual valve
	PP-150D	Category B passive manual valve
	PP-151D	Category B passive manual valve
	PP-152D	Category B passive manual valve
	PP-153D	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-154D	Category B passive manual valve
	PP-155D	Category B passive manual valve
	PP-156D	Category B passive manual valve
	PP-157D	Category B passive manual valve
	PP-158D	Category B passive manual valve
	PP-159D	Category B passive manual valve
	PP-15D	Category B passive manual valve
	PP-160D	Category B passive manual valve
	PP-161D	Category B passive manual valve
	PP-162D	Category B passive manual valve
	PP-163D	Category B passive manual valve
	PP-164D	Category B passive manual valve
	PP-165D	Category B passive manual valve
	PP-166D	Category B passive manual valve
	PP-167D	Category B passive manual valve
	PP-168D	Category B passive manual valve
	PP-169D	Category B passive manual valve
	PP-16D	Category B passive manual valve
	PP-170D	Category B passive manual valve
	PP-171D	Category B passive manual valve
	PP-172D	Category B passive manual valve
	PP-173D	Category B passive manual valve
	PP-174D	Category B passive manual valve
	PP-175D	Category B passive manual valve
	PP-176D	Category B passive manual valve
	PP-177D	Category B passive manual valve
	PP-178D	Category B passive manual valve
	PP-179D	Category B passive manual valve
	PP-17D	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	PP-180D	Category B passive manual valve
	PP-181D	Category B passive manual valve
	PP-182D	Category B passive manual valve
	PP-183D	Category B passive manual valve
	PP-184D	Category B passive manual valve
	PP-185D	Category B passive manual valve
	PP-186D	Category B passive manual valve
	PP-187D	Category B passive manual valve
	PP-188D	Category B passive manual valve
	PP-189D	Category B passive manual valve
	PP-18D	Category B passive manual valve
	PP-190D	Category B passive manual valve
	PP-191D	Category B passive manual valve
	PP-192D	Category B passive manual valve
	PP-193D	Category B passive manual valve
	PP-194D	Category B passive manual valve
	PP-195D	Category B passive manual valve
	PP-196D	Category B passive manual valve
	PP-197D	Category B passive manual valve
	PP-198D	Category B passive manual valve
	PP-199D	Category B passive manual valve
	PP-19D	Category B passive manual valve
	PP-200D	Category B passive manual valve
	PP-201D	Category B passive manual valve
	PP-202D	Category B passive manual valve
	PP-203D	Category B passive manual valve
	PP-204D	Category B passive manual valve
	PP-205D	Category B passive manual valve
	PP-206D	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-207D	Category B passive manual valve
	PP-208D	Category B passive manual valve
	PP-20D	Category B passive manual valve
	PP-214D	Category B passive manual valve
	PP-219D	Category B passive manual valve
	PP-21D	Category B passive manual valve
	PP-221D	Category B passive manual valve
	PP-222D	Category B passive manual valve
	PP-22D	Category B passive manual valve
	PP-23D	Category B passive manual valve
	PP-24D	Category B passive manual valve
	PP-258D	Category B passive manual valve
	PP-259D	Category B passive manual valve
	PP-25D	Category B passive manual valve
	PP-26D	Category B passive manual valve
	PP-27D	Category B passive manual valve
	PP-28D	Category B passive manual valve
	PP-292	Category B passive manual valve
	PP-293	Category B passive manual valve
	PP-29D	Category B passive manual valve
	PP-30D	Category B passive manual valve
	PP-31D	Category B passive manual valve
	PP-32D	Category B passive manual valve
	PP-33D	Category B passive manual valve
	PP-34D	Category B passive manual valve
	PP-35D	Category B passive manual valve
	PP-36D	Category B passive manual valve
	PP-37D	Category B passive manual valve
	PP-38D	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	PP-39D	Category B passive manual valve
	PP-40D	Category B passive manual valve
	PP-41D	Category B passive manual valve
	PP-42D	Category B passive manual valve
	PP-43D	Category B passive manual valve
	PP-44D	Category B passive manual valve
	PP-45D	Category B passive manual valve
	PP-46D	Category B passive manual valve
	PP-47D	Category B passive manual valve
	PP-48D	Category B passive manual valve
	PP-49D	Category B passive manual valve
	PP-50D	Category B passive manual valve
	PP-51D	Category B passive manual valve
	PP-52D	Category B passive manual valve
	PP-53D	Category B passive manual valve
	PP-54D	Category B passive manual valve
	PP-55D	Category B passive manual valve
	PP-56D	Category B passive manual valve
	PP-57D	Category B passive manual valve
	PP-58D	Category B passive manual valve
	PP-59D	Category B passive manual valve
	PP-60D	Category B passive manual valve
	PP-61D	Category B passive manual valve
	PP-62D	Category B passive manual valve
	PP-63D	Category B passive manual valve
	PP-64D	Category B passive manual valve
	PP-65D	Category B passive manual valve
	PP-66D	Category B passive manual valve
	PP-67D	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-68D	Category B passive manual valve
	PP-69D	Category B passive manual valve
	PP-70D	Category B passive manual valve
	PP-71D	Category B passive manual valve
	PP-72D	Category B passive manual valve
	PP-73D	Category B passive manual valve
	PP-74D	Category B passive manual valve
	PP-75D	Category B passive manual valve
	PP-76D	Category B passive manual valve
	PP-77D	Category B passive manual valve
	PP-78D	Category B passive manual valve
	PP-79D	Category B passive manual valve
	PP-80D	Category B passive manual valve
	PP-81D	Category B passive manual valve
	PP-82D	Category B passive manual valve
	PP-83D	Category B passive manual valve
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	PP-87D	Category B passive manual valve
	PP-88D	Category B passive manual valve
	PP-89D	Category B passive manual valve
	PP-90D	Category B passive manual valve
	PP-91D	Category B passive manual valve
	PP-92D	Category B passive manual valve
	PP-93D	Category B passive manual valve
	PP-94D	Category B passive manual valve
	PP-95D	Category B passive manual valve
	PP-96D	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-97D	Category B passive manual valve
	PP-98D	Category B passive manual valve
	PP-99D	Category B passive manual valve
G-190261 (4)	PP-108D	Category B passive manual valve
	PP-109C	Category B passive manual valve
	PP-110D	Category B passive manual valve
	PP-14A	Category B passive manual valve
	PP-15A	Category B passive manual valve
	PP-209D	Category B passive manual valve
	PP-210C	Category B passive manual valve
	PP-211D	Category B passive manual valve
	PP-222C	Category B passive manual valve
	PP-223C	Category B passive manual valve
	PP-224C	Category B passive manual valve
	PP-225C	Category B passive manual valve
	PP-226C	Category B passive manual valve
	PP-22A	Category B passive manual valve
	PP-231C	Category B passive manual valve
	PP-232C	Category B passive manual valve
	PP-234C	Category B passive manual valve
	PP-235C	Category B passive manual valve
	PP-236C	Category B passive manual valve
	PP-237C	Category B passive manual valve
	PP-238C	Category B passive manual valve
	PP-23A	Category B passive manual valve
	PP-240C	Category B passive manual valve
	PP-241C	Category B passive manual valve
	PP-242C	Category B passive manual valve
	PP-244A	Category B passive manual valve

P&ID	Valve No.	Reason For Exclusion
	PP-244C	Category B passive manual valve
	PP-245A	Category B passive manual valve
	PP-246A	Category B passive manual valve
	PP-247A	Category B passive manual valve
	PP-248A	Category B passive manual valve
	PP-249A	Category B passive manual valve
	PP-249C	Category B passive manual valve
	PP-24A	Category B passive manual valve
	PP-250C	Category B passive manual valve
	PP-251C	Category B passive manual valve
	PP-252C	Category B passive manual valve
	PP-261D	Category B passive manual valve
	PP-262A	Category B passive manual valve
	PP-262D	Category B passive manual valve
	PP-263D	Category B passive manual valve
	PP-264D	Category B passive manual valve
	PP-265D	Category B passive manual valve
	PP-266D	Category B passive manual valve
	PP-274C	Category B passive manual valve
	PP-291A	Category B passive manual valve
	PP-291B	Category B passive manual valve
	PP-291C	Category B passive manual valve
	PP-295	Category B passive manual valve
	PP-29A	Category B passive manual valve
	PP-308	Category B passive manual valve
	PP-309	Category B passive manual valve
	PP-30A	Category B passive manual valve
	PP-310	Category B passive manual valve
	PP-36C	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	PP-38A	Category B passive manual valve
	PP-40A	Category B passive manual valve
	PP-41A	Category B passive manual valve
	PP-42A	Category B passive manual valve
	PP-43A	Category B passive manual valve
	PP-49C	Category B passive manual valve
	PP-89C	Category B passive manual valve
	PP-90C	Category B passive manual valve
	PP-91C	Category B passive manual valve
	PP-92C	Category B passive manual valve
	PP-93C	Category B passive manual valve
G-190262 (1)	IVSW-16D	Category B passive manual valve
	IVSW-16G	Category B passive manual valve
	IVSW-70	No safety function
	IVSW-98	No safety function
	PCV-26E	Exempt - control valve
	PCV-30A	Exempt - control valve
	PCV-30G	Exempt - control valve
	PCV-30G1	Exempt - control valve
	PCV-30G2	Exempt - control valve
HBR2-6490 (1)	VCT-15	Category B passive manual valve
	VCT-16	Category B passive manual valve
	VCT-17	Category B passive manual valve
HBR2-9067 (1)	RC-588A	Category B passive manual valve
	RC-588B	Category B passive manual valve
	RC-591	Category B passive manual valve
	RC-592	Category B passive manual valve
	RC-599	Category B passive manual valve
	RC-600A	Category B passive manual valve

Excluded Valve Table

P&ID	Valve No.	Reason For Exclusion
	RC-600B	Category B passive manual valve

United States Nuclear Regulatory Commission
Attachment II to Serial: RNP-RA/12-0017
48 Pages (including cover page)

CAROLINA POWER AND LIGHT COMPANY

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

INSERVICE TESTING PROGRAM PLAN – FIFTH INTERVAL

SYSTEM DIAGRAMS

DRAWING NO. 5379-353 SHEET 1 OF 1

RC-PRESSURIZER STEAM SPACE 5379-1971 SH. 1 (C-3)

RC-PRESSURIZER LIQUID SPACE 5379-1971 SH. 2 (E-2)

RC-LOOP 3 5379-1971 SH. 1 (D-4)

RC-LOOP 2 5379-1971 SH. 1 (D-8)

SI-ACCUM. "A" SAMPLES 5379-1882 SH. 5 (C-5)

SI-ACCUM. "B" SAMPLES 5379-1882 SH. 5 (C-6)

SI-ACCUM. "C" SAMPLES 5379-1882 SH. 5 (B-5)

RHR-LOOP 5379-1484 SH. 1 (C-4)

CVC-VOL. CONTROL TK. 5379-685 SH. 2 (F-8)

CVC-LETDOWN LINE 5379-685 SH. 2 (G-2)

CVC-LETDOWN LINE 5379-685 SH. 2 (G-4)

INSIDE CV

OUTSIDE CV

INSIDE SAMPLING ROOM

PIPE ALLEY

INSIDE CONTAINMENT

OUTSIDE CONTAINMENT

RCS FILTER ROOM

IVSW-HEADER 'B' G-198262 SH. 1 (C-5)

IVSW-HEADER 'B' G-198262 SH. 1 (B-5)

IVSW-HEADER 'B' G-198262 SH. 1 (B-5)

IVSW-HEADER 'D' G-198262 SH. 1 (G-8)

PASS-HBR2-8261 SH. 1 (B-8)

PASS-HBR2-8261 SH. 1 (B-8)

PRESSURIZER STEAM SAMPLE VESSEL
ITEM: ATSV 1

PRESSURIZER LIQUID SAMPLE VESSEL
ITEM: ATSV 2

HOT LEG SAMPLE VESSEL
ITEM: ATSV 3

SAMPLE HEAT EXCHANGERS
ITEM: AHSS 1
ITEM: AHSS 2
ITEM: AHSS 3

VOLUME CONTROL TANK SAMPLE VESSEL
ITEM: ATSV 4

PRIMARY SAMPLE SINK

CWD-WASTE COMP. B 5379-931 SH. 1 (G-5)

P&WW-DEMIN. WTR. G-198282 SH. 1 (E-6)

CVC-209B

CVC-VOL. CONTROL TK. 5379-685 SH. 2 (F-3)

NOTES:
1. ALL VALVES INSTALLED WITH FLOW UNDER SEAT EXCEPT VALVE NUMBERS 968, 978A, 978B, 988.
2. ¾" NOMINAL PIPE O.D. x ⅝" TUBING INSERT.
3. ALL CHECK VALVES SHOULD BE "Y" TYPE LIFT CHECK.
4. DELAY COIL - 120 FT. x ⅜" O.D. TUBING X 0.245" I.D.
5. ALL W ITEM NUMBERS IN SAMPLING SYSTEM ARE SHOWN WITHOUT PREFIX CPLSS.
6. DELETE.

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7883
FLOW DIAGRAM SYMBOLS & E. SPEC.	G-873176
INSTRUMENTATION SCHEMATICS	A-190301
REACTOR CONT. BLDG. PIPING PENET.	B-190178
PRIMARY & MAKE-UP WATER SYSTEM	G-198282
COMPONENT COOLING WATER SYSTEM	5379-376

REVISIONS																												
NO.	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
DRN.	83-765	84-695	84-908	84-1216														EC 64182	EC 69564
MOD.																		SIGNED	ELECTRONICALLY SIGNED
DESCRIPTION	REVISED AND REDRAWN SEE MAKE-UPS TO 5379-353 REV. 8.																		
BY:	J. MAXWELL	M. MILES	K. RUBENSTEIN	T. BALLENGER	J. WALTERS	HAROLD E. LLOYD	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WICKER	R. MACDONALD	D.M. EDWARDS	
CHK:	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON															
APPR:																			
DATE:	12-5-84	4-25-85	9-23-85	4-17-86															

DRN: J. MAXWELL
CHK: W. JOHNSON
DSGN: AS-BUILT
DRFT APPR:
ENG APPR: *Richard Lloyd*
DATE: 12-5-84

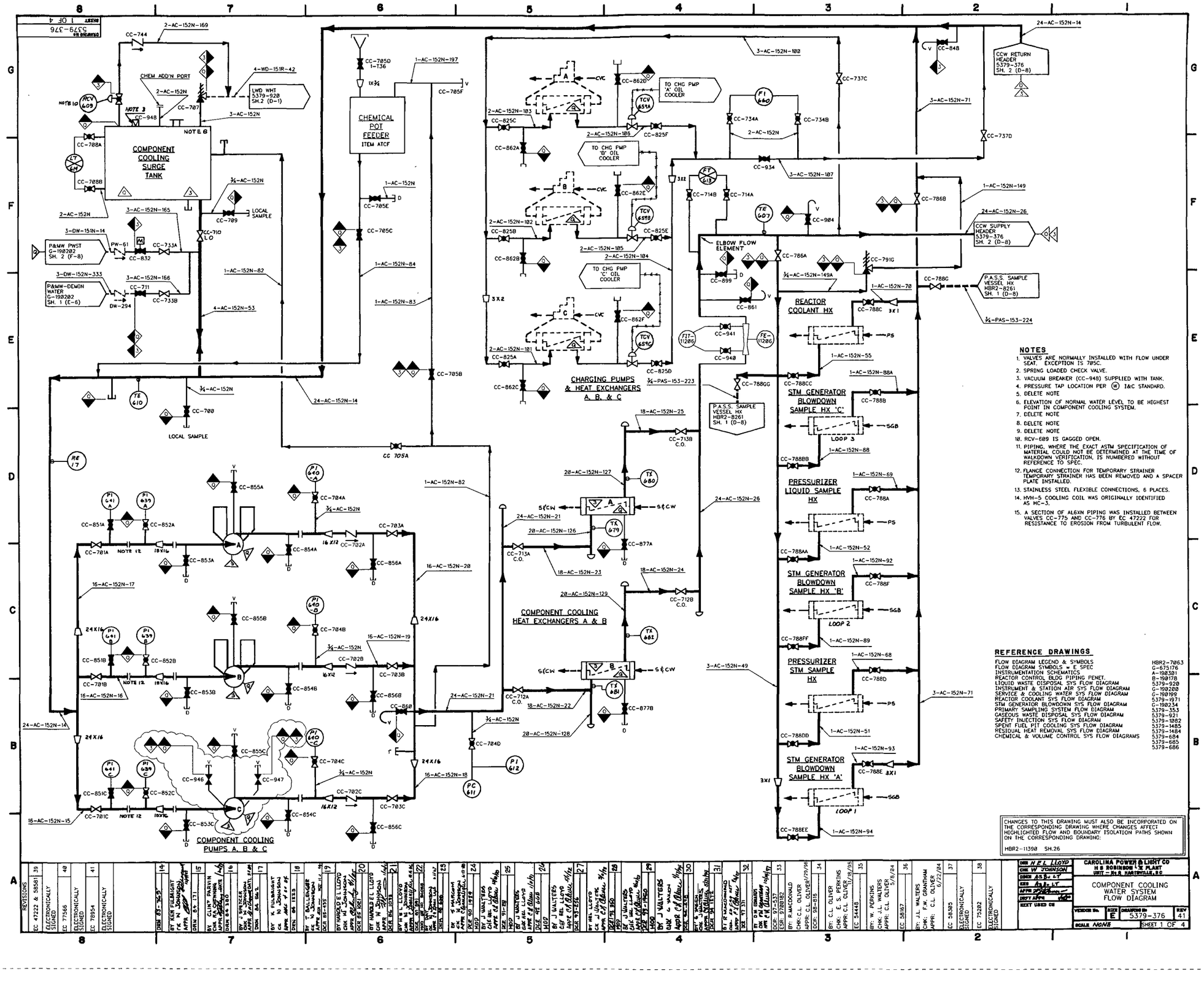
CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: PRIMARY SAMPLING SYSTEM FLOW DIAGRAM

VENDOR NO. | SIZE E | DRAWING NO. 5379-353 | REV. 27

SCALE NONE | SHEET 1 OF 1

SHEET 1 OF 4
DRAWINGS NO 5379-376



NOTES

1. VALVES ARE NORMALLY INSTALLED WITH FLOW UNDER SEAT. EXCEPTION IS 785C.
2. SPRING LOADED CHECK VALVE.
3. VACUUM BREAKER (CC-948) SUPPLIED WITH TANK.
4. PRESSURE TAP LOCATION PER (M) I&C STANDARD.
5. DELETE NOTE
6. ELEVATION OF NORMAL WATER LEVEL TO BE HIGHEST POINT IN COMPONENT COOLING SYSTEM.
7. DELETE NOTE
8. DELETE NOTE
9. DELETE NOTE
10. RCV-609 IS GAGGED OPEN.
11. PIPING, WHERE THE EXACT ASTM SPECIFICATION OF MATERIAL COULD NOT BE DETERMINED AT THE TIME OF WALKDOWN VERIFICATION, IS NUMBERED WITHOUT REFERENCE TO SPEC.
12. FLANGE CONNECTION FOR TEMPORARY STRAINER TEMPORARY STRAINER HAS BEEN REMOVED AND A SPACER PLATE INSTALLED.
13. STAINLESS STEEL FLEXIBLE CONNECTIONS, 6 PLACES.
14. HVH-5 COOLING COIL WAS ORIGINALLY IDENTIFIED AS HC-3.
15. A SECTION OF A16XN PIPING WAS INSTALLED BETWEEN VALVES CC-775 AND CC-776 BY EC 47222 FOR RESISTANCE TO EROSION FROM TURBULENT FLOW.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7863
FLOW DIAGRAM SYMBOLS - E SPEC	G-675176
INSTRUMENTATION SCHEMATICS	A-198381
REACTOR CONTROL BLDG PIPING PENET.	B-198178
LIQUID WASTE DISPOSAL SYS FLOW DIAGRAM	5379-920
INSTRUMENT & STATION AIR SYS FLOW DIAGRAM	G-198280
SERVICE & COOLING WATER SYS FLOW DIAGRAM	G-198199
REACTOR COOLANT SYS FLOW DIAGRAM	5379-1971
STM GENERATOR BLOWDOWN SYS FLOW DIAGRAM	G-198234
PRIMARY SAMPLING SYSTEM FLOW DIAGRAM	5379-353
GASEOUS WASTE DISPOSAL SYS FLOW DIAGRAM	5379-921
SAFETY INJECTION SYS FLOW DIAGRAM	5379-1282
SPENT FUEL PIT COOLING SYS FLOW DIAGRAM	5379-1485
RESIDUAL HEAT REMOVAL SYS FLOW DIAGRAM	5379-1484
CHEMICAL & VOLUME CONTROL SYS FLOW DIAGRAMS	5379-684, 5379-685, 5379-686

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11390 SH.26

REVISIONS	
39	EC 47222 & 58581 ELECTRONICALLY SIGNED
40	EC 77566 ELECTRONICALLY SIGNED
41	EC 78954 ELECTRONICALLY SIGNED

DRN: N.E.L. LLOYD
CHK: W. JOHNSON
DSGN: A.S.M. LT
ENG: R.M. LT
APPR: C.H. MYERS
DRFT: M.C.S.
NEXT USED ON

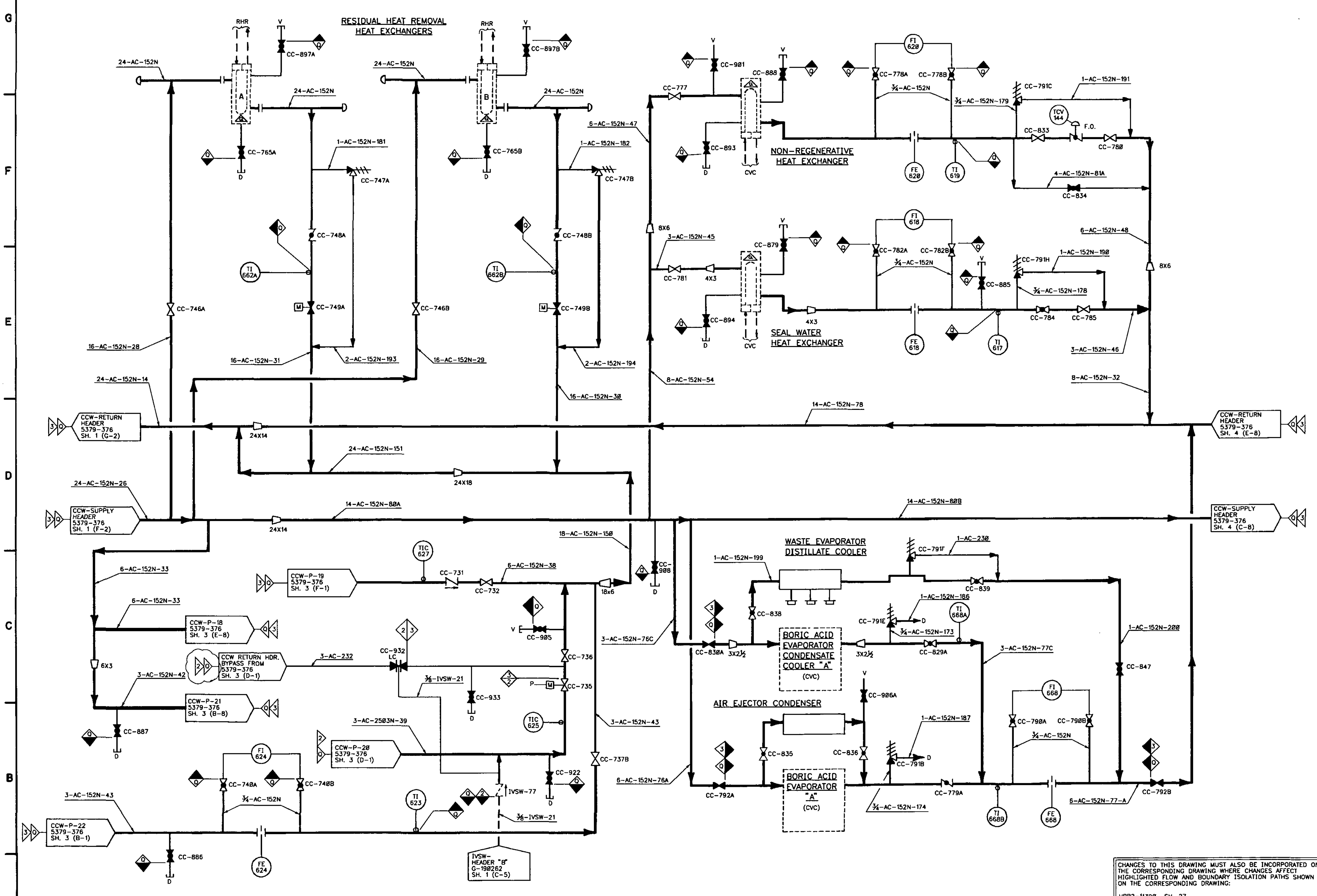
CAROLINA POWER & LIGHT CO
H B ROBINSON 2 "E" PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

COMPONENT COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR DR.	SIZE	DRAWING DR.	REV
	E	5379-376	41

SCALE NONE SHEET 1 OF 4

NOTES:
FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE SHEET 1.



CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

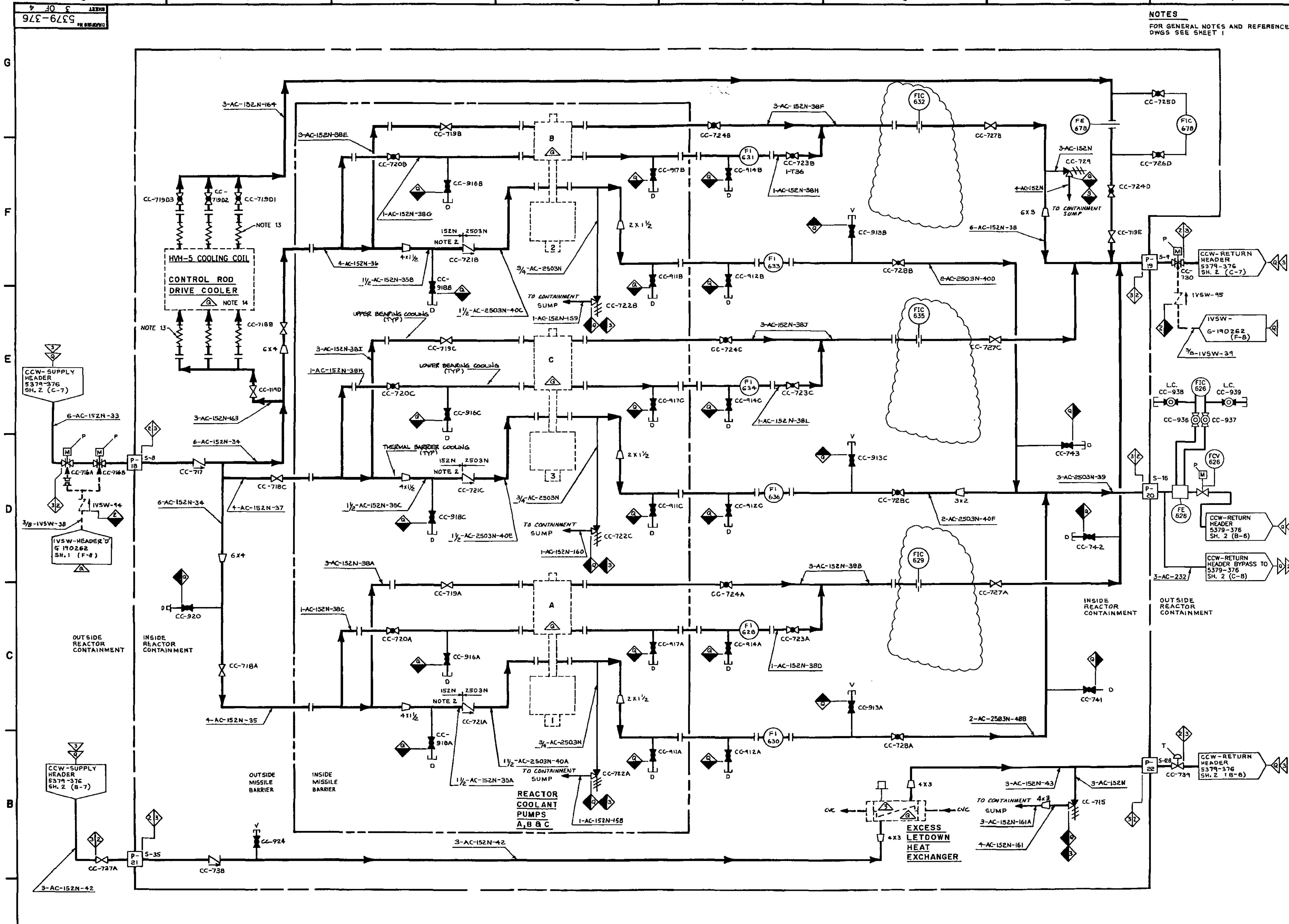
HBR2-11390 SH. 27

CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT - No 2 HARTSVILLE, S.C.

COMPONENT COOLING WATER SYSTEM FLOW DIAGRAM

DRN M. WHITE
CHK W. JOHNSON

SIZE E | DRAWING No 5379-376 | REV 33
SCALE NONE | SHEET 2 OF 4



REVISIONS		
12	DRN 82 00579	REVISED & REDRAWN SUPERSEDES DWG NO CP 200 5379 376 REV #11 SH 2 BY M WHITE CHK W JOHNSON APPR ... Q LIST BOUNDARIES OK ... ISI BOUNDARIES OK
13	DRN 83-171	BY KEN FULBRIGHT CK W JOHNSON APPR ...
14	DRN 84 1219 MOD	BY KLF CK W JOHNSON APPR ...
15	DCR 85-20 MOD	BY HAROLD E L LLOYD CHK W JOHNSON APPR ...
16	PCR 86 620 MOD M-874	BY G MILES CHK W JOHNSON APPR ...
17	DCR 87 1193	BY J E CHK W JOHNSON APPR ...
18	DCR 88 236	BY S MARCOM CHECK W JOHNSON APPR ...
19	DCR 92 158	BY HEL LLOYD CK J WALTERS APPR C.L OLIVER
20	DCR 92 1070	BY HEL LLOYD CK J WALTERS APPR C.L OLIVER
21	DCR 94 ...	BY R MACDONALD CHK G JAKEN APPR
22	DCR 98-466 ESR 97-182	BY: JOHN WALTERS CHK: C.L. OLIVER APPR: C.L. OLIVER 4/17/98
23	EC 54448	BY: W. PERKINS CHK: J.L. WALTERS APPR: C.L. OLIVER 5/8/04
24	EC 61833	ELECTRONICALLY SIGNED
25	EC 61834 & 60183	ELECTRONICALLY SIGNED
26	EC 66858	ELECTRONICALLY SIGNED
27	EC 79965 & 79124	ELECTRONICALLY SIGNED

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

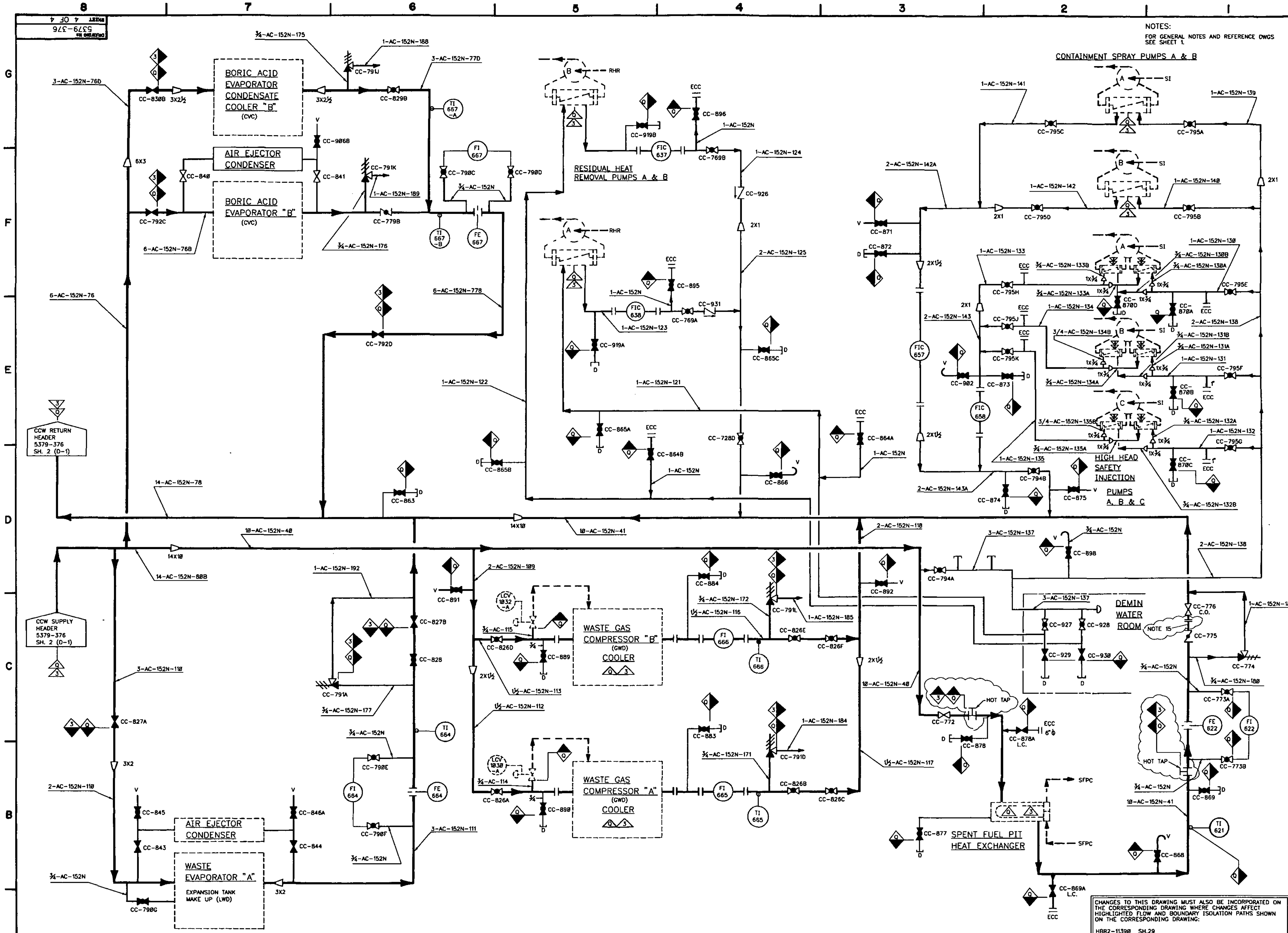
HBR2-11390 SH. 28

DRN M WHITE
CHK W JOHNSON
DSGN AS BUILT
ENG AS BUILT
APPR
DRFT APPR
NEXT USED ON

CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT – No 2 HARTSVILLE, S C

COMPONENT COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR No | SIZE E | DRAWING No 5379-376 | REV 27
SCALE NONE | SHEET 3 OF 4



DRN	H E L LLOYD
CHK	W JOHNSON
DSGN	As b cT
ENG	As B cT
NEXT USED ON	

CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT – No 2 HARTSVILLE, S C

COMPONENT COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING No	REV
	E	5379-376	34

SCALE NONE — SHEET 4 OF 4

REVISIONS:
12 — REVISED & REDRAWN THIS SHEET SUPERSEDES DWG NO CP 200 5379 376 SH 3 REV #11 BY H E L LLOYD CHK W JOHNSON
13 — DRN 83-712
14 — BY KEN FULBRIGHT CK W JOHNSON; DRN 84 170
15 — BY CLINT PARVIN CHK R A CHEWNING; DCR 84-1045
16 — MOD 787 BY HAROLD E L LLOYD CHK W JOHNSON; DRN 85 21
17 — BY W BLANCHARD CHK W JOHNSON; DCR 85-631
18 — BY HAROLD E L LLOYD CHK W JOHNSON; DCR 85 981
19 — BY HAROLD E L LLOYD CHK W JOHNSON; DCR 86-1271
20 — BY H E L LLOYD CK W JOHNSON; DCR 90-107
21 — BY J WALTERS CHK H E LLOYD; DCR 90 1040; MOD 1059
22 — BY HEL LLOYD CK J WALTERS; DCR 90-2260; MOD 1017
23 — BY HEL LLOYD CK J WALTERS; DCR 91 516
24 — BY HEL LLOYD CK J WALTERS; DCR 91 1090
25 — BY J WALTERS CHK HEL LLOYD; DCR 91 1725
26 — BY J WALTERS CHK HEL LLOYD; DCR 92 669
27 — BY J WALTERS CHK HEL LLOYD; DCR 93 1545
28 — BY G YAKEN CHK J WALTERS
29 — BY G YAKEN CHK J WALTERS; DCR 95 0611
30 — BY C YAKEN CHK S WATFORD; DCR 95 0515; DCR:97-379
BY: R.MACDONALD CHK: E.S.PERKINS APPR: C.L.OLIVER 10/27/97
31 — DCR: 97-559 ESR: 97-00182 BY: R.MACDONALD CHK: C.L. OLIVER APPR: C.L. OLIVER 1/29/98
32 — EC 60023 BY: E.S. PERKINS CHK: F.W.GRANTHAM APPR: C.L.OLIVER 4/8/05
33 — EC 58998 ELECTRONICALLY SIGNED
34 — EC 47222 & 75553 ELECTRONICALLY SIGNED

DRAWING NO. 5379-685
SHEET NO.: 1 OF 3

INSIDE MISSILE BARRIER
OUTSIDE MISSILE BARRIER
INSIDE REACTOR CONTAINMENT
OUTSIDE REACTOR CONTAINMENT
PIPE TUNNEL
CHARGING PUMP ROOM
NON-REGENERATIVE HEAT EXCHANGER ROOM
RHR HX ROOM
SEAL WATER HX ROOM

RC - LOOP 1 5379-1971 SH.1 (F-5)
RC - LOOP 2 5379-1971 SH.1 (C-5)
RC - LOOP 1 5379-1971 SH.1 (G-8)
RC - AUX. SPRAY 5379-1971 SH.2 (G-4)
RC - RETURN 5379-1971 SH.1 (A-8)
RC - PRT 5379-1971 SH.2 (F-5)
RC - PRT 5379-1971 SH.2 (G-5)
RC - PRT 5379-1971 SH.2 (F-5)
IVSW - HEADER 'C' G-198262 SH.1 (C-8)
IVSW - HEADER 'A' G-198262 SH.1 (C-3)
IVSW - HEADER 'B' G-198262 SH.1 (C-5)
LWD - RCDT 5379-928 SH.3 (F-2)
CVC - CHARGING PUMPS DISCHARGE 5379-685 SH.2 (D-8)
CVC - PCV-145 5379-685 SH.2 (G-8)
RHR - RHR HX 5379-1484 SH.1 (D-7)
CVC - SEAL WTR HX 5379-685 SH.2 (E-8)
LWD - RCDP DISCH. HDR 5379-928 SH.3 (C-8)
HVAC BLDG. EXHAUST G-198384 SH.2 (F-5)
LWD DRAIN TO SUMP TANK 'A' 5379-928 SH.1 (G-6)
CVC - CHARG. PMPS. 5379-685 SH.2 (A-8)

REGENERATIVE HEAT EXCHANGER
NON-REGENERATIVE HEAT EXCHANGER
EXCESS LETDOWN HEAT EXCHANGER
LETDOWN ORIFICES A, B, & C
REACTOR COOLANT PUMP 'A' (LOOP 1)
REACTOR COOLANT PUMP 'B' (LOOP 2)
REACTOR COOLANT PUMP 'C' (LOOP 3)
CHARGING PUMPS LEAKAGE COLLECTION TANK
SEAL WATER INJECTION FILTER 'A'
SEAL WATER INJECTION FILTER 'B'
CHARGING PUMPS LEAKAGE COLLECTION TANK TRANSFER PUMPS
SEAL WATER RETURN FILTER
NO. 1 SEAL WATER BYPASS ORIFICE NOTE 13

NOTES
1. WITH LOSS OF POWER TO CVC-289 VALVE FAIL OPEN TO VOLUME CONTROL TANK AND CLOSED TO RCDT.
2. SPECIAL VALVE - FUNCTIONS AS BOTH ISOLATION AND RELIEF VALVE.
3. SPECIAL SPRING LOADED CHECK VALVE.
4. DIAPHRAGM SEAL.
5. ELECTROMAGNETIC - LOADED METER IN HORIZONTAL PIPE RUN.
6. .06" DIA. HOLE IN CLAPPER OR CUP.
7. VENT & DRAIN REQUIREMENTS DEPENDENT UPON PIPING LAYOUT TO BE SPECIFIED BY A.E.
8. GLOBE VALVES ARE NORMALLY INSTALLED WITH FLOW UNDER THE SEAT.
9. STEAM TRAP & STRAINER SUPPLIED BY A.E.
10. ALL (M) ITEM NO'S IN CVCS ARE SHOWN WITHOUT PREFIX CPLCS.
11. ACTUATE AUTOMATICALLY BY GAS ANALYZER CONTROLLER A.C-1067.
12. WELDS PIPE SCHEDULES USED. REFER TO EDBS.
13. LOCATE ORIFICE AS CLOSE TO RC PUMP AS POSSIBLE.
14. VALVE POSITION IS SHOWN WITH FILTER 'A' IN SERVICE AND FILTER 'B' OUT OF SERVICE.
15. WITH LOSS OF POWER TO TCV-143, VALVE FAILS CLOSED TO MIXED BED DEMINERALIZERS AND OPENS TO REACTOR COOLANT FILTERS.
16. WITH LOSS OF POWER TO LCV-115A, VALVE FAILS OPEN TO VOLUME CONTROL TANK.
17. WITH LOSS OF POWER TO CVC-246, VALVE FAILS OPEN TO VOLUME CONTROL TANK AND CLOSED TO DEBORATING DEMINERALIZERS.
18. ONLY ONE (1) FILL TANK AND ASSEMBLY ARE REQUIRED TO SERVICE ALL DEMINERALIZERS.
19. DELETED
20. BORON RECIRCULATION PIPING TO AND FROM BIT AND BASTS BLOCKED USING 1¼"ø SS BLIND STOCK AS PER MOD-888.
21. HEAT TRACING ON BORON RECIRC. PIPING TO AND FROM BIT AND BASTS DEACTIVATED AS PER MOD-888.
22. PI-3001 IS ON THE FLUID DRIVES LUBRICATION OIL.
23. VIEWPORTS ADDED IN DRAIN LINES TO CHECK DRAIN FLOW.
24. HOLE DRILLED IN UPSTREAM DISK.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7863
FLOW DIAGRAM SYMBOLS (M) E-SPEC	G-675176
INSTRUMENT SCHEMATICS	A-198381
REACTOR CONT. BLDG. PIPING PENET.	B-198178
PRIMARY SAMPLING SYSTEM FLOW DIAGRAM	5379-353
CHEM & VOL CONTROL SYS FLOW DIAGS	5379-684
INSTRUMENT & STATION AIR SYSTEM	G-198288
REACTOR COOLANT SYSTEM FLOW DIAGRAM	5379-1971
AUXILIARY STEAM SYSTEM FLOW DIAGRAM	G-1982848
COMPONENT COOLING WATER SYSTEM	5379-376

REVISIONS

NO	DATE	BY	DESCRIPTION
37	9/4/92	R MACDONALD	DCR 92-1122
38	12/15/89	D.M. EDWARDS	DCR 89-1470
39	12/15/89	D.M. EDWARDS	DCR 89-1580
40	6/6/89	R MACDONALD	DCR 89-1358
41	11/4/88	J WALTERS	DCR 88-1174
42	10/26/88	D.M. EDWARDS	DCR 88-1133
43	10/26/88	D.M. EDWARDS	DCR 88-1133
44	10/26/88	F.W. GRANTHAM	DCR 88-883
45	10/26/88	D.M. EDWARDS	DCR 88-883
46	4/27/89	F.W. GRANTHAM	DCR 89-484
47	1/3/89	F.W. GRANTHAM	DCR 89-482
48	1/18/91	E.S. PERKINS	CC 56274
49	1/13/92	E.S. PERKINS	CC 56785
50	1/14/92	E.S. PERKINS	CC 56471
51	4/27/94	J.L. WALTERS	CC 62763
52		ELECTRONICALLY SIGNED	CC 66518
53	12/22/94	J WALTERS	DCR 94-1124
54	12/21/94	J WALTERS	DCR 94-1165
55	1/10/95	J WALTERS	DCR 94-1165
56	2/6/95	J WALTERS	DCR 94-1165

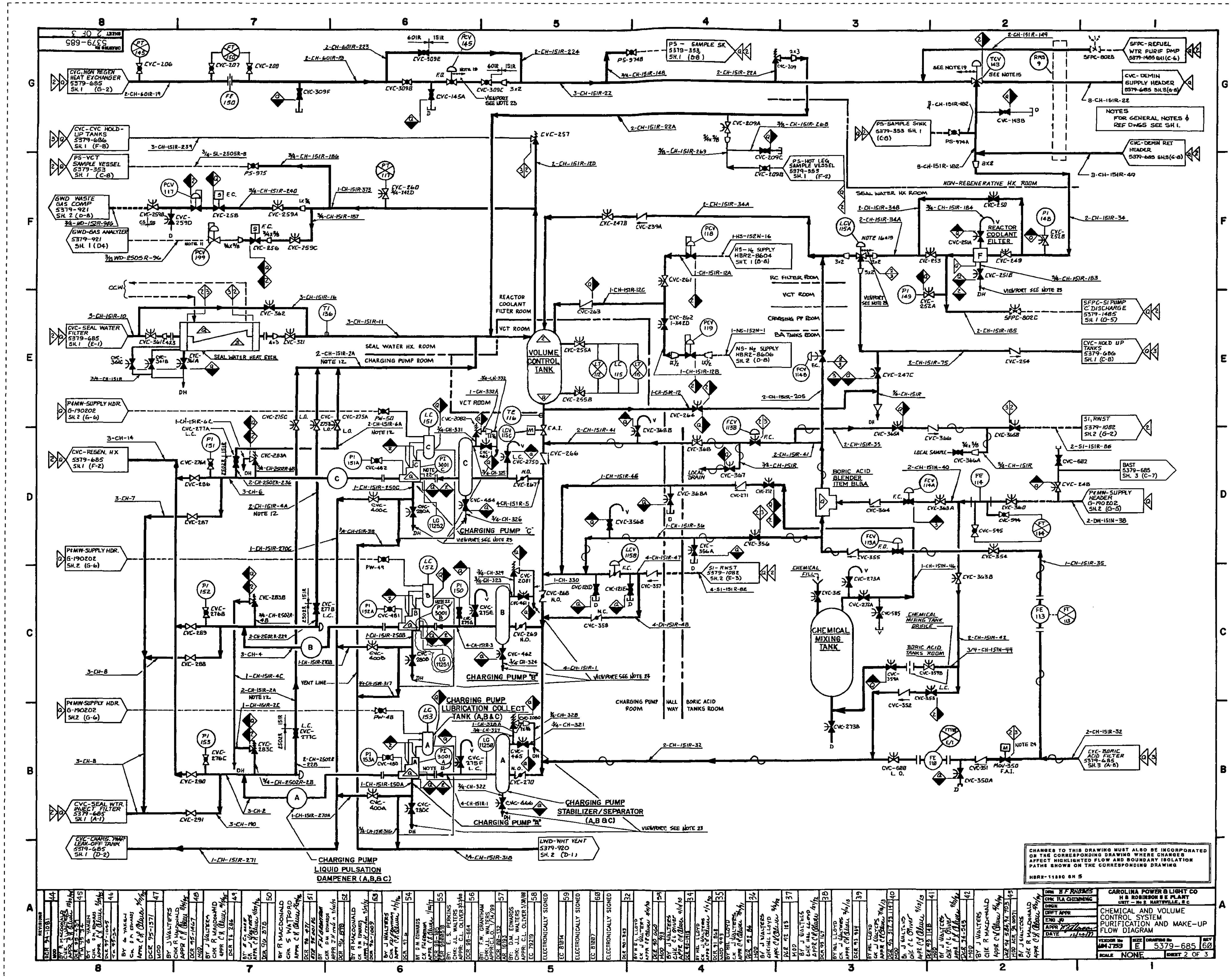
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING
HBR2-11380 SH 4

DES (M)	
CHK R.A.CHEWNING	
DESN (M)	
DRFT APPR	
I-NC	
APPR	
DATE	

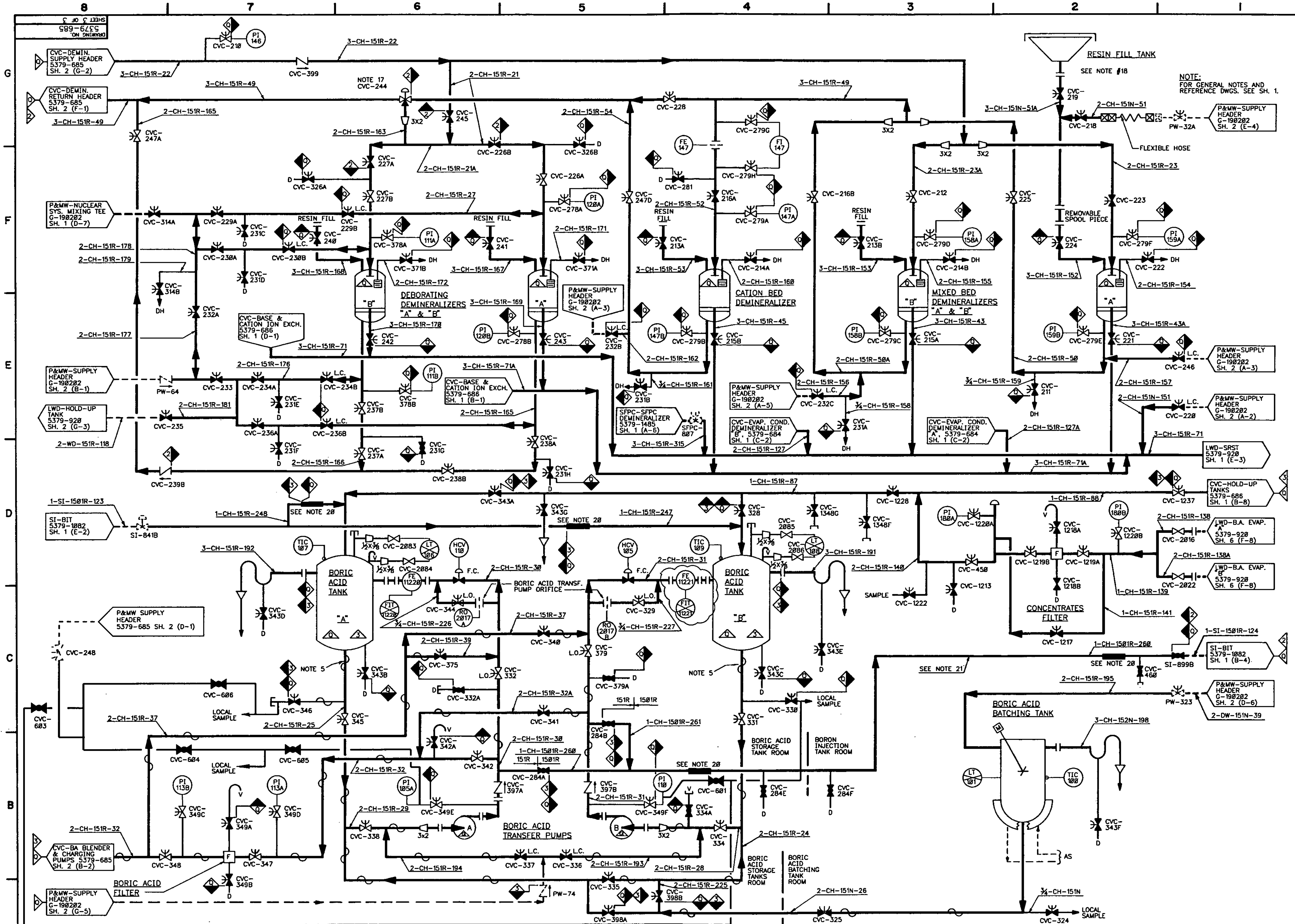
CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT UNIT - No 2 HARTSVILLE, S.C

CHEMICAL & VOLUME CONTROL SYSTEM PURIFICATION & MAKE-UP FLOW DIAGRAM

VENDOR No 684J753 | SIZE E | DRAWING No 5379-685 | REV 52
SCALE NONE | SHEET 1 OF 3



VOLUME CONTROL TANK
CHEMICAL MIXING TANK
BORIC ACID BLENDER ITEM BLBA
REACTOR COOLANT FILTER
SEAL WATER HEAT EXCH
CHARGING PUMP "C"
CHARGING PUMP "B"
CHARGING PUMP "A"
CHARGING PUMP LUBRICATION COLLECT TANK (A,B&C)
CHARGING PUMP STABILIZER/SEPARATOR (A,B&C)
CHARGING PUMP LIQUID PULSATION DAMPENER (A,B&C)
NON-REGENERATIVE HX ROOM
SEAL WATER HX ROOM
CHARGING PUMP ROOM
REACTOR COOLANT FILTER ROOM
VCT ROOM
RC FILTER ROOM
CHARGING PP ROOM
BA TANKS ROOM
HALL WAY
BORIC ACID TANKS ROOM
CVC-NON REGEN HEAT EXCHANGER 5379-685 SH.1 (G-2)
CVC-CVC HOLD-UP TANKS 5379-686 SH.1 (F-8)
PS-VCT SAMPLE VESSEL 5379-353 SH.1 (C-8)
GWD WASTE GAS COMP 5379-921 SH. 2 (D-8)
GWD-GAS ANALYZER 5379-921 SH. 1 (D4)
CVC-SEAL WATER FILTER 5379-685 SH.1 (E-1)
PMW-SUPPLY HDR. G-190202 SH.2 (G-6)
CVC-REGEN. HX 5379-685 SH.1 (F-2)
CVC-SEAL WTR INJECT FILTER 5379-685 SH.1 (A-1)
CVC-CHARG. PUMP LEAK-OFF TANK 5379-685 SH.1 (D-2)
LWD-WHT VENT 5379-920 SH.2 (D-1)
PS - SAMPLE SK 5379-353 SH.1 (B-8)
SFPC-REFUEL WTR PURIF PMP 5379-1485 SH.1 (C-6)
CVC-DEMIN SUPPLY HEADER 5379-685 SH.3 (G-8)
PS-SAMPLE SINK 5379-353 SH.1 (C-8)
PS-HOT LEG SAMPLE VESSEL 5379-353 SH.1 (F-2)
CVC-DEMIN RET HEADER 5379-685 SH.3 (G-8)
HS-H2 SUPPLY HBR2-8604 SHT. 1 (B-8)
NS-N2 SUPPLY HBR2-8606 SH.2 (D-8)
SFPC-SI PUMP 'C' DISCHARGE 5379-1485 SH.1 (D-5)
CVC-HOLD UP TANKS 5379-686 SH.1 (C-8)
SI, RWST 5379-1082 SH.2 (G-2)
BAST 5379-685 SH. 3 (C-7)
PMW-SUPPLY HEADER G-190202 SH.2 (G-5)
SI-RWST 5379-1082 SH.2 (E-3)
CVC-BORIC ACID FILTER 5379-685 SH.3 (A-8)
NOTES FOR GENERAL NOTES & REF DWGS SEE SH.1.
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING
HBR2-11880 SH 5
CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT — No 2 HARTSVILLE, S C
CHEMICAL AND VOLUME CONTROL SYSTEM PURIFICATION AND MAKE-UP FLOW DIAGRAM
DRN B F RHODES
CHK R.A CHENNING
SIZE E
DRAWING No 5379-685
REV 60
SCALE NONE
SHEET 2 OF 3



REVISIONS		
15	DRN. 83-789	REVISED & REDRAWN PER WALKDOWN TO SUPERSEDE DWG. CP-200-5379-685 SH. 3, REV. 14. BY: CLINT PARVIN CHK: R.A. CHEWNING APPR: DATE:
16	DRN: 84-692	BY: B. MILES CHK: W. JOHNSON APPR:
17	DRN. 85-1260	BY: K. L. FULBRIGHT CK: W. JOHNSON APPR:
18	DCR: 85-878	BY: HAROLD E.L. LLOYD CK: W. JOHNSON APPR:
19	DCR: 86-24	BY: HAROLD E.L. LLOYD CK: W. JOHNSON APPR:
20	DCR: 86-389 MOD: 888	BY: H.E.L. LLOYD CHK: W. JOHNSON APPR:
21	DCR: 87-1102	BY: H.E.L. LLOYD CK: W. JOHNSON APPR:
22	DCR: 88-966 MOD:	BY: J. WALTERS CK: W. JOHNSON APPR:
23	DCR: 91-1718 MOD:	BY: J. WALTERS CHK: H.E.L. LLOYD APPR: C.L. Oliver
24	DCR: 92-184 MOD:	BY: J. WALTERS CHK: H.E.L. LLOYD APPR: C.L. Oliver
25	DCR: 94-1090 MOD:	BY: J. WALTERS CHK: R. MACDONALD APPR:
26	DCR: 95-216 MOD: EE 94-075	BY: J. WALTERS CHK: R. MACDONALD APPR:
27	DCR: 96-1175	BY: F.N. GRANTHAM CHK: D.M. EDWARDS APPR: J. Harrelson
28	DCR: 98-743 MOD: ESR: 98-00359	BY: J. WALTERS CHK: R.N. GRANTHAM APPR: J. Harrelson
29	DCR 00-130 AR 16193	DWN: D.M. EDWARDS CHK: J.L. WALTERS APPR: C.L. OLIVER 5/30/00
30	EC 61155 AR 154753	DWN: E.S. PERKINS CHK: C.L. OLIVER APPR: C.L. OLIVER 6/1/05
31	EC 61312 AR 160496	DWN: E.S. PERKINS CHK: J.L. WALTERS APPR: C.L. OLIVER 6/13/05
32	EC 64761	ELECTRONICALLY SIGNED
33	EC 72581	ELECTRONICALLY SIGNED
34	EC 72582	ELECTRONICALLY SIGNED

DRN: CLINT PARVIN
CHK: R.A. CHEWNING
DSGN:
DRFT APPR
ENG:
APPR:
DATE:

CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: CHEMICAL & VOLUME CONTROL SYSTEM PURIFICATION & MAKE-UP FLOW DIAGRAM

VENDOR NO.	SIZE	DRAWING NO.	REV.
684J753	E	5379-685	34
SCALE NONE		SHEET 3 OF 3	

DRAWING NO. 5379-686

NOTES:
1. PORTABLE RESIN FILL TANK SHOWN ON DWG. 5379-685, SH. 3.
2. CVC-477 DRAINS THE VENT HEADER.

REFERENCE DRAWINGS:
FLOW DIAG. LEGEND & SYMBOLS – HBR2-78063
FLOW DIAG. SYMBOLS (W) E. SPEC. – G-675176
INSTRUMENTATION SCHEMATICS – A-198301
COMPONENT COOLING WATER SYSTEM – 5379-376
AUXILIARY STEAM SYSTEM – G-198284
INSTRUMENT & STATION AIR SYSTEM – G-198280

NS-N_2 MANIFOLD HBR2-28606 SH. 2 (A-8)
GWD-GAS DECAY TANKS 5379-921 SH. 2 (G-8)
LWD-RCDT PUMP DISCH. 5379-928 SH. 3 (C-8)
CVC-VOL. CONT. TANK 5379-685 SH. 2 (G-8)
GWD-VENT HEADER 5379-921 SH. 1 (C-4)
GWD-COMPRESSOR A&B RELIEF 5379-921 SH. 2 (G-8)
CVC-ION EXCH. FILT. A&B AND GAS STRIP. 5379-686 SH. 2 (E-7)
BORIC ACID BLENDER TEMPORARY DRAIN & SPENT FUEL PIT DRAIN CONNECTION
CVC-MONIT. TANK TRANS. PUMPS DISC. 5379-684 SH. 1 (E-2)
CVC-REACTOR COOLANT FILTER 5379-685 SH. 2 (E-1)
CVC-CONC. FILTER 5379-685 SH. 3 (D-1)
LWD-CASK DECON. DRAIN 5379-928 SH. 1 (C-1)
CASK DECON AREA
LWD-WASTE HOLD-UP TANK 5379-928 SH. 2 (F-1)
GWD-GAS ANALYZER 5379-921 SH. 1 (D-2)
GWD-GAS ANALYZER 5379-921 SH. 1 (C-2)
LWD-WASTE HOLD-UP TANK 5379-928 SH. 2 (E-1)
HOLD-UP TANK "A"
HOLD-UP TANK "B"
HOLD-UP TANK "C"
GAS STRIPPER FEED PUMPS
BASE & CATION ION EXCHANGER "C"
BASE & CATION ION EXCHANGER "B"
BASE & CATION ION EXCHANGER "A"
RESIN FILL CONN.
SEE NOTE #1 (TYP.)
P&MW-PW PUMP HEADER G-198282 SH. 2 (A-4)
CVC-SRST HEADER 5379-685 SH. 3 (E-7)
CVC-SRST HEADER 5379-685 SH. 3 (E-6)
CVC-GAS STRIPPER "A" 5379-686 SH. 2 (E-8)
CVC-GAS STRIPPER "B" 5379-686 SH. 2 (E-1)
RECIRCULATION PUMP
LOCAL SAMPLE
BELL REDUCER

REVISION	BY	DATE	APPR.
12 MOD.	REVISED & REDRAWN PER WALKDOWN TO CH-200-1979-686 SH 1, REV. 11	85-7-10	BY: CLINT PARVIN CHK: RA CHEWNING APPR: [illegible] DATE: [illegible]
13 MOD.	84-1695		BY: B. MILES CHK: N. JOHNSON APPR: [illegible]
14 DCR:	84-1761		BY: K. BURDAIRON CHK: N. JOHNSON APPR: [illegible]
15 DCR:	85-977		BY: MARQUEL LLOYD CHK: N. JOHNSON APPR: [illegible]
16 DCR:	86-1251		BY: FEL LLOYD CHK: N. JOHNSON APPR: [illegible]
17 DCR:	86-1251		BY: [illegible] CHK: [illegible] APPR: [illegible]
18 DCR:	87-0251		BY: J.E. JOHNSON CHK: N. JOHNSON APPR: [illegible]
19 DCR:	87-0587		BY: T. GRAFT ERR CHK: N. JOHNSON APPR: [illegible]
20 DCR:	88-515		BY: J. WALTERS CHK: [illegible] APPR: [illegible]
21 DCR:	89-319		BY: MR. LLOYD CHK: [illegible] APPR: [illegible]
22 DCR:	89-1182		BY: J. WALTERS CHK: MR. LLOYD APPR: [illegible]
23 DCR:	89-1182		BY: J. WALTERS CHK: [illegible] APPR: [illegible]
24 DCR:	91-1148		BY: J. WALTERS CHK: [illegible] APPR: [illegible]
25 DCR:	91-1487		BY: [illegible] CHK: [illegible] APPR: [illegible]
26 DCR:	81-483		BY: E. S. PERKINS CHK: F.W. GRANTHAM APPR: C.L. OLIVER 6/18/81
27 DCR:	82-117		BY: E. S. PERKINS CHK: J. L. WALTERS APPR: C.L. OLIVER 3/27/82
28 EC:	56421		BY: J. L. WALTERS CHK: [illegible] APPR: [illegible]

DRN: CLINT PARVIN
CHK: R.A. CHEWNING
DSGN:
DRFT APPR:
ENG: (W)
APPR:
DATE:

CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT – NO. 2 HARTSVILLE, S.C.

TITLE: CHEMICAL & VOLUME CONTROL SYS – BORON RECIRCULATION PROCESS & STORAGE – FLOW DIAG

VENDOR NO. | SIZE E | DRAWING NO. 5379-686 | REV. 28
SCALE NONE | SHEET 1 OF 2

DRAWING NO. 5379-920
SHEET 3 OF 8

NOTE:
FOR GENERAL NOTES & REFERENCE DRAWINGS, SEE SHEET 1.

RC-LOOP 1 5379-1971 SH. 1 (E-8)
RC-RCP-A SEAL LEAKAGE 5379-1971 SH. 2 (B-8)
RC-LOOP 3 5379-1971 SH. 1 (E-1)
RC-LOOP 2 5379-1971 SH. 1 (B-8)
RC-RCP-B SEAL LEAKAGE 5379-1971 SH. 2 (B-3)
RC-RCP-C SEAL LEAKAGE 5379-1971 SH. 2 (B-6)
RC-FLANGE LEAK-OFF 5379-1971 SH. 1 (G-5)
RC-PRT 5379-1971 SH. 2 (F-7)
RC-PRT 5379-1971 SH. 2 (D-6)
NS-N2 SUPPLY HBR2-86116 SH. 2 (E-8)
GWD-VENT HEADER 5379-921 SH. 1 (F-5)
GWD-GAS ANALYZER 5379-921 SH. 1 (E-4)
CVC-HOLD-UP TANKS 5379-686 SH. 1 (F-8)
CVC-CHG. PP. LEAK OFF DRN. TK. PP. DISCH. 5379-685 SH. 1 (B-1)
LWD-WHT 5379-928 SH. 2 (E-3)
CVC-EXCESS LETDOWN HX. 5379-685 SH. 1 (E-4)
SI-A ACCUM. 5379-1982 SH. 5 (E-8)
SI-B ACCUM. 5379-1982 SH. 5 (D-8)
SI-C ACCUM. 5379-1982 SH. 5 (B-8)
IVSW-HEADER "C" G-198262 SH. 1 (E-8)
IVSW-HEADER "D" G-198262 SH. 1 (F-8)
IVSW-HEADER "E" G-198262 SH. 1 (C-5)
IVSW-HEADER "C" G-198262 SH. 1 (C-8)

REACTOR COOLANT DRAIN TANK
REACTOR COOLANT DRAIN PUMPS A & B
SUMP PUMPS A&B
REACTOR CONTAINMENT SUMP
OUTSIDE REACTOR CONTAINMENT BLDG.
INSIDE REACTOR CONTAINMENT BLDG.
REFUELING CANAL FLOOR DRAIN
LOWER CAVITY DRAINS
TO REACTOR CONTAINMENT SUMP
SFPC-REFUEL WTR. PURIFICATION PUMP 5379-1485 SH. 1 (A-5)

REVISIONS				
DCR: 98-317	42	BY: J.L. WALTERS	CHK: E.S. PERKINS	APPR: C.L. OLIVER 3/30/98
ESR: 97-00198		BY: E.S. PERKINS	CHK: F.W. GRANTHAM	APPR: C.L. OLIVER 9/16/97
DCR: 98-3313	43	EC 50274		
	44	EC 78375		ELECTRONICALLY SIGNED
	45			

DRN	K FULBRIGHT		CAROLINA POWER & LIGHT CO
CHK	C. LLORET		H.B. ROBINSON S.E. PLANT
DSGN	R.S. BURTT		UNIT – No. 2 HARTSVILLE, S.C.
ENG	R.S. BURTT	TITLE	LIQUID WASTE DISPOSAL SYSTEM FLOW DIAGRAM
APPR			
QA/PT APPR	2/2/98		
NEXT USED ON		VENDOR No.	SIZE: D — DRAWING No. 5379-920 — REV. 45
		SCALE: NONE	SHEET 3 OF 8

DRAWING No. 5379-921 SHEET 2 OF 2

NOTES:
1. FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE SH. 1.

NOTE 'A'
VALVES WD-3309A&B, WD-3310A&B ARE NON-MECHANICAL VALVES WITH FLEXIBLE ORIFICES WHICH CONTROL FLOW.

WASTE GAS COMPRESSOR PKG."A"

WASTE GAS COMPRESSOR PKG."B"

MOISTURE SEPARATOR

COOLER

GAS DECAY TANKS

OUTSIDE GAS DECAY TANK CUBICLE
INSIDE GAS DECAY TANK CUBICLE

SAMPLE STATION

CVC-HOLDUP TKS. 5379-686 SH. 1 (G-8)

CVC-HOLDUP TKS. 5379-686 SH. 1 (E-8)

NS-N_2 SUPPLY HBR2-8606 SH. 2 (F-8)

NS-N_2 SUPPLY HBR2-8605 SH. 2 (B-8)

CVC-VOLUME CONTROL TK VENT 5379-685 SH. 2 (F-8)

GWD-GAS ANALYZER 5379-921 SH. 1 (G-2)

CVC-GAS STRIPPER 5379-686 SH. 2 (G-5)

GWD-GAS ANALYZER 5379-921 SH. 1 (B-2)

GWD-GAS ANALYZER 5379-921 SH. 1 (E-2)

HVAC-EXHAUST G-190304 SH. 2 (E-5)

HVAC-EXHAUST G-190304 SH. 1 (B-6)

REVISIONS																																
ZONE	9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25
DWG. NO.	83-1298																															
MOD.			MOD										MOD																				
DRN.	BA-7200																															
CHK.			BY: B. MILES		BY: HAROLD E.L. LLOYD		BY: HAROLD E.L. LLOYD		BY: HAROLD E.L. LLOYD		BY: R. SANDERS		BY: HAROLD E.L. LLOYD		BY: HAROLD E.L. LLOYD		BY: L. WALTERS		BY: J. WALTERS		BY: HAROLD E.L. LLOYD		BY: J. WALTERS		BY: HAROLD E.L. LLOYD		BY: J. WALTERS		BY: HAROLD E.L. LLOYD		BY: J. WALTERS		BY: HAROLD E.L. LLOYD
APPR.			CHK: M. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON		CHK: N. JOHNSON
			APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler		APPR: Richard Hyler
DCR:	84-1248						DCR: 85-458		DCR: 86-812		DCR: 87-993		DCR: 89-1077		DCR: 89-1279		DCR: 89-499		DCR: 89-499		DCR: 89-578		DCR: 89-920		DCR: 90-2		DCR: 90-20		DCR: 90-1105		DCR: 92-1105		DCR: 92-1105

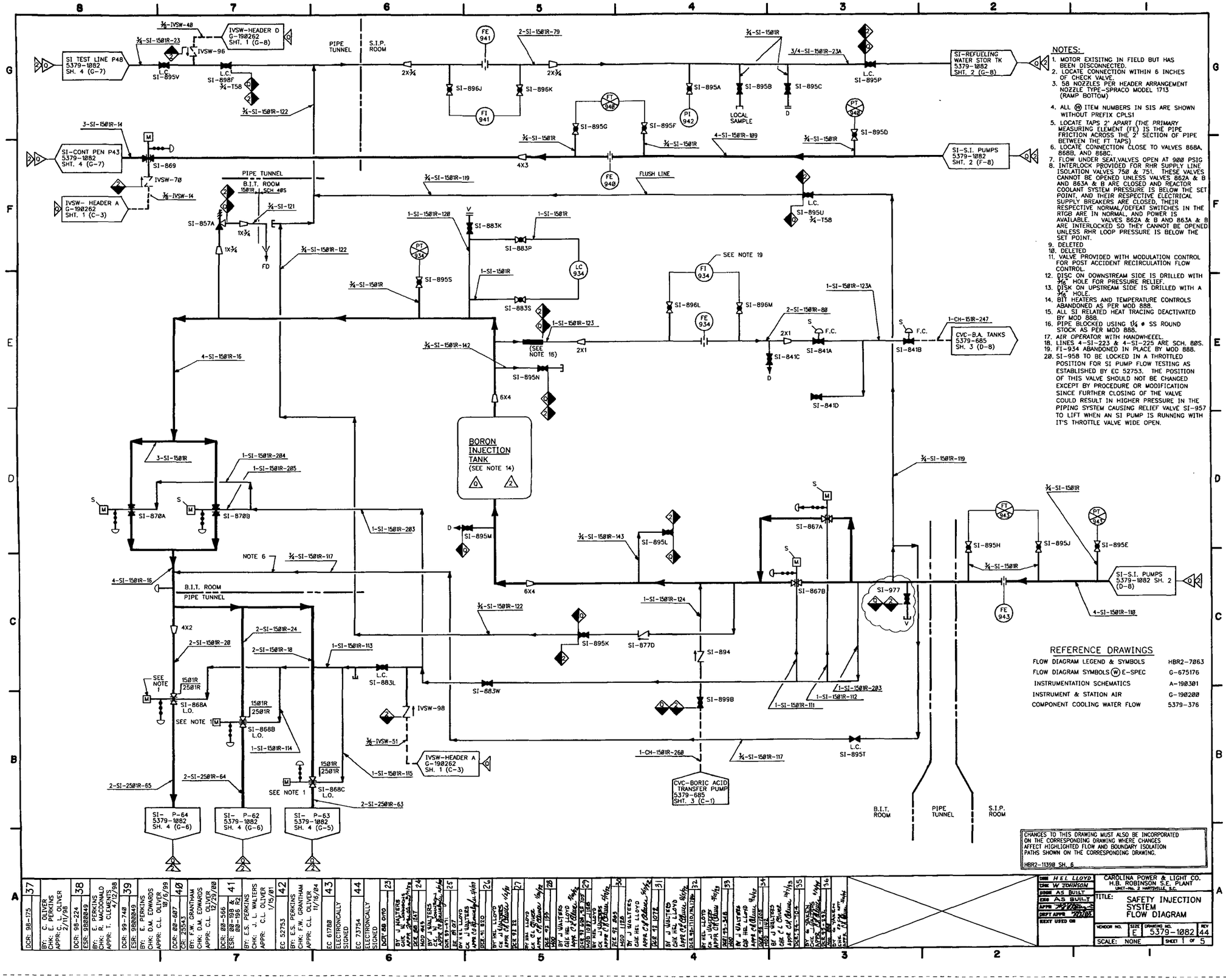
DRN:	J. MAXWELL
CHK:	R.A. CHEWNING
DRFT APPD:	
DSGN:	A.S. SMILEY
ENG:	
APPD:	
DATE:	12-84-83

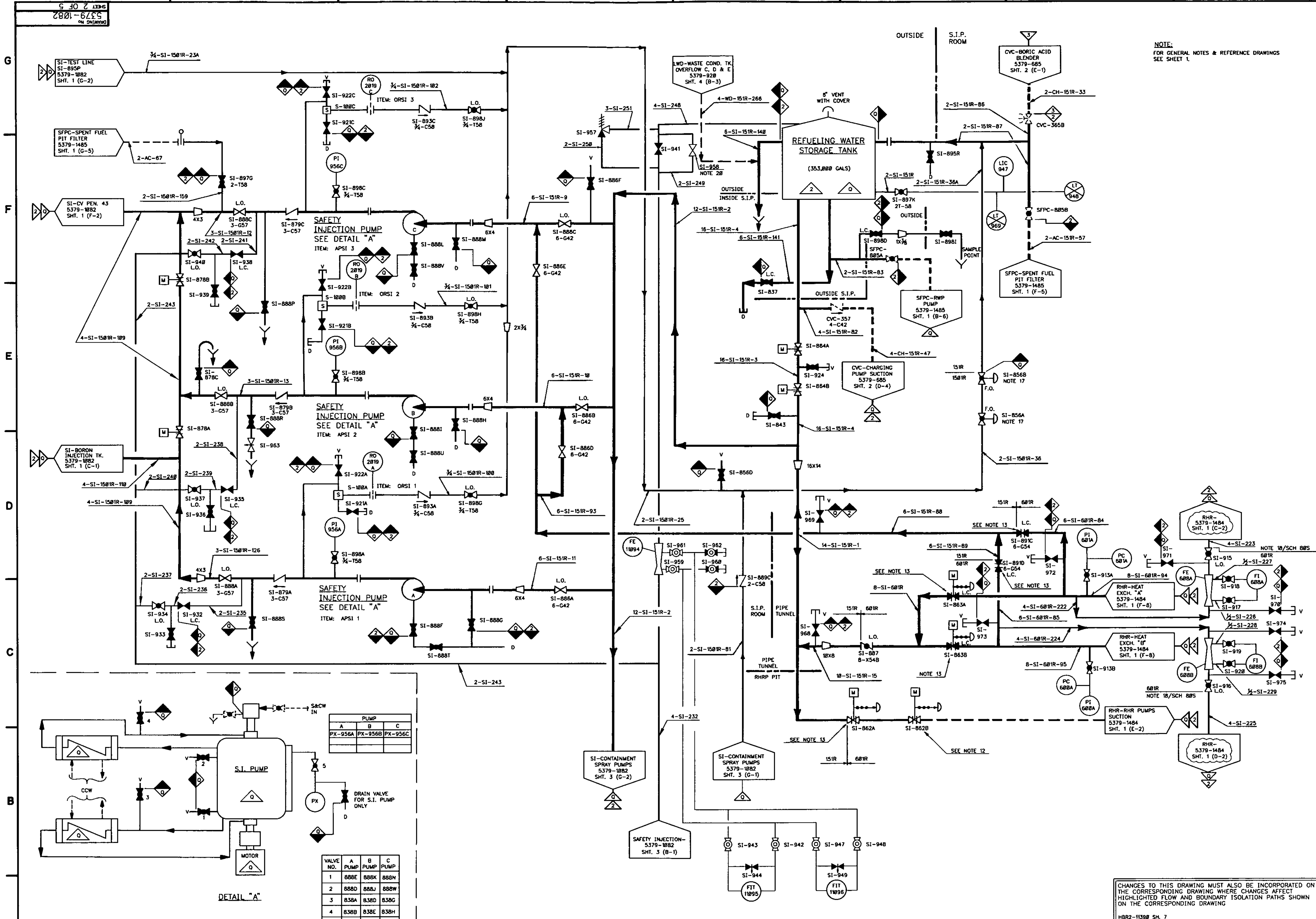
CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT – No. 2 HARTSVILLE, S.C.

TITLE: GASEOUS WASTE DISPOSAL SYSTEM FLOW DIAGRAM

VENDOR No. | SIZE E | DRAWING NO. 5379-921 | REV 32

SCALE NONE | SHEET 2 OF 2


SI TEST LINE P48 5379-1082 SH. 4 (G-7)
SI-CONT PEN P43 5379-1082 SHT. 4 (G-7)
IVSW- HEADER A G-190262 SHT. 1 (C-3)
IVSW-HEADER D G-190262 SHT. 1 (G-8)
PIPE TUNNEL
S.I.P. ROOM
B.I.T. ROOM
SI-REFUELING WATER STOR TK 5379-1082 SHT. 2 (G-8)
SI-S.I. PUMPS 5379-1082 SHT. 2 (F-8)
CVC-B.A. TANKS 5379-685 SH. 3 (D-8)
CVC-BORIC ACID TRANSFER PUMP 5379-685 SHT. 3 (C-1)
SI- P-64 5379-1082 SH. 4 (G-6)
SI- P-62 5379-1082 SH. 4 (G-6)
SI- P-63 5379-1082 SH. 4 (G-5)
BORON INJECTION TANK (SEE NOTE 14)
FLUSH LINE
SEE NOTE 19
(SEE NOTE 15)
SEE NOTE 1
SEE NOTE 6
LOCAL SAMPLE
FD
F.C.
L.C.
SI-869
SI-857A
SI-870A
SI-870B
SI-867A
SI-867B
SI-868A L.O.
SI-868B L.O.
SI-868C L.O.
SI-877D
SI-894
SI-899B
SI-977
SI-841A
SI-841B
SI-841C
SI-841D
SI-883K
SI-883P
SI-883S
SI-883W
SI-895A
SI-895B
SI-895C
SI-895D
SI-895E
SI-895F
SI-895G
SI-895H
SI-895J
SI-895K
SI-895L
SI-895M
SI-895N
SI-895P
SI-895S
SI-895T
SI-895U
SI-896J
SI-896K
SI-896L
SI-896M
FE 941
FE 940
FE 942
FE 943
FE 934
FI 941
FI 934
PT 948
PT 943
PT 934
LC 934
IVSW-96
IVSW-70
IVSW-98
IVSW-51
IVSW-14
IVSW-40
IVSW-HEADER A G-190262 SHT. 1 (C-3)
IVSW-HEADER D G-190262 SHT. 1 (G-8)
2-SI-1501R-79
3-SI-1501R-14
4-SI-1501R-109
4-SI-1501R-110
4-SI-1501R-16
1-SI-1501R-111
1-SI-1501R-112
1-SI-1501R-113
1-SI-1501R-114
1-SI-1501R-115
1-SI-1501R-123A
1-SI-1501R-124
1-SI-1501R-128
2-SI-1501R-80
2-SI-1501R-24
2-SI-1501R-28
2-SI-1501R-18
2-SI-2501R-65
2-SI-2501R-64
2-SI-2501R-63
3-SI-1501R
1-SI-1501R-284
1-SI-1501R-285
1-SI-1501R-283
1-CH-1501R-247
1-CH-1501R-268
3/4-SI-1501R-23
3/4-SI-1501R-23A
3/4-SI-1501R-117
3/4-SI-1501R-119
3/4-SI-1501R-121
3/4-SI-1501R-122
3/4-SI-1501R-142
3/4-SI-1501R-143
3/4-T58
1501R 2501R
SCH 80S
4X3
6X4
4X2
1X3/4
2X1
2X3/4
NOTES:
1. MOTOR EXISITNG IN FIELD BUT HAS BEEN DISCONNECTED.
2. LOCATE CONNECTION WITHIN 6 INCHES OF CHECK VALVE.
3. 58 NOZZLES PER HEADER ARRANGEMENT NOZZLE TYPE-SPRACO MODEL 1713 (RAMP BOTTOM)
4. ALL (W) ITEM NUMBERS IN SIS ARE SHOWN WITHOUT PREFIX CPLS1
5. LOCATE TAPS 2' APART (THE PRIMARY MEASURING ELEMENT (FE) IS THE PIPE FRICTION ACROSS THE 2' SECTION OF PIPE BETWEEN THE FT TAPS)
6. LOCATE CONNECTION CLOSE TO VALVES 868A, 868B, AND 868C.
7. FLOW UNDER SEAT,VALVES OPEN AT 900 PSIG
8. INTERLOCK PROVIDED FOR RHR SUPPLY LINE ISOLATION VALVES 750 & 751. THESE VALVES CANNOT BE OPENED UNLESS VALVES 862A & B AND 863A & B ARE CLOSED AND REACTOR COOLANT SYSTEM PRESSURE IS BELOW THE SET POINT, AND THEIR RESPECTIVE ELECTRICAL SUPPLY BREAKERS ARE CLOSED, THEIR RESPECTIVE NORMAL/DEFEAT SWITCHES IN THE RTGB ARE IN NORMAL, AND POWER IS AVAILABLE. VALVES 862A & B AND 863A & B ARE INTERLOCKED SO THEY CANNOT BE OPENED UNLESS RHR LOOP PRESSURE IS BELOW THE SET POINT.
9. DELETED
10. DELETED
11. VALVE PROVIDED WITH MODULATION CONTROL FOR POST ACCIDENT RECIRCULATION FLOW CONTROL.
12. DISC ON DOWNSTREAM SIDE IS DRILLED WITH 1/16" HOLE FOR PRESSURE RELIEF.
13. DISK ON UPSTREAM SIDE IS DRILLED WITH A 1/16" HOLE.
14. BIT HEATERS AND TEMPERATURE CONTROLS ABANDONED AS PER MOD 888.
15. ALL SI RELATED HEAT TRACING DEACTIVATED BY MOD 888.
16. PIPE BLOCKED USING 1 1/4 ø SS ROUND STOCK AS PER MOD 888.
17. AIR OPERATOR WITH HANDWHEEL.
18. LINES 4-SI-223 & 4-SI-225 ARE SCH. 80S.
19. FI-934 ABANDONED IN PLACE BY MOD 888.
20. SI-958 TO BE LOCKED IN A THROTTLED POSITION FOR SI PUMP FLOW TESTING AS ESTABLISHED BY EC 52753. THE POSITION OF THIS VALVE SHOULD NOT BE CHANGED EXCEPT BY PROCEDURE OR MODIFICATION SINCE FURTHER CLOSING OF THE VALVE COULD RESULT IN HIGHER PRESSURE IN THE PIPING SYSTEM CAUSING RELIEF VALVE SI-957 TO LIFT WHEN AN SI PUMP IS RUNNING WITH IT'S THROTTLE VALVE WIDE OPEN.
REFERENCE DRAWINGS
FLOW DIAGRAM LEGEND & SYMBOLS HBR2-7863
FLOW DIAGRAM SYMBOLS (W) E-SPEC G-675176
INSTRUMENTATION SCHEMATICS A-190301
INSTRUMENT & STATION AIR G-190200
COMPONENT COOLING WATER FLOW 5379-376
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING.
HBR2-11398 SH. 6
B.I.T. ROOM
PIPE TUNNEL
S.I.P. ROOM
37 DCR: 98-175 BY: C. OLIVER CHK: E. PERKINS APPR: C. L. OLIVER 2/11/98
38 DCR: 98-224 ESR: 98000849 BY: E. PERKINS CHK: R. MACDONALD APPR: T. CLEMENTS 4/13/98
39 DCR: 99-748 ESR: 98000849 BY: E. PERKINS CHK: D.M. EDWARDS APPR: C.L. OLIVER 10/6/99
40 DCR: 88-687 CR: 25543 BY: F.W. GRANTHAM CHK: D.M. EDWARDS APPR: C.L. OLIVER 12/29/00
41 DCR: 88-566 & 88-198 R2 ESR: 88-198 R2 BY: E.S. PERKINS CHK: J. L. WALTERS APPR: C.L. OLIVER 1/15/01
42 EC 52753 BY: E.S. PERKINS CHK: F.W. GRANTHAM APPR: C.L. OLIVER 11/16/04
43 EC 61788 ELECTRONICALLY SIGNED
44 EC 73754 ELECTRONICALLY SIGNED
23 DCR 88 OMD
24 BY J WALTERS CHK J. LAMBERT APPR C.L. OLIVER DCR 88 1417 MOD 445
25 BY J WALTERS APPR C.L. OLIVER DCR 99-471
26 BY HEL LLOYD CK J WALTERS APPR C.L. OLIVER DCR 91 810
27 BY J WALTERS CK C.L. OLIVER APPR C.L. OLIVER DCR 91 28
28 BY HEL LLOYD CK J WALTERS APPR C.L. OLIVER DCR 91 195 MOD 445
29 BY J WALTERS CK C.L. OLIVER APPR C.L. OLIVER DCR 91 958 R3 MOD 445
30 BY HEL LLOYD CK J WALTERS APPR C.L. OLIVER DCR 91 1083 MOD 445
31 BY J WALTERS CHK HEL LLOYD APPR C.L. OLIVER DCR 92 1072
32 BY J WALTERS CHK HEL LLOYD APPR C.L. OLIVER DCR 92-1110/1178
33 BY HEL LLOYD CK J WALTERS APPR C.L. OLIVER DCR 92-1110/1178
34 BY J WALTERS CHK HEL LLOYD APPR C.L. OLIVER DCR 92-1268
35 BY J WALTERS CHK C.L. OLIVER APPR C.L. OLIVER DCR 93-154
36 BY S JASEN CHK J WALTERS APPR C.L. OLIVER DCR 93-1336
DRN HEL LLOYD
CHK W JOHNSON
PROG AS BUILT
ENG AS BUILT
APPR
DEPT APPR
REMY USED ON
CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT-No. 2 HARTSVILLE, S.C.
TITLE: SAFETY INJECTION SYSTEM FLOW DIAGRAM
VENDOR NO.
SIZE E
DRAWING NO. 5379-1082
REV 44
SCALE: NONE
SHEET 1 OF 5



PUMP		
A	B	C
PX-956A	PX-956B	PX-956C

VALVE NO.	A PUMP	B PUMP	C PUMP
1	888E	888K	888N
2	888D	888J	888W
3	838A	838D	838G
4	838B	838E	838H
5	838C	838F	838I

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

HBR2-11390 SH. 7

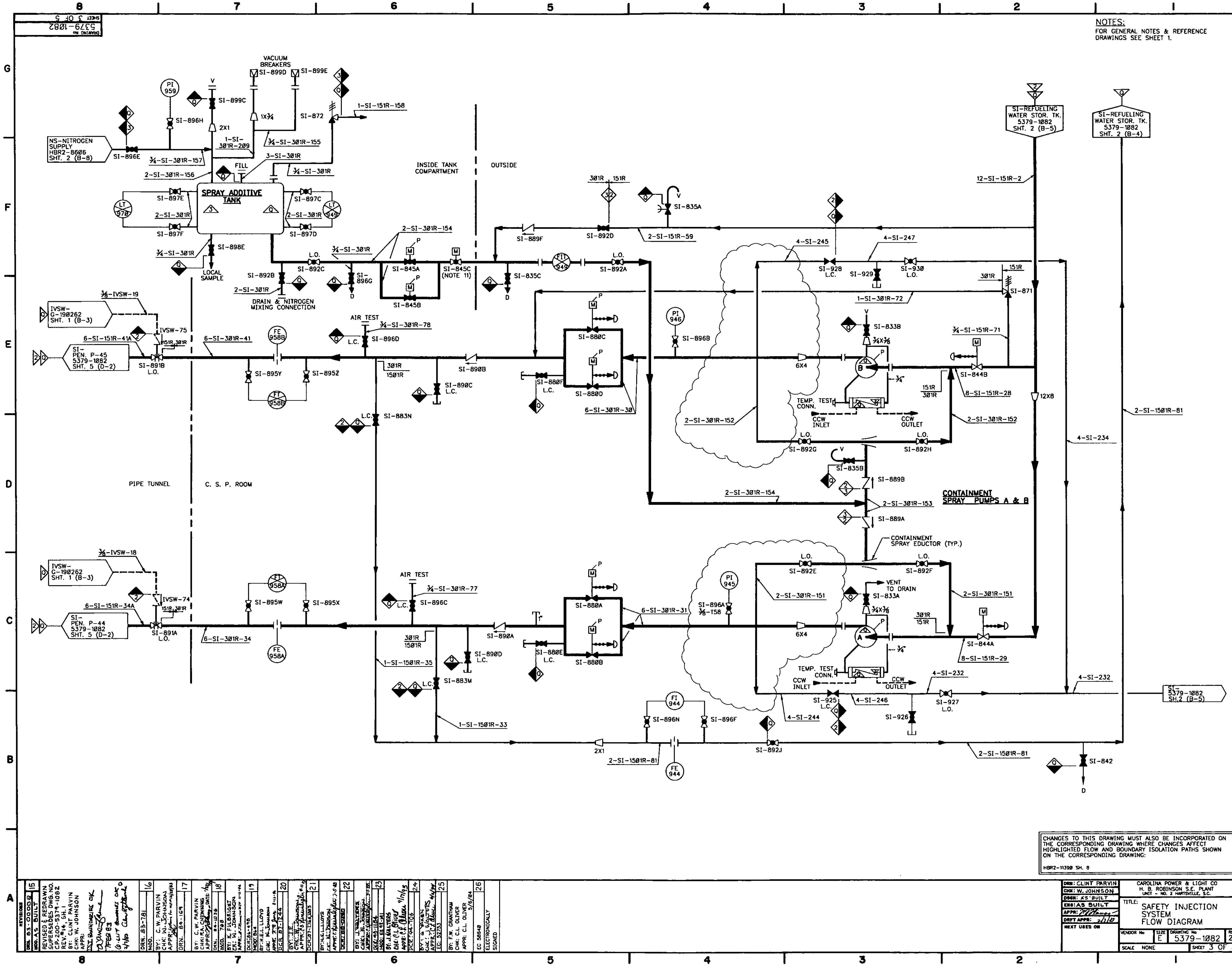
DRN: M. WHITE
CHK: W. JOHNSON
DSGN: AS BUILT
ENG: AS BUILT
APPR:
DRFT APPR: 2/1/93
NEXT USED ON

CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: SAFETY INJECTION SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING No	REV
	E	5379-1082	49

SCALE NONE — SHEET 2 OF 5


NOTES:
FOR GENERAL NOTES & REFERENCE DRAWINGS SEE SHEET 1.
SPRAY ADDITIVE TANK
VACUUM BREAKERS
NS-NITROGEN SUPPLY HBR2-8606 SHT. 2 (B-8)
LOCAL SAMPLE
DRAIN & NITROGEN MIXING CONNECTION
INSIDE TANK COMPARTMENT
OUTSIDE
SI-REFUELING WATER STOR. TK. 5379-1082 SHT. 2 (B-5)
SI-REFUELING WATER STOR. TK. 5379-1082 SHT. 2 (B-4)
IVSW-G-190262 SHT. 1 (B-3)
SI-PEN. P-45 5379-1082 SHT. 5 (D-2)
SI-PEN. P-44 5379-1082 SHT. 5 (D-2)
AIR TEST
PIPE TUNNEL
C. S. P. ROOM
TEMP. TEST CONN.
CCW INLET
CCW OUTLET
CONTAINMENT SPRAY PUMPS A & B
CONTAINMENT SPRAY EDUCTOR (TYP.)
VENT TO DRAIN
SI-5379-1082 SH.2 (B-5)
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:
HBR2-11390 SH. 8
DRN: CLINT PARVIN
CHK: W. JOHNSON
DSGN: AS BUILT
ENG: AS BUILT
CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.
TITLE: SAFETY INJECTION SYSTEM FLOW DIAGRAM
SIZE E
DRAWING No 5379-1082
REV 26
SCALE NONE
SHEET 3 OF 5

NOTE:

FOR GENERAL NOTES & REFERENCE DRAWINGS, SEE SHEET 1.

SI-TEST LINE 5379-1082 SHT. 1 (G-8)

SI-SAFETY INJECTION PUMPS 5379-1082 SHT. 1 (F-8)

SI-BORON INJECTION TANK 5379-1082 SHT. 1 (A-7)

SI-BORON INJECTION TANK 5379-1082 SHT. 1 (A-7)

SI-BORON INJECTION TANK 5379-1082 SHT. 1 (A-7)

OUTSIDE REACTOR CONTAINMENT

INSIDE REACTOR CONTAINMENT

SI-ACCUMULATORS 5379-1082, SH. 5 (G-4)

¾-SI-1501R-23

3-SI-1501R-14

2-SI-2501R-65

2-SI-2501R-64

2-SI-2501R-63

1-SI-1501R-27

P-48 S-5

P-43 S-2

P-64 S-7

P-62 S-3

P-61 S-5

SI-859

¾-SI-1501R

1-RC-601R-71

RC-PRT 5379-1971 SH. 2 (G-6)

¾-SI-1501R-103

¾-SI-1501R-23

1-SI-1501R-27

SI-874E

SI-883R

3X2

2-SI-2501R-65

1-RC-313

RC-PRT 5379-1971 SH. 2 (F-6)

SI-876

¾-SI-2501R-230

SI-923

SI-873K

SI-873L

SI-854B

SI-854A

SI-854D

SI-854C

FT 932

FE 932

FT 933

FE 933

NOTE 5

NOTE 5

2-SI-1501R-17

2-SI-1501R-19

SI-866A

SI-866B

1501R 2501R

1501R 2501R

SI-976 L.O.

2-SI-2501R-201

2-SI-2501R-56

SI-874D

SI-874C

SI-873A

SI-873B

SI-873C

OUTSIDE MISSILE BARRIER

INSIDE MISSILE BARRIER

2-SI-2501R-57

SI-874A

SI-874B

2-RC-2501R-18

2-RC-2501R-20

RC-LOOP 3 HOT LEG 5379-1971 SH. 1 (E-2)

RC-LOOP 2 HOT LEG 5379-1971 SH. 1 (D-7)

SI-873J

SI-873H

SI-873F

SI-875N

SI-875M

NOTE 2

SI-875A

SI-873E

10-RC-2501R-23

RC-LOOP 1 COLD LEG 5379-1971, SH. 1 (E-5)

10-RC-2501R-21

RC-LOOP 2 COLD LEG 5379-1971, SH. 1 (C-5)

10-RC-2501R-37

RC-LOOP 3 COLD LEG 5379-1971, SH. 1 (E-3)

SI-875P

SI-875S

SI-875B

SI-875T

SI-875R

SI-875C

NOTE 2

SI-873D

2-SI-2501R-64

2-SI-2501R-63

10-SI-2501R-47

10-SI-2501R-48

10-SI-2501R-54

SI-884B

¾-SI-2501R-96

¾-SI-1501R-104

¾-SI-1501R-23

SI-850B

F.C.

2501R 1501R

¾-SI-1501R-96A

SI-876A B-C48Z

SI-875H

SI-884A

SI-875G

SI-877A

¾-SI-2501R-90

SI-895I

SI-850A

F.C.

1501R 2501R

¾-SI-1501R-105

SI-850C

F.C.

1501R 2501R

SI-877B ¾-C58

¾-SI-2501R-91

SI-884C

SI-875E

SI-884D

¾-SI-1501R-97A

SI-850D

F.C.

1501R 2501R

¾-SI-2501R-97

SI-876E

SI-876B B-C48Z

SI-876D

¾-SI-1501R-106

SI-875J

SI-875I

SI-850E

F.C.

1501R 2501R

SI-877C

¾-SI-2501R-92

SI-884E

SI-850F

F.C.

2501R 1501R

¾-SI-1501R-98A

¾-SI-2501R-98

SI-884F

SI-875L

SI-875F

SI-876C

8-SI-2501R-39

10X8

10-SI-2501R-40

8-SI-2501R-37

8-SI-2501R-38

10X8

L.O. SI-885

SI-875K

SI-865A

SI-865B

SI-865C

10-SI-601R-50

10-SI-601R-51

10-SI-601R-55

SI-ACCUMULATOR A 5379-1082, SH. 5 (E-7)

SI-ACCUMULATOR B 5379-1082, SH. 5 (C-7)

SI-ACCUMULATOR C 5379-1082, SH. 5 (B-7)

SEE NOTE 13

2501R 601R

RHR-744A N.C.

RHR-744B N.C.

RHR-HX A & B DISCH. PEN. #17 5379-1484 SHT. 1 (B-8)

RHR-HX A & B DISCH. PEN. #17 5379-1484 SHT. 1 (B-8)

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11390 SH. 9

REVISIONS			
DRN AS BUILT			14
CHK AS BUILT			
DRN 83-782	REVISED & REDRAWN SUPERSEDES DWG NO CP-2201-ESM 1002 BY C. HUNT PARVIN CHK W. JOHNSON APPR [signature]	[signature] 4/18/84	15
DRN 83-00041			
DRN 83-782	REVISED PER DCR NO 83-0004. BY M. WHITE CHK C. LLORET SR APPR [signature]	[signature] 1/13/83	16
DRN [illegible] DCR 86-316	BY K. FILBRIGHT CHK W. JOHNSON APPR [signature]	[signature]	17
DRN 88-1694	BY TRS CHK W JOHNSON APPR [signature]	[signature]	18
DRN 89-1695 DCR 87-1145, 81-1145	BY K. L. F. JOHNSON CHK W. JOHNSON APPR [signature]	[signature]	19
DCR 88-0171	BY J. WALTERS CHK C. OLIVER APPR [signature]	[signature]	20
DCR 90-1682 MOD 944	BY J WALTERS CHK C OLIVER APPR [signature]	[signature] 1/4/91	21
DCR 91-821	BY J WALTERS CHK MR. LLOYD APPR [signature]	[signature] 7/4/91	22
MOD 1152	BY K. FORBES CHK C.L. OLIVER APPR [signature]	[signature] 7/4/91	23
DCR 92-907	BY J WALTERS CHK C.L. OLIVER APPR [signature]	[signature] 4/4/93	24
DCR 93-1077	BY G. YANKEN CHK C.L. OLIVER APPR [signature]	[signature] 8/23/94	25
DCR 98-225	BY E. S. PERKINS CHK J. WALTERS APPR C.L. OLIVER	8/5/99	26
DCR 98-488	BY E. S. PERKINS CHK J. WALTERS APPR C.L. OLIVER	8/5/99	27
CR 2004-3	BY E.S. PERKINS CHK D.M. EDWARDS APPR C.L. OLIVER	12/21/00	28
EC 68823	BY: E.S. PERKINS CHK: F.W. GRANTHAM APPR: C.L. OLIVER	1/8/09	29
EC 58379	ELECTRONICALLY SIGNED		30
EC 72835	ELECTRONICALLY SIGNED		
EC 72356	ELECTRONICALLY SIGNED		31

DSN	CLINT PARVIN
DDC	W JOHNSON
DRGS	AS BUILT
ENG	AS BUILT
APPR	[signature]
DEPT APPR	[signature] 1/13/83
NEXT USED ON	

CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT - No 2 HARTSVILLE, S C

TITLE SAFETY INJECTION SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING No	REV
	E	5379-1082	31

SCALE NONE SHEET 4 OF 5

DRAWING NO. 5379-1082 SHEET 5 OF 5

NOTES :
FOR GENERAL NOTES & REFERENCE DRAWINGS SEE SHEET 1

OUTSIDE REACTOR CONTAINMENT
INSIDE REACTOR CONTAINMENT

ACCUMULATOR A
ACCUMULATOR B
ACCUMULATOR C

SI - SAFETY INJECTION PUMPS 5379-1082 SH. 4 (G-4)

ECCS SUMP
S-158 ECCS SUMP STRAINERS

C.S.P. ROOM | OUTSIDE

INSIDE REACTOR CONTAINMENT

OUTSIDE REACTOR CONTAINMENT

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING.
HBR2-11398 SH. 18

DRN	CLINT PARVIN
CHK	W JOHNSON
DSGN	AS BUILT
ENG	AS BUILT
APPR	
DEPT APPR	10/12
NEXT USED ON	

CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT UNIT – No. 2 HARTSVILLE, S.C.

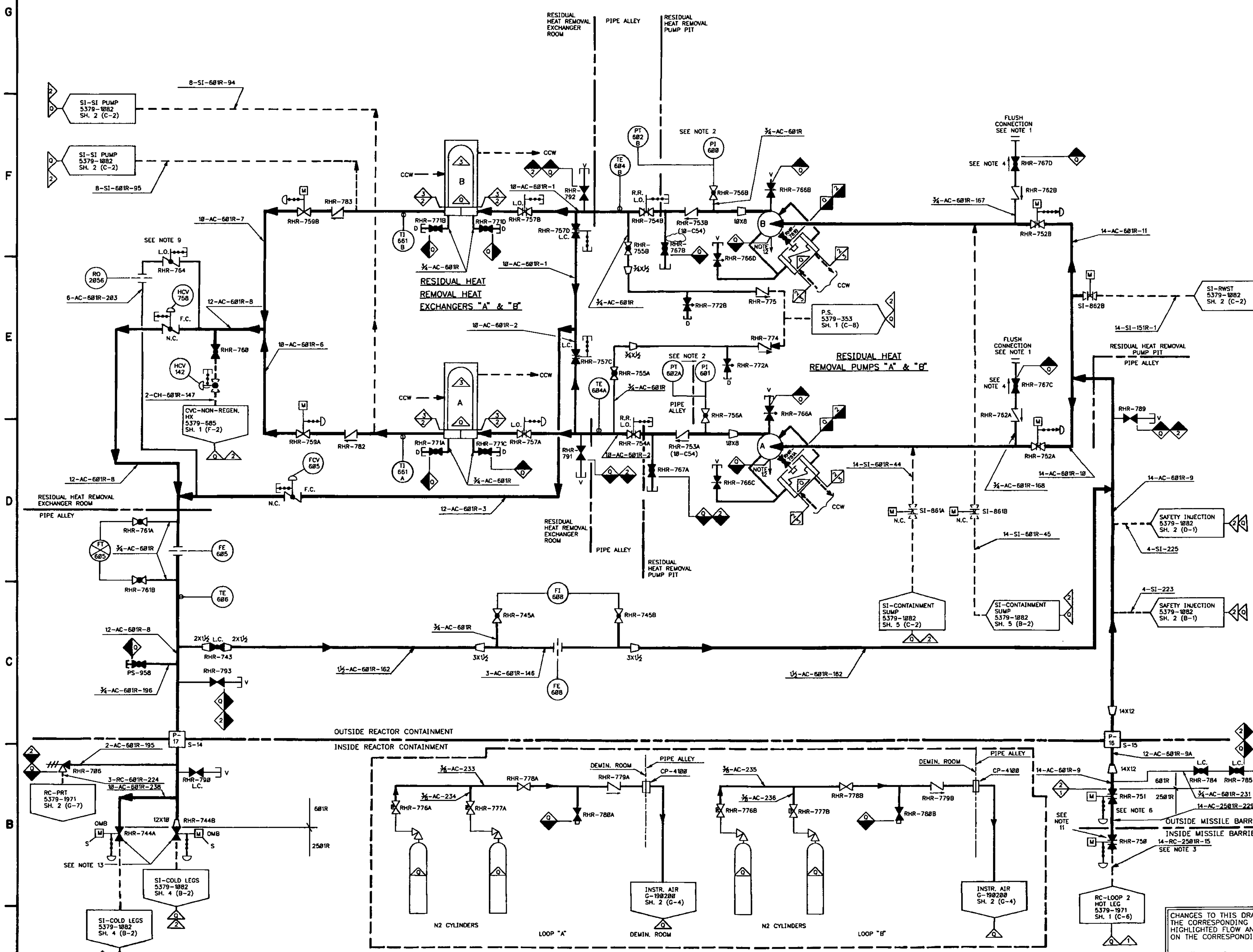
TITLE: SAFETY INJECTION SYSTEM FLOW DIAGRAM

VENDOR No.	SIZE	DRAWING No.	REV
	E	5379-1082	39

SCALE: NONE SHEET 5 OF 5

ELECTRONICALLY SIGNED

DRAWING NO. 5379-1484 SHEET 1 OF 1



NOTES:

1. LOCATE ABOVE RESIDUAL HEAT REMOVAL PUMP SHIELDING AND CLOSE TO VALVES 752A & B.
2. INSTALL AT AN ACCESSIBLE AND CONVENIENT LOCATION.
3. SUCTION CONNECTION LOCATED ON BOTTOM HALF OF REACTOR COOLANT PIPING, 30° ANGLE TO HORIZONTAL.
4. VALVES ARE NORMALLY INSTALLED WITH FLOW UNDER SEAT. EXCEPTIONS ARE 767C & D.
5. DELETED
6. INTERLOCK PROVIDED FOR RHR SUPPLY LINE ISOLATION VALVES 750 & 751. THESE VALVES CANNOT BE OPENED UNLESS VALVES 862A & B AND 863A & B ARE CLOSED AND REACTOR COOLANT SYSTEM PRESSURE IS BELOW THE SETPOINT AND THEIR RESPECTIVE ELECTRICAL SUPPLY BREAKERS ARE CLOSED, THEIR RESPECTIVE NORMAL/DEFEAT SWITCHES IN THE RTGB ARE IN NORMAL, AND POWER IS AVAILABLE. VALVES 862A & B AND 863A & B ARE INTERLOCKED SO THEY CANNOT BE OPENED UNLESS RHR LOOP PRESSURE IS BELOW THE SET-POINT.
7. ALL Ⓦ ITEM NO'S ARE SHOWN WITHOUT PREFIX CPLAC.
8. DELETED
9. VALVES NORMALLY OPEN DURING PLANT OPERATION & CLOSED DURING SHUTDOWN INSTALL IN CONVENIENT OPERATING LOCATION.
10. DELETED
11. RHR 750 HAS A 3/16" HOLE IN UPSTREAM DISK.
12. SEAL LEAKAGE TO SUMP.
13. VALVES RHR-744A & B HAVE A 1/8" HOLE IN THE REACTOR COOLANT SYSTEM SIDE OF DISC FOR PRESSURE RELIEF.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS – HBR2-7063
FLOW DIAG. SYMBOLS Ⓦ E-SPEC – G-675176
INSTRUMENTATION SCHEMATICS – A-190301

REACTOR CONT. BLDG. PIPING PENET. – B-190178

SAFETY INJECTION SYSTEM – FLOW DIAGRAM — 5379-1082
REACTOR COOLANT SYSTEM – FLOW DIAGRAM — 5379-1971
LIQUID WASTE DISPOSAL SYSTEM FLOW DIAGRAM — 5379-920
COMPONENT COOLING WATER SYSTEM FLOW DIAGRAM — 5379-376

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

HBR2-11390 SH.25

REVISIONS

Rev	Reference	By / Chk / Appr
34	DCR: 98-113; ESR: 9700040	BY: R.MACDONALD; CHK: C. L. OLIVER; APPR: C. L. OLIVER 3/27/98
35	DCR: 99-395	BY: E. S. PERKINS; CHK: J. L. WALTERS; APPR: C. L. OLIVER 7/29/99
36	DCR: 00-462; ESR 00-196, 00-198	BY: E. S. PERKINS; CHK: J.L. WALTERS; APPR: C.L. OLIVER 11/8/00
37	DCR: 00-598; CR: 25543	BY: F.W. GRANTHAM; CHK: D.M. EDWARDS; APPR: C.L. OLIVER 12/29/00
38	DCR: 02-483; AR: 54566 C/A #1	BY: E.S. PERKINS; CHK: J.L. WALTERS; APPR: C.L. OLIVER 8/5/02
39	EC 50805	BY: E.S. PERKINS; CHK: J.L. WALTERS; APPR: C.L. OLIVER 11/4/02
40	EC 51299	BY: J. L. WALTERS; CHK: E.S. PERKINS; APPR: C.L. OLIVER 5/4/04
41	EC 71464	ELECTRONICALLY SIGNED
42	EC 72099	ELECTRONICALLY SIGNED
43	EC 75948	ELECTRONICALLY SIGNED
44	EC 75084	ELECTRONICALLY SIGNED
45	EC 83582	ELECTRONICALLY SIGNED

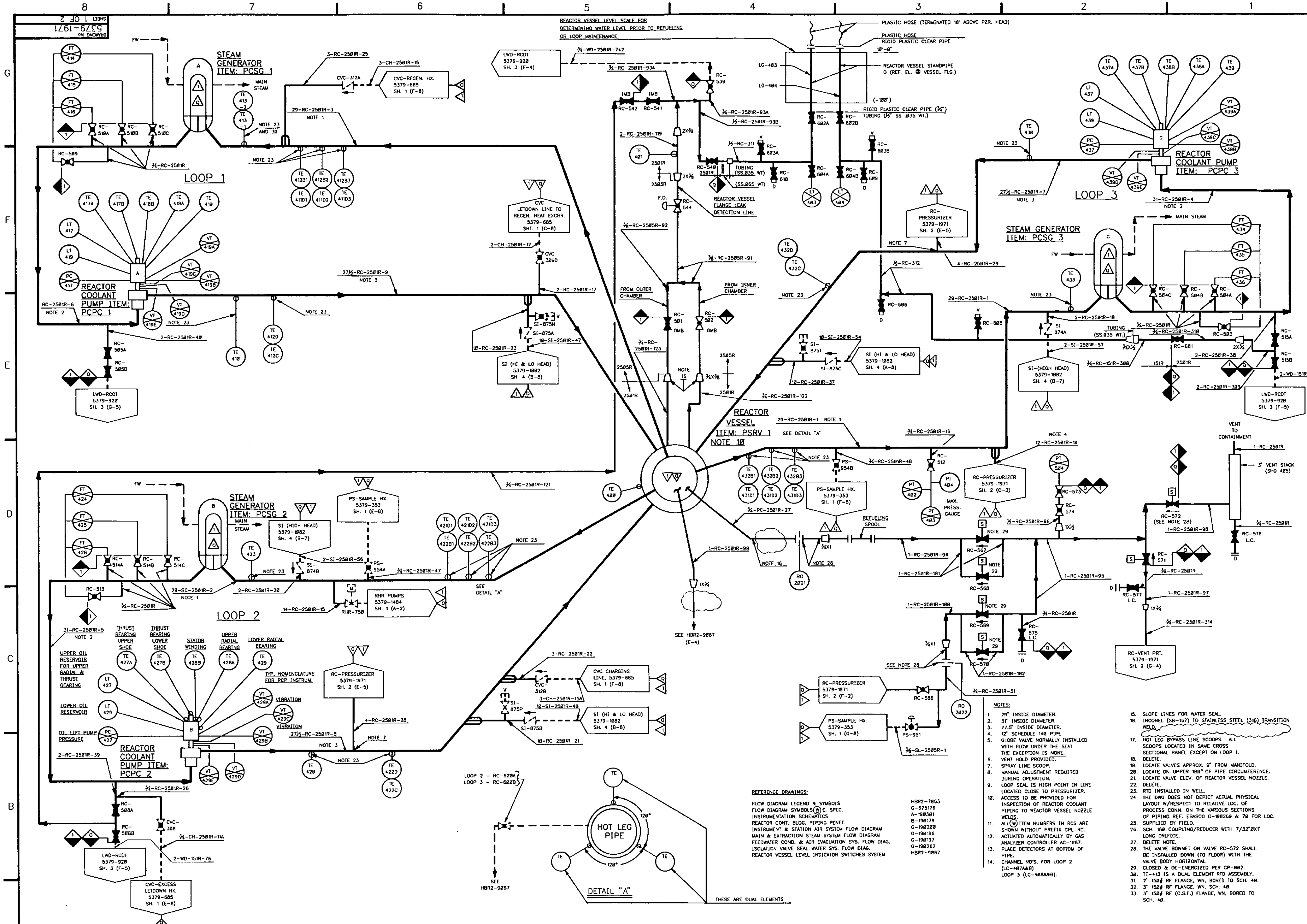
DRN W BLANCHARD
DSGN AS BUILT
ENG AS BUILT

CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT – NO. 2 HARTSVILLE, SC

TITLE: RESIDUAL HEAT REMOVAL SYSTEM FLOW DIAGRAM

VENDOR NO.	SIZE	DRAWING NO.	REV.
	E	5379-1484	45

SCALE NONE — SHEET 1 of 1



REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS (W) E. SPEC.	G-675176
INSTRUMENTATION SCHEMATICS	A-190301
REACTOR CONT. BLDG. PIPING PENET.	B-190178
INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM	G-190200
MAIN & EXTRACTION STEAM SYSTEM FLOW DIAGRAM	G-190196
FEEDWATER COND. & AIR EVACUATION SYS. FLOW DIAG.	G-190197
ISOLATION VALVE SEAL WATER SYS. FLOW DIAG.	G-190262
REACTOR VESSEL LEVEL INDICATOR SWITCHES SYSTEM	HBR2-9067

NOTES:

1. 29" INSIDE DIAMETER.
2. 31" INSIDE DIAMETER.
3. 27.5" INSIDE DIAMETER.
4. 12" SCHEDULE 140 PIPE.
5. GLOBE VALVE NORMALLY INSTALLED WITH FLOW UNDER THE SEAT. THE EXCEPTION IS NONE.
6. VENT HOLD PROVIDED.
7. SPRAY LINE SCOOP.
8. MANUAL ADJUSTMENT REQUIRED DURING OPERATION.
9. LOOP SEAL IS HIGH POINT IN LINE LOCATED CLOSE TO PRESSURIZER.
10. ACCESS TO BE PROVIDED FOR INSPECTION OF REACTOR COOLANT PIPING TO REACTOR VESSEL NOZZLE WELDS.
11. ALL (W) ITEM NUMBERS IN RCS ARE SHOWN WITHOUT PREFIX CPL-RC.
12. ACTUATED AUTOMATICALLY BY GAS ANALYZER CONTROLLER AC-1067.
13. PLACE DETECTORS AT BOTTOM OF PIPE.
14. CHANNEL NO'S. FOR LOOP 2 (LC-407A&B) LOOP 3 (LC-408A&B).
15. SLOPE LINES FOR WATER SEAL.
16. INCONEL (SB-167) TO STAINLESS STEEL (316) TRANSITION WELD.
17. HOT LEG BYPASS LINE SCOOPS. ALL SCOOPS LOCATED IN SAME CROSS SECTIONAL PANEL EXCEPT ON LOOP 1.
18. DELETE.
19. LOCATE VALVES APPROX. 9" FROM MANIFOLD.
20. LOCATE ON UPPER 180° OF PIPE CIRCUMFERENCE.
21. LOCATE VALVE ELEV. OF REACTOR VESSEL NOZZLE.
22. DELETE.
23. RTD INSTALLED IN WELL.
24. THE DWG DOES NOT DEPICT ACTUAL PHYSICAL LAYOUT W/RESPECT TO RELATIVE LOC. OF PROCESS CONN. ON THE VARIOUS SECTIONS OF PIPING REF. EBASCO G-190269 & 70 FOR LOC.
25. SUPPLIED BY FIELD.
26. SCH. 160 COUPLING/REDUCER WITH 7/32"ØX1" LONG ORIFICE.
27. DELETE NOTE.
28. THE VALVE BONNET ON VALVE RC-572 SHALL BE INSTALLED DOWN (TO FLOOR) WITH THE VALVE BODY HORIZONTAL.
29. CLOSED & DE-ENERGIZED PER GP-002.
30. TE-413 IS A DUAL ELEMENT RTD ASSEMBLY.
31. 2" 150# RF FLANGE, WN, BORED TO SCH. 40.
32. 3" 150# RF FLANGE, WN, SCH. 40.
33. 3" 150# RF (C.S.F.) FLANGE, WN, BORED TO SCH. 40.

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11390 SH. 2

CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: REACTOR COOLANT SYSTEM FLOW DIAGRAM

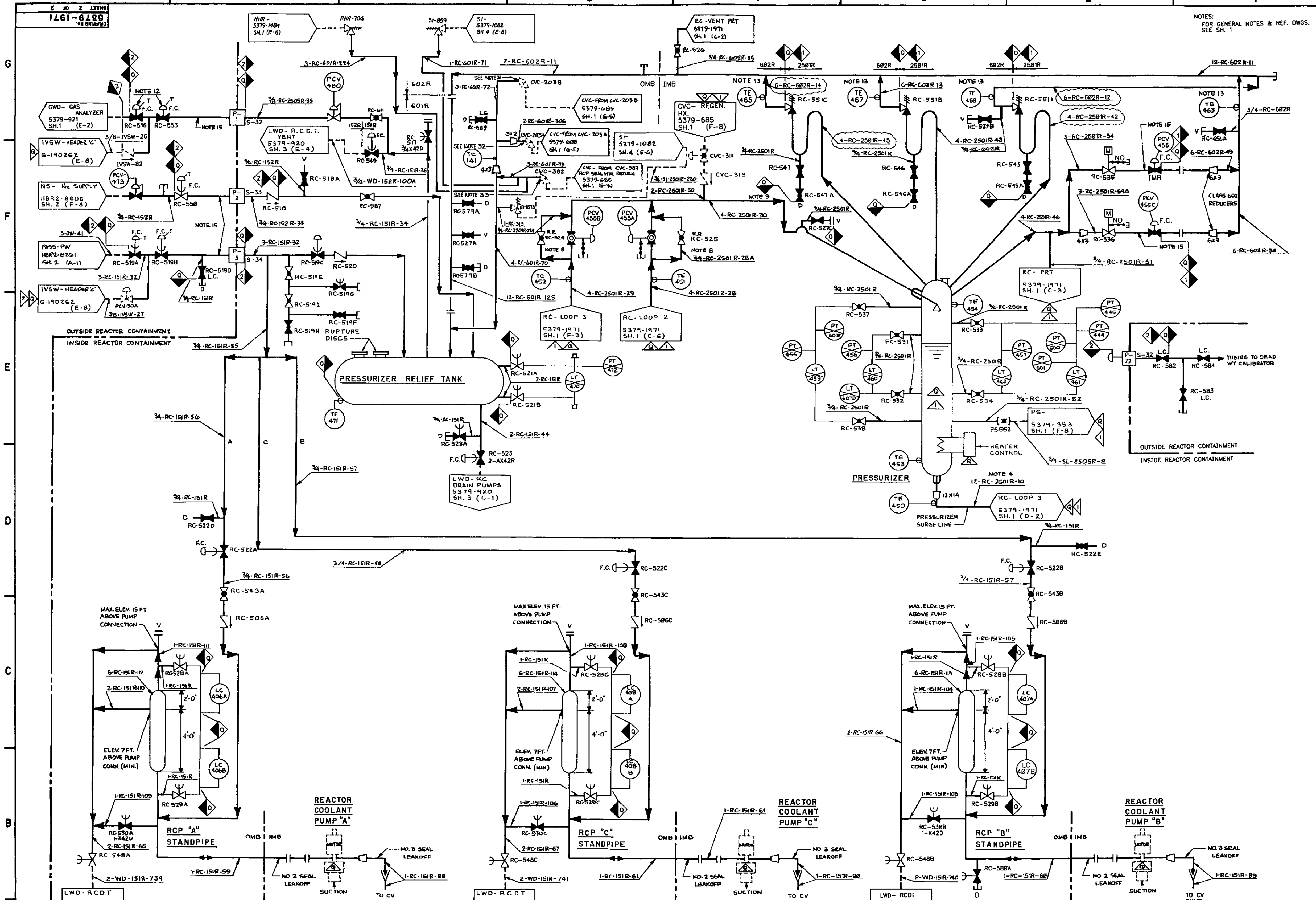
VENDOR No	SIZE	DRAWING No	REV
	E	5379-1971	39

SCALE NONE — SHEET 1 OF 2

DRN: W. BLANCHARD

REVISIONS

REV	DESCRIPTION
15	DRN. 82-00190 MOD.
16	DCR 83-00028 MOD. ADDED ISI CLASS FLAGS; Q LIST FLAGS REVISED; ZONE C-6 RHRS DWG. NO. WAS 5379-1484; ADDED LINE NO.'S AS REQUIRED; ZONE G-4 ADDED VENT 564-C; BY: DTB; CK.: R.AIKIN
35	DCR: 95-1623 MOD.
36	DCR 02-373; EC #45497; BY: J.WALTERS; CHK: E.S. PERKINS; APPR: C.L. OLIVER 10/29/02
37	EC 51008; AR 75600; BY: E.S. PERKINS; CHK: C.L. OLIVER; APPR: C.L. OLIVER 11/26/02
38	EC 51485 & 54509; BY: E.S. PERKINS; CHK: F.W. GRANTHAM; APPR: C.L. OLIVER 5/12/04
39	EC 56266; ELECTRONICALLY SIGNED.
22	DCR: 84-1183; MOD: M-526; BY: W. BLANCHARD; CHK: W. JOHNSON; DCR 86-688
23	BY: BJ; CHK: N. JOHNSON; DCR: 86-876
24	BY: BJ; CHK: W. JOHNSON; DCR: 87-721
25	MOD: 891; BY: H.E.L. LLOYD; CK: W. JOHNSON; DCR: 88-505
26	BY: J. WALTERS; CK: W. JOHNSON; DCR: 88-1328
27	MOD: 959; BY: J. WALTERS; CK: W. JOHNSON; DCR: 90-1715
28	MOD: 1011; BY: J. WALTERS; CHK: H.E.L. LLOYD; DCR: 92-710
29	BY: H.E.L. LLOYD; CK: J. WALTERS; DCR: 92-704
30	BY: H.E.L. LLOYD; CK: J. WALTERS; DCR: 92-1028
31	BY: H.E.L. LLOYD; CK: J. WALTERS; DCR: 93-192
32	BY: H.E.L. LLOYD; CK: C.L. OLIVER; DCR 94-709
33	BY: R. MACDONALD; CHK: G. YAKEN; DCR 95-1392
34	ESR 95-00053; BY: R. MACDONALD; CHK: E. CROCKETT



CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11390 SH.3

REVISIONS

Rev.	Entry
14	DRN. 82-00195
15	DCR 83-00019 MOD. ADDED ISI CLASS FLAGS; Q LIST FLAGS REVISED; ADDED LINE NO'S AS REQUIRED; BY: DTB; CK: R. AIKIN; APPR
41	DCR: 94-690; MOD: BY: J. WALTERS; CHK: R. MACDONALD; APPR: C.L. Oliver
42	DCR: 94-858; MOD: BY: J. WALTERS; CHK: J. STEPHENSON; APPR: C.L. Oliver
43	DCR: 95-870; ESR: 94-00273; BY: J. WALTERS; CHK: R. MACDONALD; APPR: C.L. Oliver
44	DCR: 95-1624; BY: E. CROCKER; CHK: G. YAKEN; APPR: J. Harrelson
45	DCR: 96-318; BY: E. CROCKETT; CHK: S. WATFORD; APPR: C.L. Oliver
46	DCR: 96-705; ESR: 96-00909; BY: D.M. EDWARDS; CHK: J. WALTERS; APPR: J. Harrelson
47	DCR: 98-169; EE 92-064; BY: C. OLIVER; CHK: W. PERKINS; APPR: C. OLIVER 2/5/98
48	DCR: 98-573; BY: F. W. GRANTHAM; CHK: J. WALTERS; APPR: C. OLIVER 6/18/98
49	DCR: 98-710; BY: W. PERKINS; CK: C.L. OLIVER; APPR: C.L. OLIVER 6/21/98
50	EC 78530 ELECTRONICALLY SIGNED
51	EC 79999 ELECTRONICALLY SIGNED
27	DCR: 88-940
28	BY: J. WALTERS; CK: W. JOHNSON; APPR; DCR: 89-88
29	BY: H.E.L. LLOYD; CK: W. JOHNSON; APPR; DCR: 90-1093; MOD: 999
30	BY: J. WALTERS; CHK: H.E.L. LLOYD; APPR: C.L. Oliver; DCR: 91-1112; MOD:
31	BY: J. WALTERS; CHK: H.E.L. LLOYD; APPR: C.L. Oliver; DCR: 92-791
32	BY: H.E.L. LLOYD; CK: J. WALTERS; APPR: C.L. Oliver; DCR: 92-1036
33	BY: J. WALTERS; CHK: C.L. Oliver; APPR: C.L. Oliver; DCR: 92-1073
34	BY: HAROLD E.L. LLOYD; CK: J. WALTERS; APPR: C.L. Oliver; DCR: 92-1332
35	BY: J. WALTERS; CHK: H.E.L. LLOYD; APPR: C.L. Oliver; DCR: 93-786
36	BY: H.E.L. LLOYD; CK: J. WALTERS; APPR: C.L. Oliver; DCR: 93-1013; MOD:
37	BY: J. WALTERS; CHK: H.E.L. LLOYD; APPR: C.L. Oliver; DCR: 93-1252; MOD: 1143
38	BY: J. WALTERS; CK: C.L. Oliver; APPR: C.L. Oliver; DCR: 93-1736
39	BY: G. YAKEN; CHK: C.L. Oliver; APPR: C.L. Oliver; DCR: 94-175
40	BY: G. YAKEN; CHK: J. WALTERS; APPR: C.L. Oliver; DCR: 94-710
	BY: R. MACDONALD; CHK: G. YAKEN; APPR: C.L. Oliver

DRN: W. BLANCHARD
CHK: R. Aikin 11-1-82
DSGN:
ENG:
APPR:
DRFT APPR:
NEXT USED ON

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT - No. 2 HARTSVILLE, S.C.

REACTOR COOLANT SYSTEM-FLOW DIAGRAM

VENDOR No.	SIZE	DRAWING No.	REV.
	E	5379-1971	51

SCALE NONE — SHEET 2 OF 2

DRAWING NO. G-190196 SHEET 1 OF 4

STEAM GENERATOR 'C' — STEAM GENERATOR 'B' — STEAM GENERATOR 'A'

INSIDE CONTAINMENT VESSEL | OUTSIDE CONTAINMENT VESSEL

CONDENSING CHAMBER (TYP.)

AIR OPERATED RELIEF VALVE (TYP.)

SS-SAMPLE COOLER HBR2-9886 SH.1 (D-2)

SS-SAMPLE COOLER HBR2-9886 SH.1 (E-2)

SS-SAMPLE COOLER HBR2-9886 SH.1 (F-2)

MS-H.P. TURBINE G-190196 SH. 3 (G-8)

MS-H.P. TURBINE G-190196 SH. 3 (B-8)

FC&AE-MISC. DRN. COLLECTION TANK C-190197 SH. 3 (D-8)

FC&AE-MISC. DRN. COLLECTION TANK C-190197 SH. 3 (C-8)

FC&AE-MISC. DRN. COLLECTION TANK C-190197 SH. 3 (C-8)

FC&AE-STEAM AFWP LABYRINTH SEAL G-190197 SH.4 (D-2)

PUMP — TURBINE — AUXILIARY FEEDWATER PUMP (STEAM DRIVEN)

TO ATMOS

TO ATMOS

NOTES:

1. MATERIAL SPEC. PIPE AND FITTINGS ALL CARBON STEEL.
2. MATERIAL SPEC. PIPE AND FITTINGS ALL STAINLESS STEEL.
3. PIPING IS LABELED WITHOUT REFERENCE TO MATERIAL SPECIFICATION IF THE EXACT ASTM SPEC. COULD NOT BE DETERMINED AT THE TIME OF THE VERIFICATION WALKDOWN.
4. FOR GLAND STEAM LEAKOFF CONTINUATIONS SEE DWG. HBR2-8680.
5. FOR ELECTRO-HYDRAULIC HIGH PRESSURE OIL CONNECTIONS SEE DWG. HBR2-8699.
6. THIS INTERLOCKS WITH AUX. FW PUMP DISCHARGE. SEE DWG. G-190197 SH. 4(D-3).
7. MATERIAL SPEC. PIPE AND FITTINGS ALL CHROMIUM MOLYBDENUM.
8. VALVES MS-V1-8A, B, C HAVE A 1/8" HOLE IN THE STEAM GENERATOR SIDE DISC FOR PRESSURE RELIEF.
9. PARTIAL MTL. CHANGE CS AND LOW ALLOY STEEL.
10. PARTIAL MTL. CHANGE CS AND STAINLESS STEEL.
11. PARTIAL MTL. CHANGE LOW ALLOY AND STAINLESS STEEL.
12. GP-5 COULD ALIGN THIS VALVE DIFFERENTLY BASED ON POWER LEVEL (ESR 98-00281).

3-3/4" PRESSURE TAPS FOR STEAM BREAK PROTECTION (TYPICAL)

REFERENCE DRAWINGS

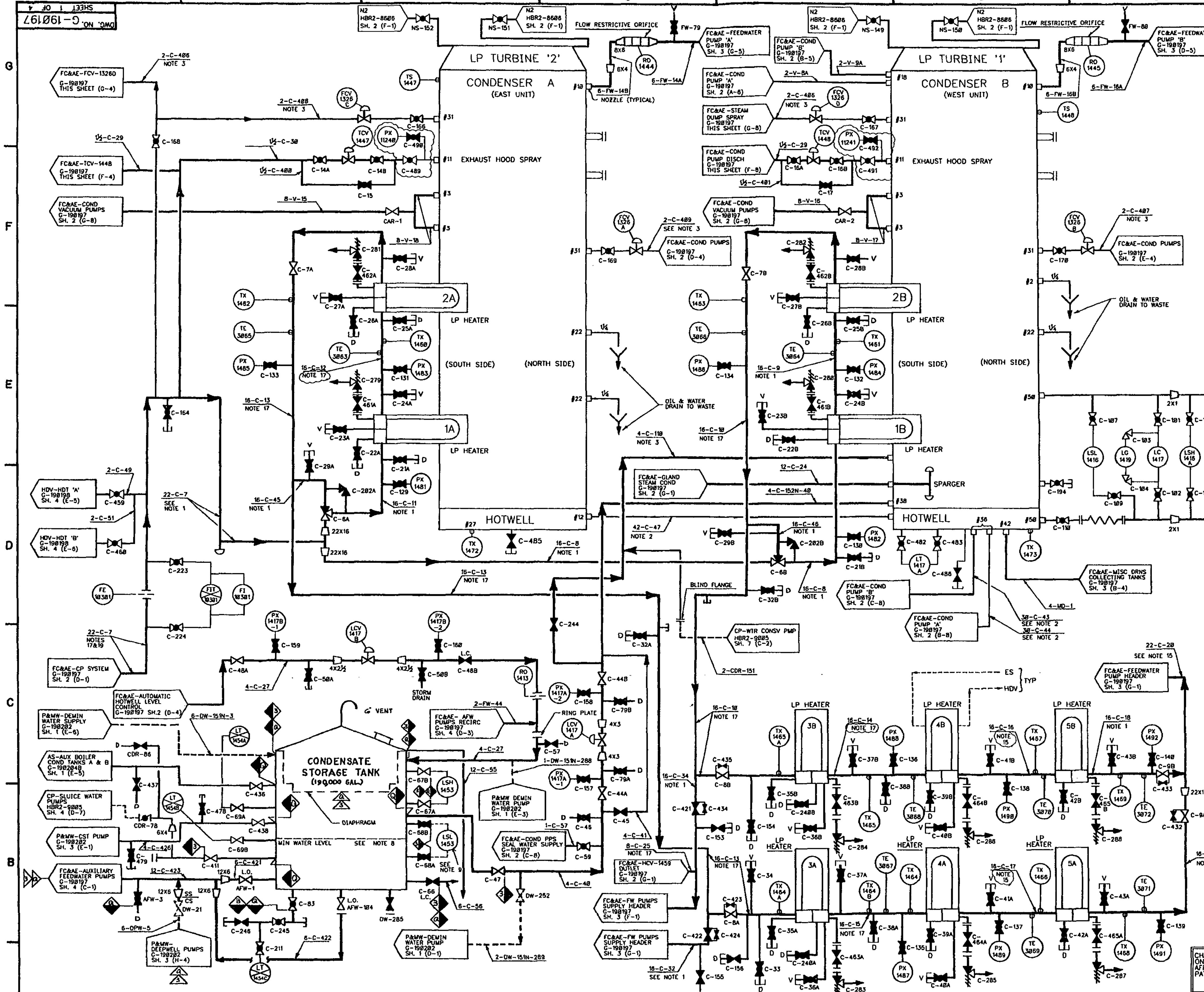
FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS	E. SPEC. G-675176
INSTRUMENTATION SCHEMATICS	A-190301
REACTOR CONT. BLDG. PIPING PENETRATIONS	B-190178
GLAND STM SYS. FLOW DIAGRAM	HBR2-8680
ELECTRO-HYDRAULIC HIGH PRESS. OIL SYS. FLOW DIAGRAM	HBR2-8699
INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM	G-190200
FEEDWATER, CONDENSATE & AIR EVACUATION SYSTEM	C-190197
FLOW ACCELERATED CORROSION ISO	HBR2-11517

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:
HBR2-11390 SH. 13

REVISIONS	NO.
DRN. 15-03-55 MOD. FOR RETROFIT	62
BY: D.M. EDWARDS CHK: R.E. GILBERT APPR: C.L. OLIVER	63
BY: D.M. EDWARDS CHK: J.L. WALTERS APPR: R.E. GILBERT	64
DCR: 96-6258 BY: R. MACDONALD CHK: J. WALTERS APPR: T. HARRISON	65
DCR: 97-120 BY: F.W. GRANTHAM CHK: D.M. EDWARDS APPR: C.L. OLIVER	66
DCR: 98-00671 ESR: 98-00385 BY: E. S. PERKINS CHK: F.W. GRANTHAM APPR: C.L.O. 10/16/98	67
DCR: 99-00493 ESR: 98-00385 BY: J.L. WALTERS CHK: E.S. PERKINS APPR: C.L.O. 10/15/99	68
DCR: 99-1851 ESR: 99-00258 BY: F.W. GRANTHAM CHK: D.M. EDWARDS APPR: C.L.O. 12/15/99	69
DCR: 01-00213 ESR: 99-00281 BY: F.W. GRANTHAM CHK: W.PERKINS APPR: C. L. OLIVER 2/21/01	70
DCR: 01-468 ESR: 98-00281 BY: E. S. PERKINS CHK: C.L. OLIVER APPR: C.L. OLIVER 6/1/01	71
DCR: 01-642 AS-BUILT BY: J.L.WALTERS CHK: F.W. GRANTHAM APPR: D.M. EDWARDS 9/21/01	72
DCR: 02-488	73
BY: E.S. PERKINS CHK: F.W. GRANTHAM APPR: C.L. OLIVER DCR:02-342.231 EC 47187, 47869	74
BY: W.PERKINS CHK: F.W. GRANTHAM APPR: C.L. OLIVER 11/4/02	75
EC 53619	76
BY: W.PERKINS CHK: C.L. OLIVER APPR: C.L. OLIVER 8/14/03	77
EC 58534 & 55879	78
BY: J.L. WALTERS CHK: C.L. OLIVER APPR: D.M. EDWARDS	79
EC 57929	80
BY: W.PERKINS CHK: F.W. GRANTHAM APPR: D.M. EDWARDS 6/3/04	81
EC 59338	82
ELECTRONICALLY SIGNED	83
EC 78832	84
ELECTRONICALLY SIGNED	85
DCR: 94-1619	34
BY: MICHAEL LLOYD CK: J. WALTERS APPR: M. Lloyd	35
DCR: 94-236	36
BY: J. WALTERS CHK: M. LLOYD APPR: M. Lloyd	37
DCR: 94-311	38
BY: G. WILSON CHK: J. WALTERS APPR: M. Lloyd	39
DCR: 95-221 MOD:	40
BY: J. WALTERS CHK: R. MACDONALD APPR: M. Lloyd	41
DCR: 97-151	42
BY: D.M. EDWARDS CHK: G. WILSON APPR: M. Lloyd	43

DRN: T. CANTON	CAROLINA POWER & LIGHT CO. H.B. ROBINSON S.E. PLANT UNIT - No. 2 HARTSVILLE, S.C.
CHK: W. JOHNSON	
ENG: AS-BUILT	
DRFT APPR.	TITLE MAIN & EXTRACTION STEAM SYSTEM FLOW DIAGRAM
APPR: M. Lloyd	
DATE: 10-2-95	VENDOR No. — SIZE E — DRAWING No. G-190196 — REV. 58
	SCALE: NONE — SHEET 1 OF 4

DWG. NO. C-190197 SHEET 1 OF 4



NOTES

1. PIPE SPEC A-106 GR.B CARBON STEEL SCH. 30.
2. ASTM SPEC. A-155, KC-55-1 CARBON STEEL.
3. PIPING, WHERE THE EXACT ASTM SPECIFICATION OF MATERIAL COULD NOT BE DETERMINED AT THE TIME OF WALKDOWN VERIFICATION, IS NUMBERED WITHOUT REF. TO SPEC.
4. PIPE SPEC. A-106 GR.B CARBON STEEL SCH. 100.
5. VALVES AFW-V2-14A/B/C AND AFW-V2-16A/B/C HAVE A 1/8" HOLE IN THE STEAM GENERATOR SIDE DISC FOR PRESSURE RELIEF.
6. DELETED
7. DPS-1477 IS ONE SWITCH THAT SHOWS AT TWO DIFFERENT LOCATIONS ON THE FLOW DIAGRAMS.
8. MIN. WATER LEVEL AS DETERMINED BY TECHNICAL SPECIFICATIONS SECTION 3.4.1C.
9. DUE TO CST ALARM SETPOINT CHANGES, LSL-1453 HAS BEEN DELETED (LSL-1453 ABANDONED IN PLACE.)
10. FT-1425A, FT-1425B, FT-1425C, FT-1426A, FT-1426B, AND FT-1426C SHOULD BE TREATED AS "Q-LIST" FOR FUTURE PROCUREMENT, MAINTENANCE, AND DESIGN CHANGE ACTIVITIES (REFERENCE TMM-026).
11. PIPE MATERIAL SPEC.CPL-HBR-2-M047 APPENDIX C.
12. DELETED
13. S/G EXPANDER MATERIAL: CHROMOLY (A234 WP22).
14. FOR REDUCER AND PIPE MATERIAL, SEE HBR2-11517 SH. 14.
15. MATERIAL SPEC PIPE & FITTING ALL CHROMIUM MOLYBDENUM.
16. MATERIAL SPEC PIPE & FITTING ALL STAINLESS STEEL.
17. PARTIAL MATERIAL CHANGE SEE HBR2-11517 FAC ISO'S.
18. LSLL-1416 ABANDONED IN PLACE PER ESR# 00-00136.
19. A 4 FT. FLOW STRAIGHTENER IS INSTALLED AT THE FLANGE LOCATED 17 FT. UPSTREAM OF FE-10301.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS (W) E. SPEC	G-675176
INSTRUMENT SCHEMATICS	A-190301
REACTOR CONT. BLDG. PIPING PENET.	B-190178
MAIN & EXTRACTION STEAM SYSTEM	G-190196
HEATER DRAINS & VENTS SYSTEM	G-190198
SERVICE & COOLING WATER SYSTEM	G-190199
INSTRUMENT & STATION AIR SYSTEM	G-190200
STEAM GENERATOR BLOWDOWN SYSTEM	G-190234
GLAND STEAM SYSTEM	HBR2-8680
FLOW ACCELERATED CORROSION ISO'S	HBR2-11517

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING.

HBR2-11390 SH. 14

DRN K FULBRIGHT
CHK W JOHNSON
DRFT APPV
ENG
APPR
DATE 12-28-83

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

FEEDWATER, CONDENSATE & AIR EVACUATION SYSTEM FLOW DIAGRAM

VENDOR No.	SIZE	DRAWING NO.	REV
	E	G-190197	79
SCALE NONE		SHEET 1 OF 4	

DRAWING NO G-190197
SHEET 4 OF 4

INSIDE CONTAINMENT VESSEL

OUTSIDE CONTAINMENT VESSEL

NOTE
FOR GENERAL NOTES & REF. DWGS. SEE SH.1

STEAM GENERATOR A

STEAM GENERATOR B

STEAM GENERATOR C

CF-CHEM PUMPS G-190284C SH.1 (C-2)

CF-CHEM PUMPS G-190284C SH.1 (B-2)

SGB-SGB PUMP 'A' G-190234 SH.2 (E-5)

SGB-SGB PUMP 'B' G-190234 SH.2 (E-5)

SGB-SGB PUMP 'C' G-190234 SH.2 (D-5)

SGB-DRAIN PUMP G-190234 SH.2 (D-2)

INTERNALS REMOVED FROM 3 CHECK VALVES V2-12 PER MOD-767

FC&AE-FW HEADER G-190197 SH.3 (E-8)

FC&AE-FW HEADER G-190197 SH.3 (F-8)

FC&AE-FW HEADER G-190197 SH.3 (F-8)

MS MAIN STM SUPPLY G-190196 SH.1 (C-2)

AUXILIARY FEEDWATER PUMP STEAM DRIVEN

MAIN STM

ATMOS

TURBINE

SHAFT

S&CW-OIL COOLER G-190199 SH.10 (F-1)

S&CW-OIL COOLER G-190199 SH.10 (E-1)

FC&AE-COND STOR. TK G-190197 SH.1 (C-6)

FC&AE MISC. DRAINS COLLECTION TNK G-190197 SH.3 (C-7)

FC&AE-COND. STOR. TK G-190197 SH.1 (B-8)

AFW PUMP ROOM

TURB BLDG AFW PUMP RM

S&CW-SUPPLY HEADER G-190199 SH.10 (C-3)

TELL TALE DRAIN

AUXILIARY FEEDWATER PUMPS A&B MOTOR DRIVEN

CF-CHEM PUMPS G-190284C SH.1 (B-2)

AUX FEED PUMP ROOM

AUX BLDG HALLWAY

CCW PUMP ROOM

RAB HALLWAY

AUX FEED TURBINE BLDG PUMP RM

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

HBR2-11398 SH. 16

REVISIONS

EC 50847 — BY: F.W. GRANTHAM; CHK: D.M. EDWARDS; APPR: D.M. EDWARDS 6/28/84

EC 50422 — BY: F.W. GRANTHAM; CHK: J.L. WALTERS; APPR: C.L. OLIVER 10/12/84

EC 50338 — ELECTRONICALLY SIGNED

EC 72723 — ELECTRONICALLY SIGNED

EC 72883 — ELECTRONICALLY SIGNED

EC 73290 — ELECTRONICALLY SIGNED

EC 72479, 72355 & 72883 — ELECTRONICALLY SIGNED

EC 8881 — ELECTRONICALLY SIGNED

EC 83938 — ELECTRONICALLY SIGNED

EC 8459 — ELECTRONICALLY SIGNED

DCR 93-1160 — CR 92-0059 — BY: F.F. CASSADAY; CHK: J. WALTERS; APPR: C.L. OLIVER 3/4/93

DCR 96-0338 — CR 96-0044 — BY: F.F. CASSADAY; CHK: J. WALTERS; APPR: C.L. OLIVER 3/4/96

DCR 96-0110 — ESR 950060 BL — BY: R MACDONALD; CHK: J. WALTERS; APPR: J. MARELSON 1/16/96

DCR 98-0238 — ESR-97-00849 — BY: R MACDONALD; CHK: J. WALTERS; APPR: J. MARELSON 1/15/98

DCR: 98-1128B-252 — DCR: 98-354 — BY: R MACDONALD; CHK: D.M. EDWARDS; APPR: C.L.O. 10/26/98

DCR 98-0361 — BY: J. WALTERS; CHK: D.M. EDWARDS; APPR: C.L. OLIVER 4/29/99

DCR 98-0373 — BY: J. WALTERS; CHK: E.S. PERKINS; APPR: C.L. OLIVER 4/29/99

DCR 98-0384 — BY: J. WALTERS; CHK: D.M. EDWARDS; APPR: D.M. EDWARDS 9/19/01

DCR 98-0385 — BY: J. WALTERS; CHK: D.M. EDWARDS; APPR: D.M. EDWARDS 9/19/01

DCR 82-198 — BY: E.S. PERKINS; CHK: W. GRANTHAM; APPR: D. EDWARDS 3/8/02

DCR 82-395; 82-541 — EC 47152; AR 68754 — BY: E.S. PERKINS; CHK: D.M. EDWARDS; APPR: C.L. OLIVER 11/21/02

EC 51539 & 53184 — BY: E.S. PERKINS; CHK: F.W. GRANTHAM; APPR: D.M. EDWARDS 4/23/03

EC 38534 — BY: J.L. WALTERS; CHK: E.S. PERKINS; APPR: C.L. OLIVER 5/3/04

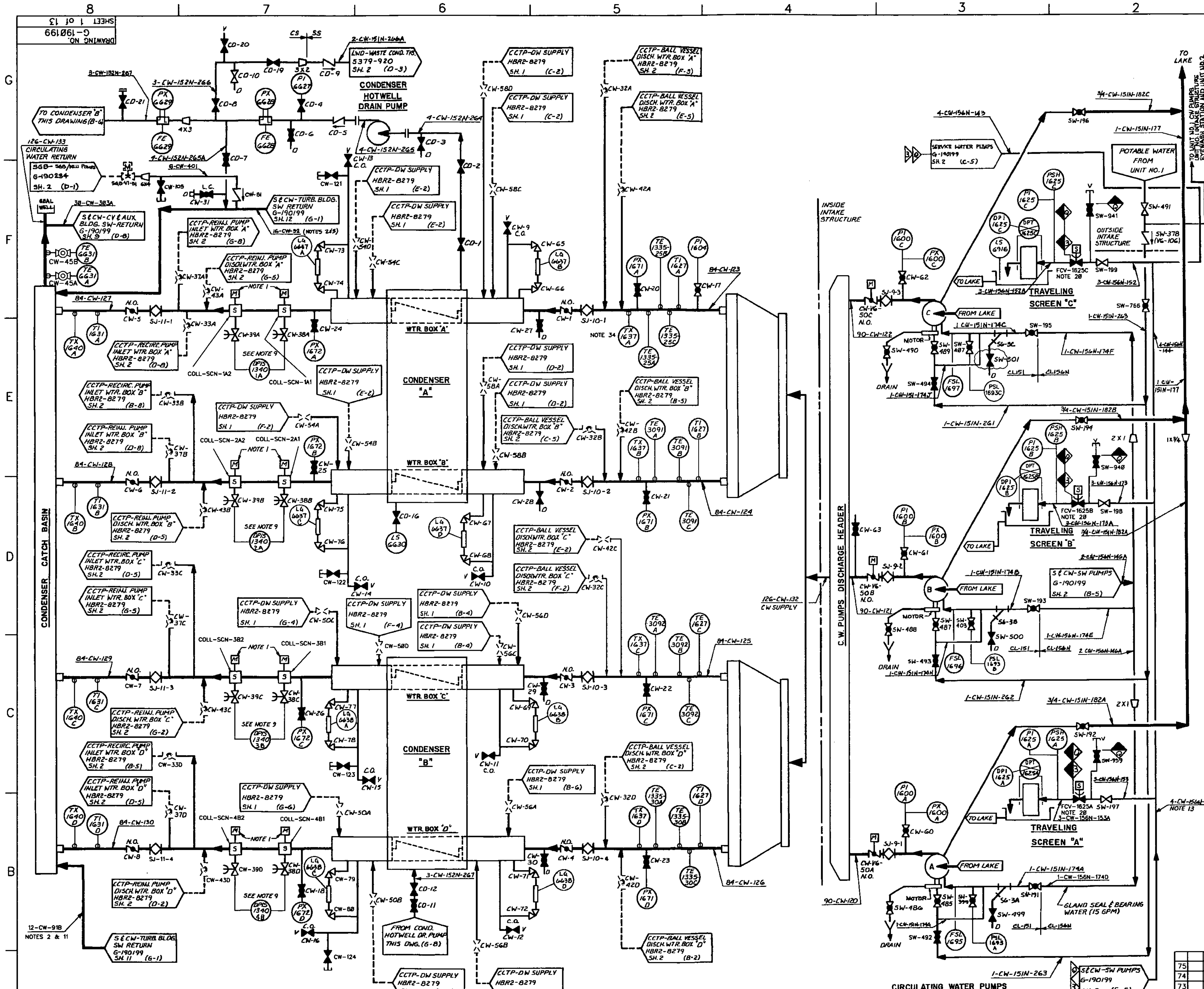
DRN: J MAJOR-II
CHK: W JOHNSON
DESIGN
DR-TAPPP
ENG
APPR
DATE: 12-16-81

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S. E. PLANT
UNIT NO.2 HARTSVILLE, SC

FEEDWATER CONDENSATE AND AIR EVACUATION SYSTEM FLOW DIAGRAM

VENDOR NO. | SIZE: F | DRAWING NO: G-190197 | REV: 62
SCALE: NONE | SHEET: 4 OF 4

DRAWING NO. G-190199 SHEET 1 of 13



NOTES:

1. MOTOR OPERATED SCREEN FOR CONDENSER OUTLET WATER BOX.
2. MATERIAL SPEC. PIPE AND FITTINGS–AWWA C202 GR.B.
3. MATERIAL SPEC. PIPE AND FITTINGS–BRASS.
4. MATERIAL SPEC. PIPE AND FITTINGS–ALUMINUM PIPING LINED WITH POLYETHLENE CO-POLYMER OR POLYMERIC/CERAMIC COMPOSITE COATING (ARC 855 OR ARC S-2).
5. MATERIAL SPEC. PIPE AND FITTINGS–CARBON STEEL PIPING WITH CEMENT LINING.
6. PIPE SPEC. PVDF.
7. ASTM SPEC. OF COPPER TUBING IN THE AREA OF THE SECONDARY SAMPLE COOLER WAS NOT AVAILABLE AT THE TIME OF THE WALKDOWN.
8. PIPING IS LABELED WITHOUT REFERENCE TO MATERIAL SPECIFICATION IF THE EXACT ASTM SPEC. COULD NOT BE DETERMINED AT THE TIME OF THE VERIFICATION WALKDOWN.
9. LOOP DIAGRAMS FOR INSTRUMENTS DPIS-1340 A, B, C & D WILL BE SHOWN WITH THE CCTP SYSTEM DRAWING NO. A-190301 SHEET 1340.
10. FIVE (5) FT. HEADER SECTION IS A106 WITH A335 P22 BRANCH CONNECTIONS AND 12" 304SS FLANGE PER EC 60855.
11. MATERIAL SPEC. PIPE AND FITTINGS–CARBON STEEL PIPING WITH COAL TAR LINING.
12. MATERIAL SPEC. PIPE AND FITTINGS–CARBON STEEL PIPING WITH PLASTIC LINING.
13. MATERIAL SPEC. PIPE AND FITTINGS SPECIFICATION NO. CPL-HBR2-M-027 PORTIONS OF 6-CW-23 & 6-CW-39 RUNNING UNDERNEATH FUEL TRANSFER CANAL HAVE WALL THICKNESS OF .240" INSTEAD OF SCHEDULE 10S AND LINER PIPE PASSING THROUGH CONTAINMENT PENETRATIONS 49-56 HAS 5.687 OD AND 5.187 ID.
14. MATERIAL SPEC. PIPE AND FITTINGS – 316L SS.
15. INTERNALS OF CHECK VALVE SW-544 HAVE BEEN REMOVED. BODY OF VALVE IS ABANDONED IN PLACE.
16. BLIND FLANGE DRILLED TO ACCEPT 3" PIPE CONNECTION.
17. FOR HVH 1, 2, 3 & 4 FABRICATION ISOMETRICS SEE DWGS. HBR2-10997 SHEETS 1-28.
18. ASTM A-106 LINED WITH BELZONA PER EE 90-131.
19. THE NORTH SERVICE WATER HEADER MAY BE PROVIDED WITH A SECOND ISOLATION BY REMOVING SPACER PLATE AND SUBSTITUTING A BLANK.
20. VALVES FCV-1625 A, B & C ARE SOLENOID CONTROLLED.
21. AN 8" SECTION OF LINE 2-CW-73 NEAR TCV-1669 IS GR.316L PER EE 87-224.
22. MARSH HEATING CO. MDL 50 AIR VENT REF. EE 89-073.
23. FLANGE GASKETS INSIDE CV SHALL BE SPIRAL WOUND 304SS LAMONS STYLE WR OR EQUAL, OUTSIDE CV COULD BE EITHER SPIRAL WOUND 304SS LAMONS STYLE WR OR EQUAL OR FULL FACE EPDM 0.125" THICK MINIMUM FROM FAIRPRENE CO. NO. DS-001 OR EQUAL.
24. 12 INCH ELBOW ON LINE 10-CW-100 CHANGED TO A234 WPB CARBON STEEL LINED WITH BELZONA PER EE 93-170.
25. THE 16x10 REDUCER DOWNSTREAM OF TCV-1650 IS 304L SS PER EE 85-72.
26. PIPING DOWNSTREAM OF SW-739 UP TO 20" TEE IS 25-6MO. ESR 99-354.
27. 12 IN. SECTION OF PIPING IS 8" DIA., SCH80, ASTM A312, TP304, SS MATERIAL BETWEEN VALVE SW-174 AND ELBOW ON LINE 8-CW-78.
28. PIPING DOWNSTREAM OF SW-740 UP TO SW-741 IS 25-6 MO. SEE ESR 99-354.
29. THE PIPING FROM THE PIT NO. 3 TO THE REACTOR AUX. BLDG. IS LOCATED ABOVE GROUND. THE PIPING AND FITTINGS ARE CARBON STEEL WITH A NEOPRENE RUBBER LINING AND COMPLY WITH THE FOLLOWING MATERIAL SPECIFICATIONS:
    PIPING: API 5L.30" NOMINAL DIAMETER, 0.375" WALL DSAW
    FITTINGS/FLANGES: ASTM A105 AND A234
30. THE PIPING FOR THE DRAIN CONNECTION DOWNSTREAM OF THE CHECK VALVE WILL BE INSULATED FOR FREEZE PROTECTION.
31. PIPING AS NOTED ON LINES 30-CW-482, 18-CW-483, 18-CW-484, AND FE-11097 SPOOL IS STD SCH, AL6XN WITH 316SS FLANGES AND INSULATING KITS INSTALLED PER EC 52357.
32. THE SOUTH SERVICE WATER HDR. MAY BE PROVIDED WITH A SECOND ISOL. BY REMOVING THE SPACER PLATE AND SUBSTITUTING A BLANK FLANGE.
33. PIPING AND ELBOWS AS NOTED ON LINES 6-CW-485 AND 6-CW-487 HAVE A WALL THICKNESS OF 0.240" INSTEAD OF SCH. 40.
34. THERMOWELL REMOVED AND REPLACED BY PLUG UNDER EC 82340.

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS (W) E SPEC.	G-675176
INSTRUMENTATION SCHEMATICS	A-190301
REACTOR CONT. BLDG. PIPING PENET.	B-190178
MAIN EXTRACTION & AUXILIARY STEAM SYSTEMS FLOW DIAGRAM	G-190196
FEEDWATER, CONDENSATE & AIR EVACUATION SYSTEMS FLOW DIAG.	G-190197
INSTRUMENT & STATION AIR SYSTEM	G-190200
HVAC SYSTEM FLOW DIAGRAM	G-190304
STEAM GENERATOR BLOWDOWN SYSTEM FLOW DIAGRAM	G-190234
ISOLATION VALVE SEAL WATER SYSTEM FLOW DIAGRAM	G-190262
LIQUID WASTE DISPOSAL SYSTEM FLOW DIAGRAM	5379-920
ELECTRO-HYDRAULIC HIGH PRESSURE OIL SYSTEM	HBR2-8699
SAFETY INJECTION SYSTEM	5379-1082
LUBE OIL SYSTEM	HBR2-8697
COMPONENT COOLING WATER SYSTEM	5379-376
HYDROGEN SEAL OIL SYSTEM	HBR2-8698
EMERGENCY DIESEL GENERATOR SYSTEM	G-190204-A
RESIDUAL HEAT REMOVAL SYSTEM	5379-1484
HEATER DRAINS & VENTS SYSTEM	G-190198
AUXILIARY STEAM SYSTEM	G-190204-B

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11390 SH.30

REV	DATE	DESCRIPTION	DWN / CHK / APP'D
75		EC 81438	ELECTRONICALLY SIGNED
74		EC 82340	ELECTRONICALLY SIGNED
73		EC 72482	ELECTRONICALLY SIGNED

CAROLINA POWER & LIGHT COMPANY
ENGINEERING SUPPORT SECTION

CP&L

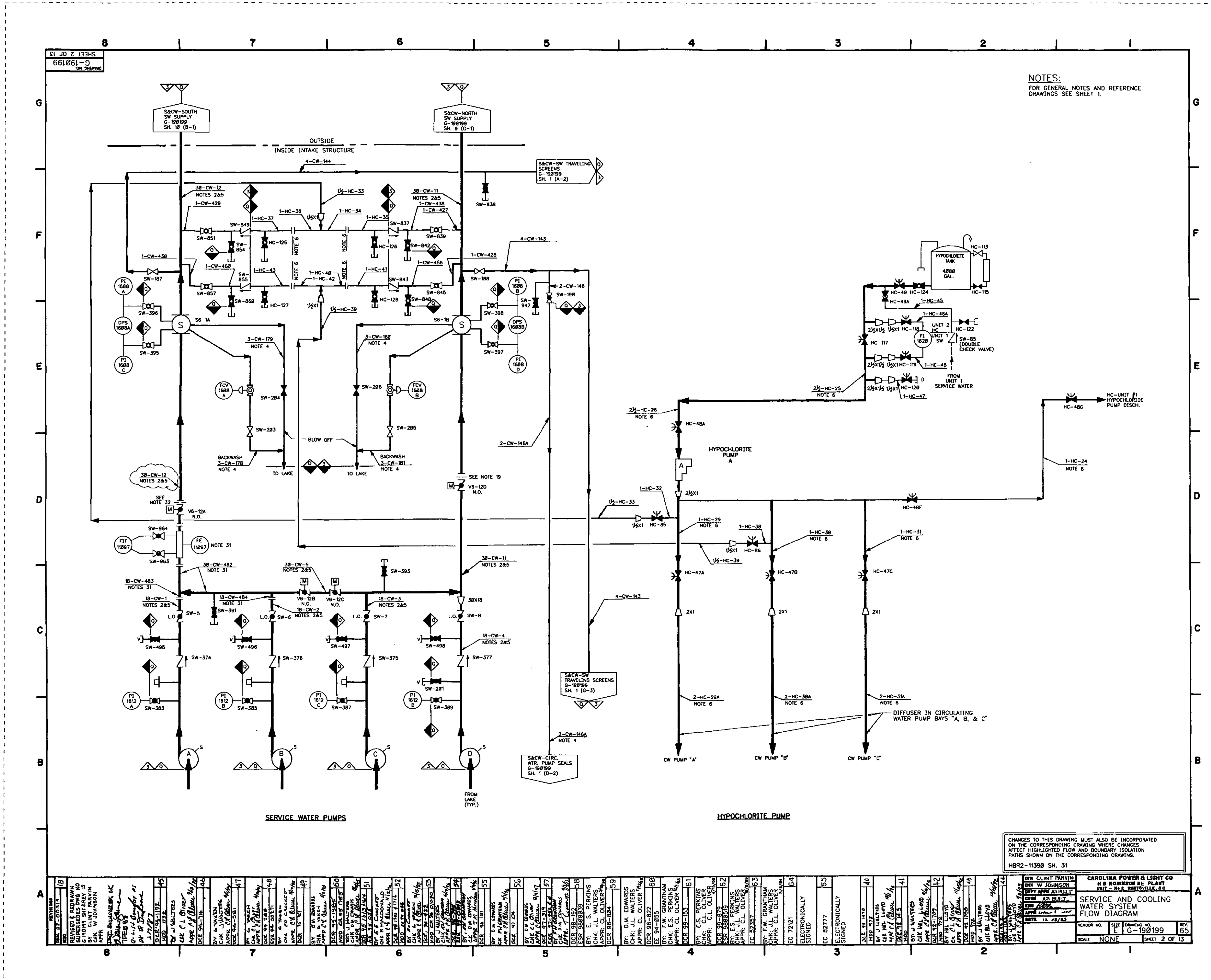
PLANT: ROBINSON PLANT – UNIT 2 SCALE: NONE

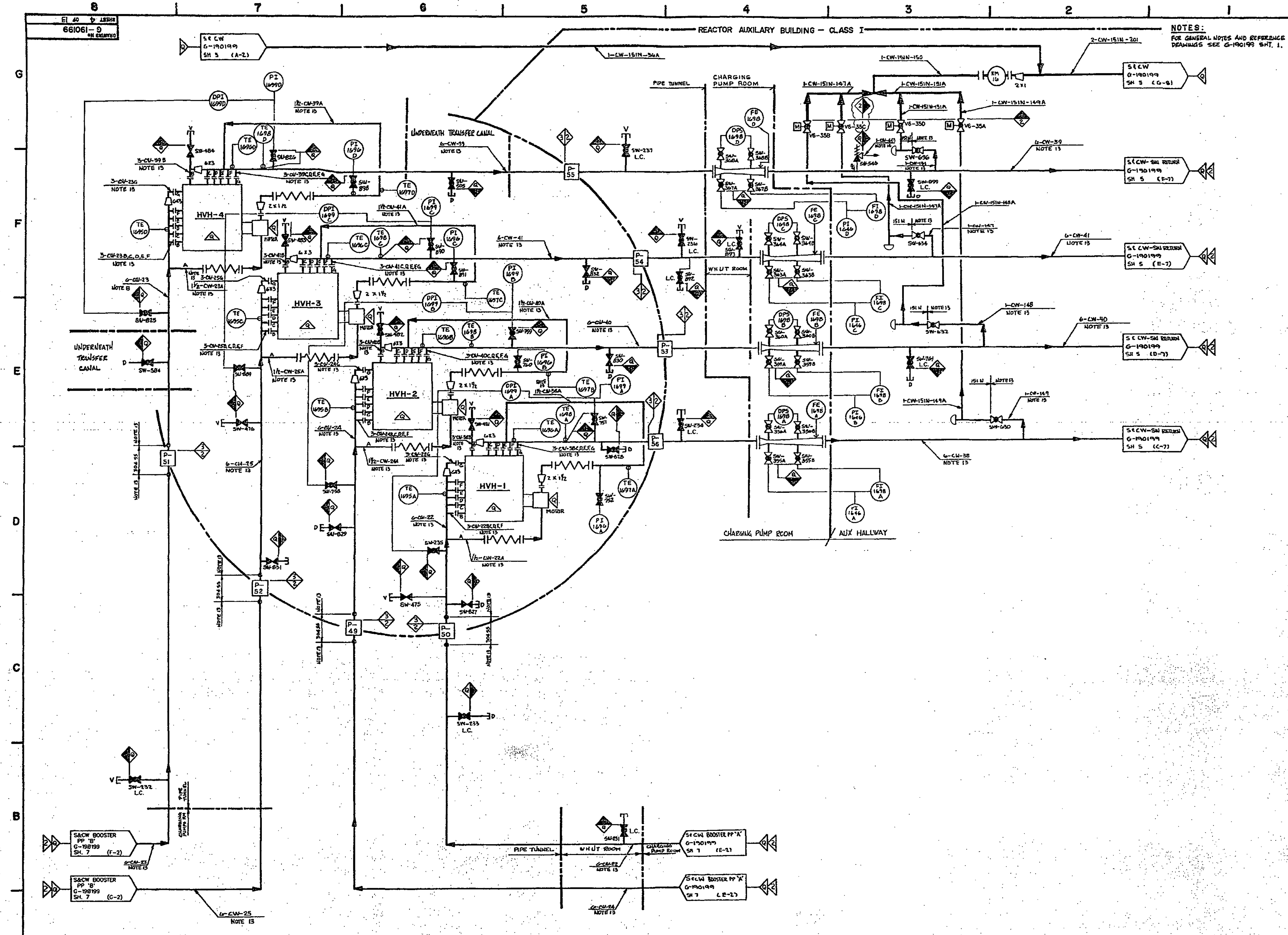
TITLE:

SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM

PLANT DWG NO.: G-190199 REV: 75 SHT: 1 OF 13

MOD SKETCH NO: SHT:


NOTES:
FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE SHEET 1.
S&CW-SOUTH SW SUPPLY G-190199 SH. 10 (B-1)
S&CW-NORTH SW SUPPLY G-190199 SH. 9 (G-1)
OUTSIDE
INSIDE INTAKE STRUCTURE
S&CW-SW TRAVELING SCREENS G-190199 SH. 1 (A-2)
HYPOCHLORITE TANK 4000 GAL.
FROM UNIT 1 SERVICE WATER
HC-UNIT #1 HYPOCHLORIDE PUMP DISCH.
HYPOCHLORITE PUMP A
BLOW OFF
BACKWASH
TO LAKE
S&CW-SW TRAVELING SCREENS G-190199 SH. 1 (G-3)
S&CW-CIRC. WTR. PUMP SEALS G-190199 SH. 1 (D-2)
DIFFUSER IN CIRCULATING WATER PUMP BAYS "A, B, & C"
CW PUMP "A"
CW PUMP "B"
CW PUMP "C"
FROM LAKE (TYP.)
SERVICE WATER PUMPS
HYPOCHLORITE PUMP
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING.
HBR2-11390 SH. 31
DRN CLINT PARVIN
CHK W JOHNSON
DRFT APPR AS BUILT
DSGN AS BUILT
DATE 12 28/83
CAROLINA POWER & LIGHT CO
H B ROBINSON SE PLANT
UNIT - No 2 HARTSVILLE, SC
SERVICE AND COOLING WATER SYSTEM FLOW DIAGRAM
VENDOR NO.
SIZE E
DRAWING NO. G-190199
REV. 65
SCALE NONE
SHEET 2 OF 13



NOTES:

FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE G-190199 SHT. 1.

DRN	BLISTON
CHK	W JOHNSON
DSGN	AS BUILT
DRFT APPR	AS BUILT
ENG	[illegible]
APPR	[illegible]
DATE	12-18-83

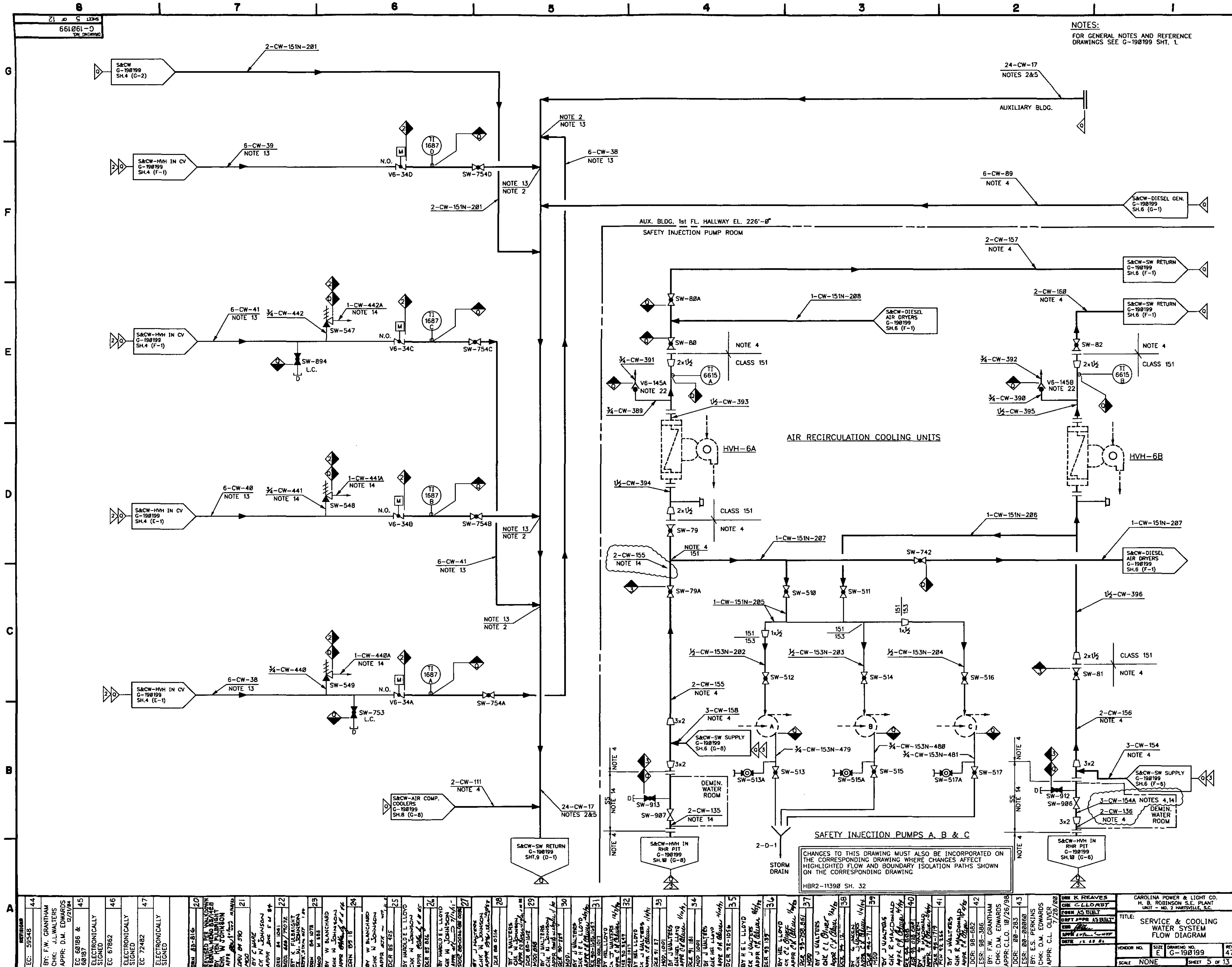
CAROLINA POWER & LIGHT CO
H B ROBINSON S E PLANT
UNIT - No 2 HARTSVILLE, S C

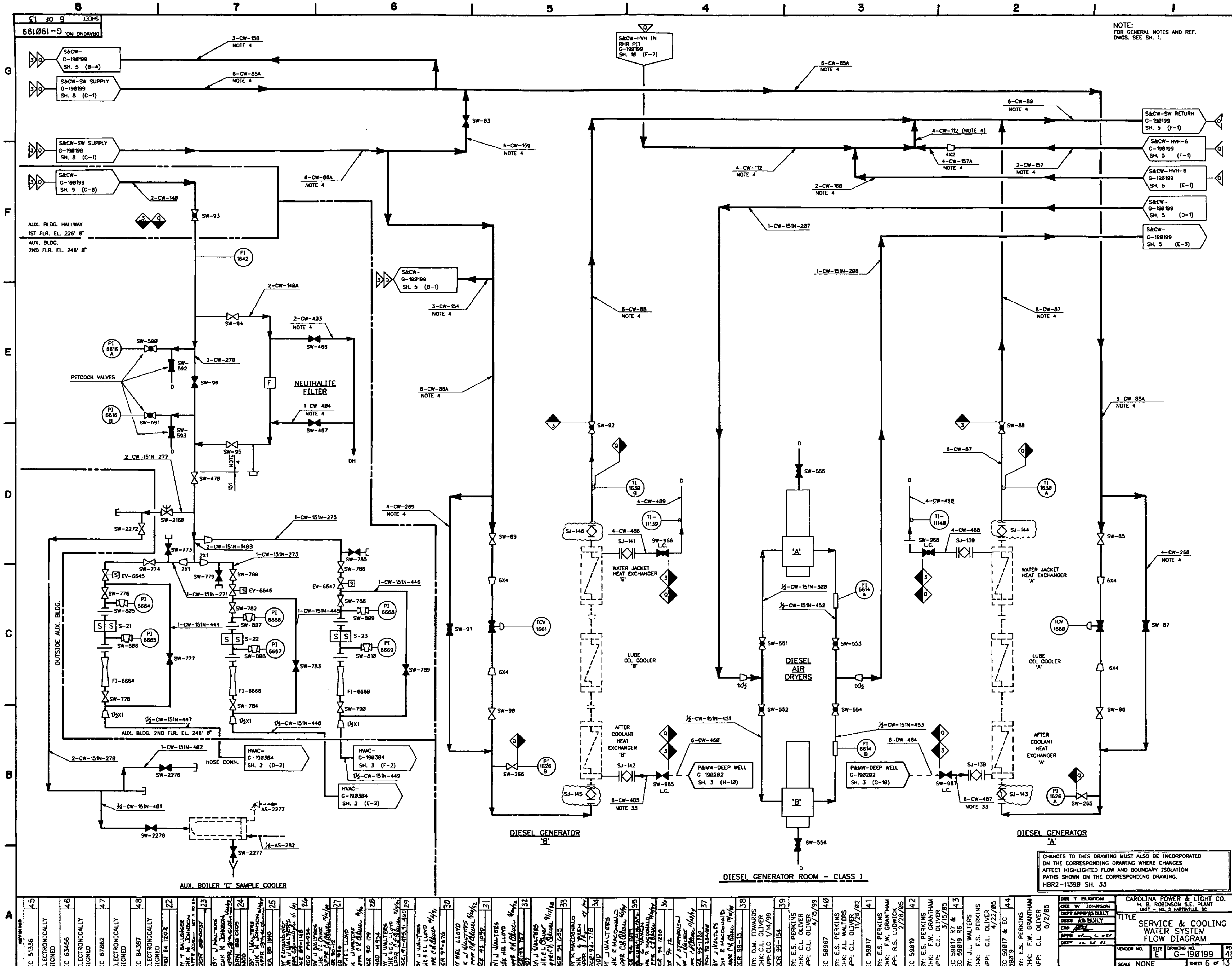
SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING NO	REV
	E	G-190199	50

SCALE NONE — SHEET 4 OF 13

DRAWING No G-190199 — SHEET 4 OF 13


NOTES:
FOR GENERAL NOTES AND REFERENCE DRAWINGS SEE G-190199 SHT. 1.
S&CW G-190199 SH.4 (G-2)
2-CW-151N-201
24-CW-17 NOTES 2&5
AUXILIARY BLDG.
NOTE 2 NOTE 13
6-CW-38 NOTE 13
6-CW-39 NOTE 13
S&CW-HVH IN CV G-190199 SH.4 (F-1)
N.O.
V6-34D
TI 1687 D
SW-754D
NOTE 13 NOTE 2
6-CW-89 NOTE 4
S&CW-DIESEL GEN. G-190199 SH.6 (G-1)
AUX. BLDG. 1st FL. HALLWAY EL. 226'-0"
SAFETY INJECTION PUMP ROOM
2-CW-157 NOTE 4
S&CW-SW RETURN G-190199 SH.6 (F-1)
2-CW-160 NOTE 4
1-CW-151N-208
S&CW-DIESEL AIR DRYERS G-190199 SH.6 (F-1)
SW-80A
SW-80
NOTE 4
CLASS 151
SW-82
6-CW-41 NOTE 13
3/4-CW-442
1-CW-442A NOTE 14
SW-547
V6-34C
TI 1687 C
SW-754C
SW-894 L.C.
3/4-CW-391
V6-145A NOTE 22
TI 6615 A
3/4-CW-389
1 1/2-CW-393
3/4-CW-392
V6-145B NOTE 22
TI 6615 B
3/4-CW-390
1 1/2-CW-395
AIR RECIRCULATION COOLING UNITS
HVH-6A
HVH-6B
6-CW-40 NOTE 13
3/4-CW-441 NOTE 14
1-CW-441A NOTE 14
SW-548
V6-34B
TI 1687 B
SW-754B
1 1/2-CW-394
SW-79
1-CW-151N-206
1-CW-151N-207
2-CW-155 NOTE 14
SW-742
S&CW-DIESEL AIR DRYERS G-190199 SH.6 (F-1)
6-CW-41 NOTE 13
SW-79A
SW-510
SW-511
1-CW-151N-205
1 1/2-CW-396
NOTE 13 NOTE 2
1/2-CW-153N-202
1/2-CW-153N-203
1/2-CW-153N-204
SW-512
SW-514
SW-516
SW-81
3/4-CW-440
1-CW-440A NOTE 14
SW-549
6-CW-38 NOTE 13
V6-34A
TI 1687 A
SW-754A
SW-753 L.C.
2-CW-155 NOTE 4
3-CW-158 NOTE 4
S&CW-SW SUPPLY G-190199 SH.6 (G-8)
2-CW-156 NOTE 4
3-CW-154 NOTE 4
3/4-CW-153N-479
3/4-CW-153N-480
3/4-CW-153N-481
SW-513
SW-513A
SW-515
SW-515A
SW-517
SW-517A
S&CW-SW SUPPLY G-190199 SH.6 (F-5)
DEMIN. WATER ROOM
SW-913
SW-907
2-CW-135 NOTE 14
SW-912
SW-906
3-CW-154A NOTES 4,14
2-CW-136 NOTE 4
2-CW-111 NOTE 4
S&CW-AIR COMP. COOLERS G-190199 SH.8 (G-8)
24-CW-17 NOTES 2&5
S&CW-SW RETURN G-190199 SH.9 (D-1)
S&CW-HVH IN RHR PIT G-190199 SH.10 (G-8)
S&CW-HVH IN RHR PIT G-190199 SH.10 (G-6)
SAFETY INJECTION PUMPS A, B & C
2-D-1
STORM DRAIN
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING
HBR2-11390 SH. 32
CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.
TITLE: SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM
SIZE E
DRAWING NO. G-190199
REV. 47
SCALE NONE
SHEET 5 OF 13
G-190199
SHEET 5 OF 12



DRAWING NO. G-190199
SHEET 6 OF 13
NOTE:
FOR GENERAL NOTES AND REF. DWGS. SEE SH. 1
S&CW-SW SUPPLY G-190199 SH. 8 (C-1)
S&CW-SW RETURN G-190199 SH. 5 (F-1)
S&CW-HVH IN RHR PIT G-190199 SH. 10 (F-7)
AUX. BLDG. HALLWAY 1ST FLR. EL. 226' 0"
AUX. BLDG. 2ND FLR. EL. 246' 0"
NEUTRALITE FILTER
PETCOCK VALVES
OUTSIDE AUX. BLDG.
AUX. BLDG. 2ND FLR. EL. 246' 0"
HOSE CONN.
AUX. BOILER 'C' SAMPLE COOLER
WATER JACKET HEAT EXCHANGER 'B'
LUBE OIL COOLER 'B'
AFTER COOLANT HEAT EXCHANGER 'B'
DIESEL GENERATOR 'B'
DIESEL AIR DRYERS
P&MW-DEEP WELL G-190202 SH. 3 (H-10)
P&MW-DEEP WELL G-190202 SH. 3 (G-10)
WATER JACKET HEAT EXCHANGER 'A'
LUBE OIL COOLER 'A'
AFTER COOLANT HEAT EXCHANGER 'A'
DIESEL GENERATOR 'A'
DIESEL GENERATOR ROOM - CLASS I
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING. HBR2-11390 SH. 33
CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, SC
TITLE
SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM
SCALE NONE
DRAWING NO. G-190199
SHEET 6 OF 13
REV. 48

DRAWING NO. G-190199
SHEET 7 OF 13

NOTES:
FOR GENERAL NOTES AND REF. DWGS. SEE SHT. 1.

SERVICE WATER BOOSTER PUMPS

S&CW - SW SUPPLY G-190199 SH. 9 (F-5)

S&CW-SW SUPPLY G-190199 SH. 9 (C-8)

S&CW-SW SUPPLY G-190199 SH. 9 (G-8)

S&CW-HVH IN CV G-190199 SH. 4 (B-8)

S&CW-HVH IN CV G-190199 SH. 4 (B-8)

S&CW-HVH IN CV G-190199 SH. 4 (B-4)

S&CW-HVH IN CV G-190199 SH. 4 (B-4)

IVSW-INJECTION TK. G-190262 SH. 1 (E-4)

S&CW-PEN. COOLERS G-190199 SH. 3 (E-8)

S&CW-PEN. COOLERS G-190199 SH. 3 (F-8)

AUX. BLDG. ACCESS CONTROL AISLE 2ND FL. EL. 246'-8" PIPE ALLEY

AUX. HALLWAY PIPE ALLEY EL. 226'-0"

RAB OUTSIDE

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11398 SH. 34

REVISIONS		
DWG	RE 00314	18
MOD	ISSUED PER DRAWING UPDATE PROGRAM BY CLINT PARVIN CHK W JOHNSON APP	19
DRN	85-618	
MOD	PUMPED RISE REVISION CHKD W JOHNSON BY J MAXWELL	20
CK	N JOHNSON	
APP		
DRN	86-570	
BY	K FAIRMAN	21
CK	N JOHNSON	
APPR		
DCR	86-578	
BY	J W SPENCER	22
CK	N JOHNSON	
APPR		
DCR	86-1203	
BY	HAROLD E L LLOYD	23
CK	N JOHNSON	
APPR		
DCR	87-1116	
BY	HAROLD E L LLOYD	24
CK	N JOHNSON	
APPR		
DCR	87-1237	
BY	MARDELL LLOYD	25
CK	N JOHNSON	
APPR		
DCR	87-2037	
BY	H E L LLOYD	26
CK	N JOHNSON	
APPR		
DCR	88-0115	
BY	H E L LLOYD	27
CK	N JOHNSON	
APPR		
DCR	88-1481	
BY	C LANGENBACH	28
CHK	J WALTERS	
APPR		
DCR	88-1759	
BY	J WALTERS	29
CHK	H E L LLOYD	
APPR		
DCR	88-1688	
BY	HAROLD E L LLOYD	30
CK	J WALTERS	
APPR		
DCR	88-1958	
BY	HAROLD E L LLOYD	31
CK	J WALTERS	
APPR		
DCR	89-1957	
BY	HEL LLOYD	32
CK	J WALTERS	
APPR		
DCR	92-1041	
BY	J WALTERS	33
CHK	HEL LLOYD	
APPR		
DCR	92-1241	
BY	J WALTERS	34
CHK	HEL LLOYD	
APPR		
MOD		
BY	J WALTERS	35
CHK	E MARSHALL	
APPR		
DCR	98-0258	
BY	J WALTERS	36
CK	E MARSHALL	
APPR		
DCR	98-00588	
ESR	98-00366	
BY:	E. S. PERKINS	
CHK:	D.M. EDWARDS	
APPR:	C.L.O. 10/26/98	
DCR:	99-86	37
ESR:	97-00383	
BY:	D.M. EDWARDS	
CHK:	E.S. PERKINS	
APPR:	C.L. OLIVER	
DCR:	99-688	38
ESR:	98-776	
BY:	D.M. EDWARDS	
CHK:	J.W. Spencer	
APPR:	T.A. Snead	

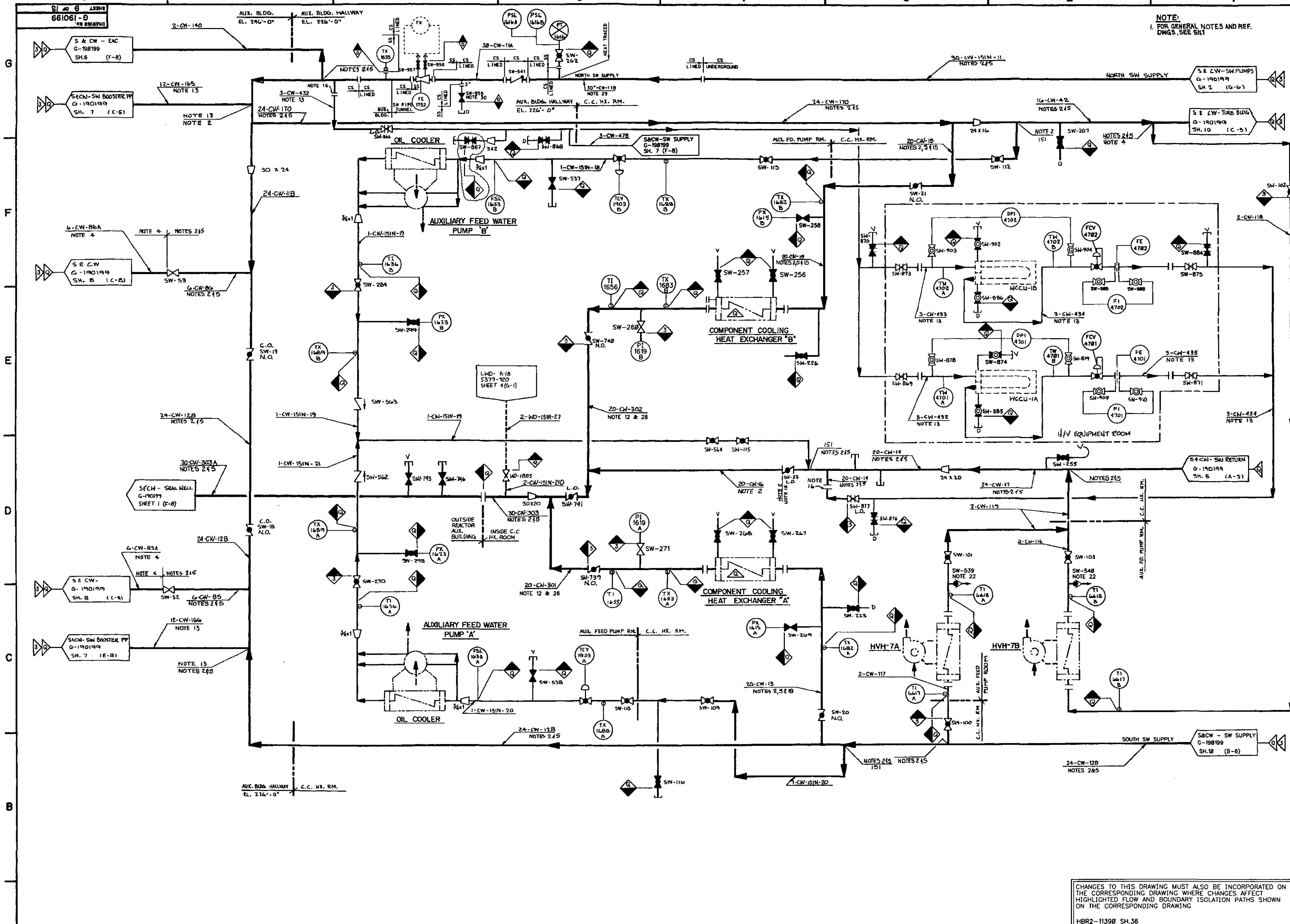
DRN CLINT PARVIN
CHK W JOHNSON
DEPT APPR AS BUILT
DWG ASSEMBLY
APP
DATE 10-22-87

CAROLINA POWER & LIGHT CO
NS ROBINSON S E PLANT
UNIT - No 2 HARTSVILLE, S C

TITLE: SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR NO.	SIZE	DRAWING NO.	REV.
	E	G-190199	38

SCALE NONE SHEET 7 OF 13



CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

HBR2-11390 SH.36

DRN: BLANTON	CAROLINA POWER & LIGHT CO. H.B. ROBINSON S.E. PLANT UNIT - No.2 HARTSVILLE, S.C.
CHK: W. JOHNSON	TITLE: SERVICE AND COOLING WATER SYSTEM FLOW DIAGRAM
DRFT APPR: "AS BUILT"	
DSGN: "AS BUILT"	
ENG:	VENDOR No. / SIZE E / DRAWING No. G-190199 / REV. 58
APPR:	SCALE NONE / SHEET 9 OF 13
DATE: 12-28-81	

DRAWING NO. G-190199 SHEET 10 OF 13

NOTES:
FOR GENERAL NOTES AND REF. DWGS. SEE SH. 1.

S&CW-SW SUPPLY G-190199 SH. 5 (B-4)
S&CW-SW RETURN G-190199 SH. 6 (C-4)
S&CW-SW SUPPLY G-190199 SH. 5 (B-2)
2-CW-135 NOTE 4
4-CW-112 NOTE 4
4-CW-112A NOTE 14
4X2
SW-76
SW-78
2-CW-137 NOTE 14
2-CW-138 NOTE 14
SW-925
SW-929
SW-924
SW-911
SW-923
SW-928
SW-75
SW-922
SW-927
SW-77
2-CW-136 NOTE 4
2X1½
SS NOTE 14
NOTE 4
SAFETY INJECTION PUMP ROOM
¾-CW-386 NOTE 3
¾-CW-387 NOTE 3
¾-CW-388 NOTE 3
¾-CW-385 NOTE 3
NOTE 4 CLASS 151
V8-146A NOTE 22
V8-146B NOTE 22
1½-CW-397
1½-CW-399
TI 6628 A
TI 6628 B
1½-CW-398
1½-CW-400
HVH-8A
HVH-8B
AIR RECIRCULATION COOLING UNITS
TI 6619 A
TI 6619 B
RESIDUAL HEAT REMOVAL PUMP PIT CLASS I

PI 6623
SW-254
1-CW-151N-298
FC&AE-EMERG. OIL COOLING SUPPLY G-198197 SH. 4 (D-2)
SW-259
CW FW
SW-261
SW-187
TCV 1902
SW-243
SW-246 L.C.
SW-244
1-CW-114B
FSL 1632
PX 1624 A
SW-463
FC&AE-EMERG. OIL COOLING RETURN G-198197 SH. 4 (D-2)
TX 1698 A
1-CW-114A
1-CW-151N-114
STEAM DRIVEN A.F.W. PUMP OIL COOLER
TX 1698 B
1-CW-151N-115
SW-252
SW-272
SW-253
CW C
TURBINE BLDG. COMP. COOLING HX ROOM
1-CW-151N-115
SW-251
SW-464
PX 1624 B
1-CW-151N-115A
SW-251A
1-CW-114
6-C-35
FC&AE-AFW PUMPS G-198197 SH. 4 (B-1)
18-CW-42 NOTES 2 & 5
1-CW-151N-113
SW-196
SW-118 L.C.
6-CW-93 NOTE 4
S&CW-SW SUPPLY G-198199 SH. 9 (G-1)
SW-908
SW-543
SW-544 SEE NOTE 15
SW-288
V8-168 N.O.
SW-954
PSL 1684A
PSL 1684B
PT 1684
TX 1685
CC HX RM
YARD PIPING
24-CW-128 NOTES 2 & 5
16-CW-44
SW-273
S&CW- G-198199 SH. 9 (B-1)
30-CW-12A
30X24
SW-545
CS CT
S&CW-SW PUMPS G-198199 SH. 2 (C-8)
SOUTH SW SUPPLY
30-CW-12 NOTES 2 & 5
1-CW-114
SW-914
SW-542
16-CW-44 NOTES 2 & 5
16-CW-44A NOTES 2 & 5
V8-16A N.O.
16-CW-42
V8-16C N.O.
S&CW-TURB. BLDG. G-198199 SH. 12 (B-8)

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING
HBR2-11390 SH. 37

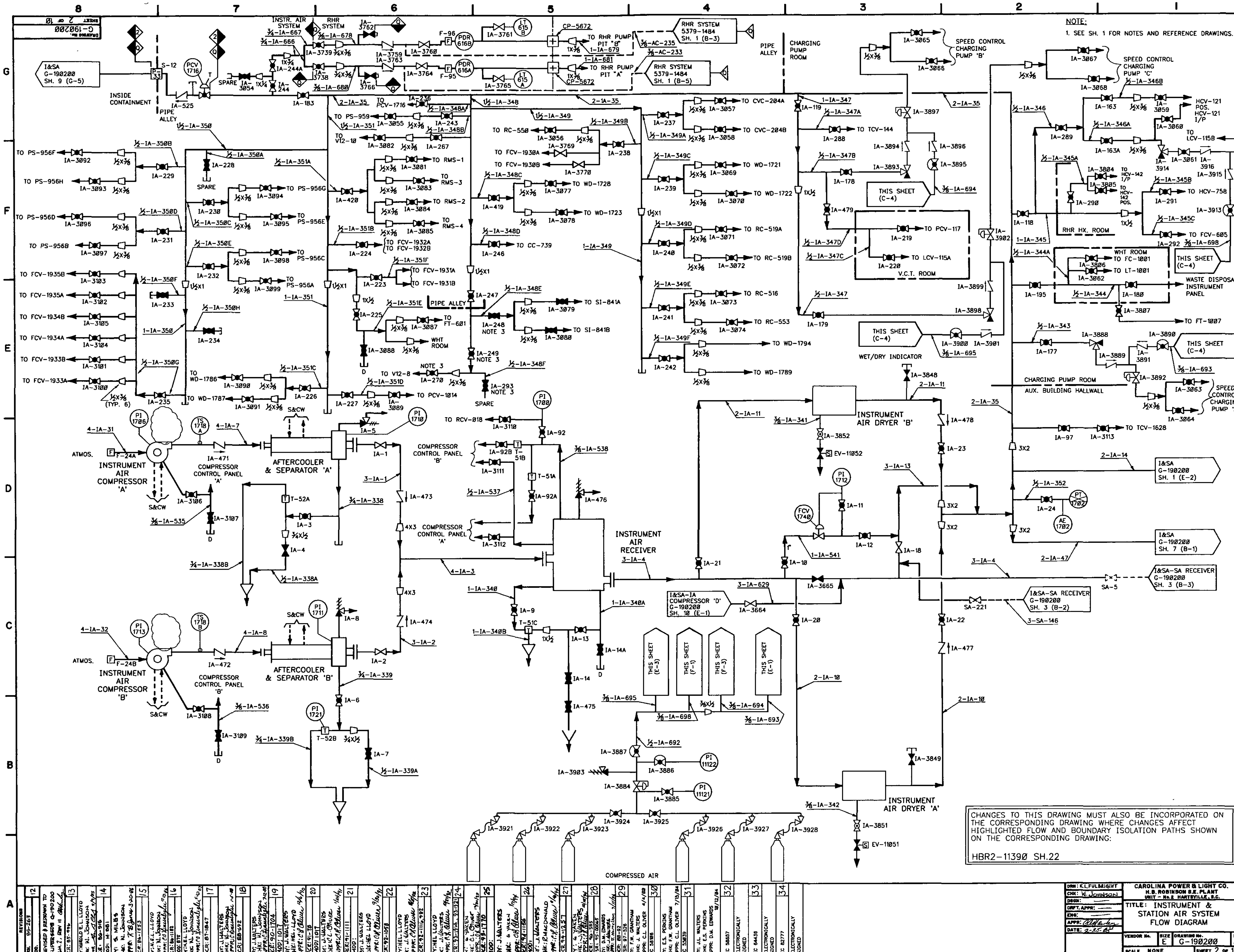
REVISION	BY	APPR	DCR
19			
REVISED AND REDRAWN PER VALVE(S) ADDED, CHANGED, OR DELETED	K. W. JOHNSON		88-321
20	K. W. JOHNSON		88-321
21	T. BALLINGER	K. W. JOHNSON	85-402
22	HAROLD E. LLOYD	K. W. JOHNSON	87-1179
23	J. ENTZMINGER	K. W. JOHNSON	88-0070001
24	HAROLD E. LLOYD	K. W. JOHNSON	88-0070001
25	C. URQUHART	K. W. JOHNSON	89-1248
26	HAROLD E. LLOYD	C. L. OLIVER	89-1248
27	HAROLD E. LLOYD	C. L. OLIVER	90-180
28	J. WALTERS	HAROLD E. LLOYD	90-692
29	J. WALTERS	HAROLD E. LLOYD	90-1001, 1012
30	J. WALTERS	C. L. OLIVER	92-1093
31	J. WALTERS	HEL LLOYD	DCR 93-158
32	HEL LLOYD	C. L. OLIVER	DCR 93-144
33	HEL LLOYD	C. J. WALTERS	DCR 93-1240
34	J. WALTERS	HEL LLOYD	DCR 93-1340
35	J. WALTERS	C. L. OLIVER	DCR 93-1340
36	G. WALTERS	C. L. OLIVER	DCR 95-1545
37	J. WALTERS	J. WALTERS	DCR 95-1545
38	R. MACDONALD	J. WALTERS	DCR 95-1545
39	D.M. EDWARDS	C. L. OLIVER	DCR: 98-571
40	F.W. GRANTHAM	C. L. OLIVER	DCR: 99-483
41	D. PHILLIPS	J. STANLEY	DCR: 98-288
42	D. M. EDWARDS	C. L. OLIVER	EC 51543
43	PERKINS/WALTERS	F.W. GRANTHAM	EC 51539, 52224
44	F.W. GRANTHAM	D.M. EDWARDS	EC 60189 & EC 61952
45	ELECTRONICALLY SIGNED		EC 60797
46	ELECTRONICALLY SIGNED		EC 60188

DSN T. BLANTON
CHK K. W. JOHNSON
DRN AS BUILT
DFRT APPR AS BUILT
ENG
APPD
DATE 6-18-85

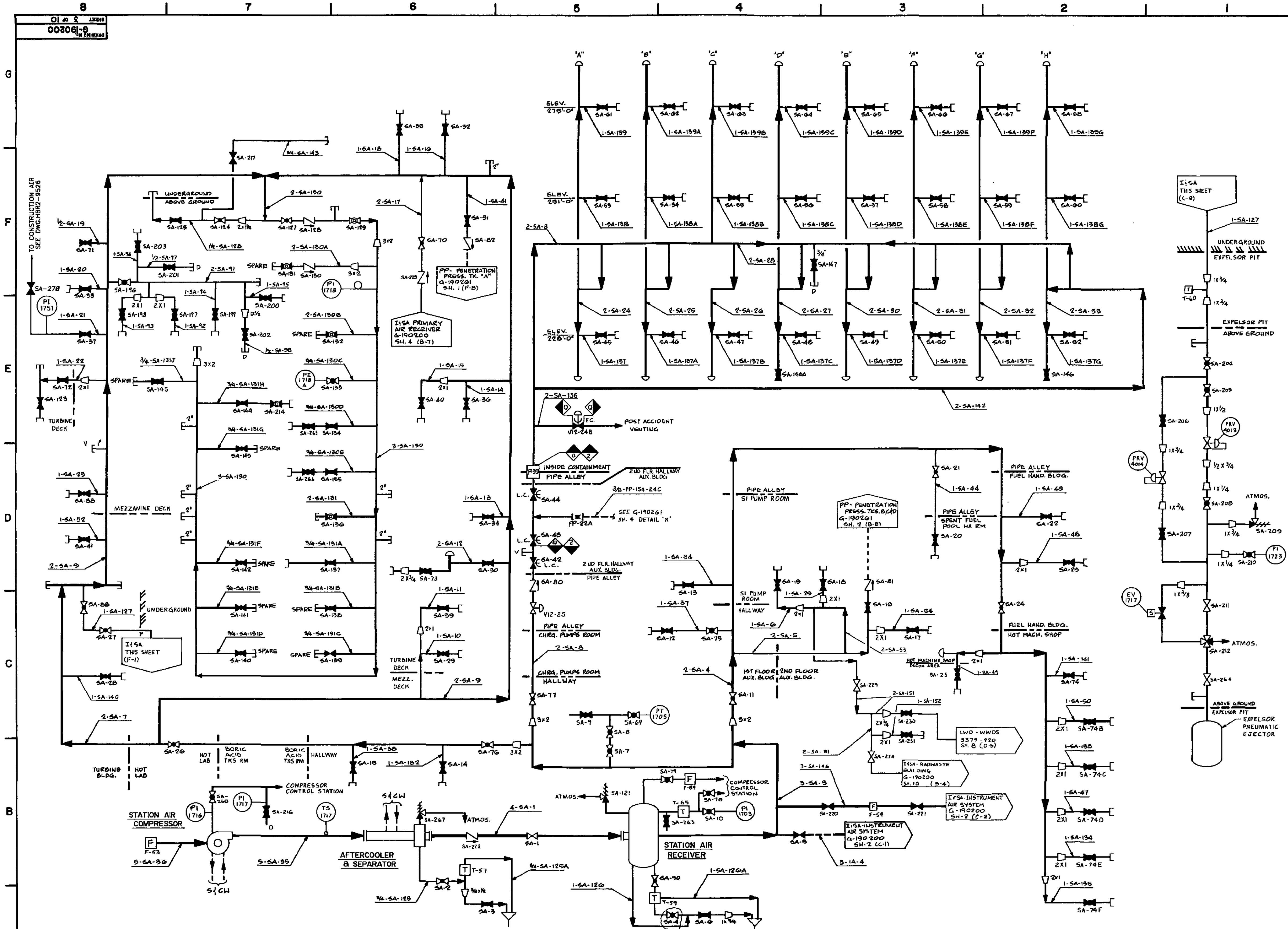
CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: SERVICE & COOLING WATER SYSTEM FLOW DIAGRAM

VENDOR NO. | SIZE F | DRAWING NO. G-190199 | REV. 46
SCALE NONE | SHEET 10 OF 13



NOTE:
1. SEE SH. 1 FOR NOTES AND REFERENCE DRAWINGS.
INSTRUMENT AIR COMPRESSOR 'A'
INSTRUMENT AIR COMPRESSOR 'B'
AFTERCOOLER & SEPARATOR 'A'
AFTERCOOLER & SEPARATOR 'B'
INSTRUMENT AIR RECEIVER
INSTRUMENT AIR DRYER 'A'
INSTRUMENT AIR DRYER 'B'
COMPRESSED AIR
CHARGING PUMP ROOM
AUX. BUILDING HALLWALL
RHR HX. ROOM
V.C.T. ROOM
WASTE DISPOSAL INSTRUMENT PANEL
SPEED CONTROL CHARGING PUMP 'A'
SPEED CONTROL CHARGING PUMP 'B'
SPEED CONTROL CHARGING PUMP 'C'
INSIDE CONTAINMENT
PIPE ALLEY
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:
HBR2-11390 SH.22
CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT - No.2 HARTSVILLE, S.C.
TITLE: INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM
SIZE E
DRAWING No. G-190200
REV. 34
SCALE NONE
SHEET 2 OF 10



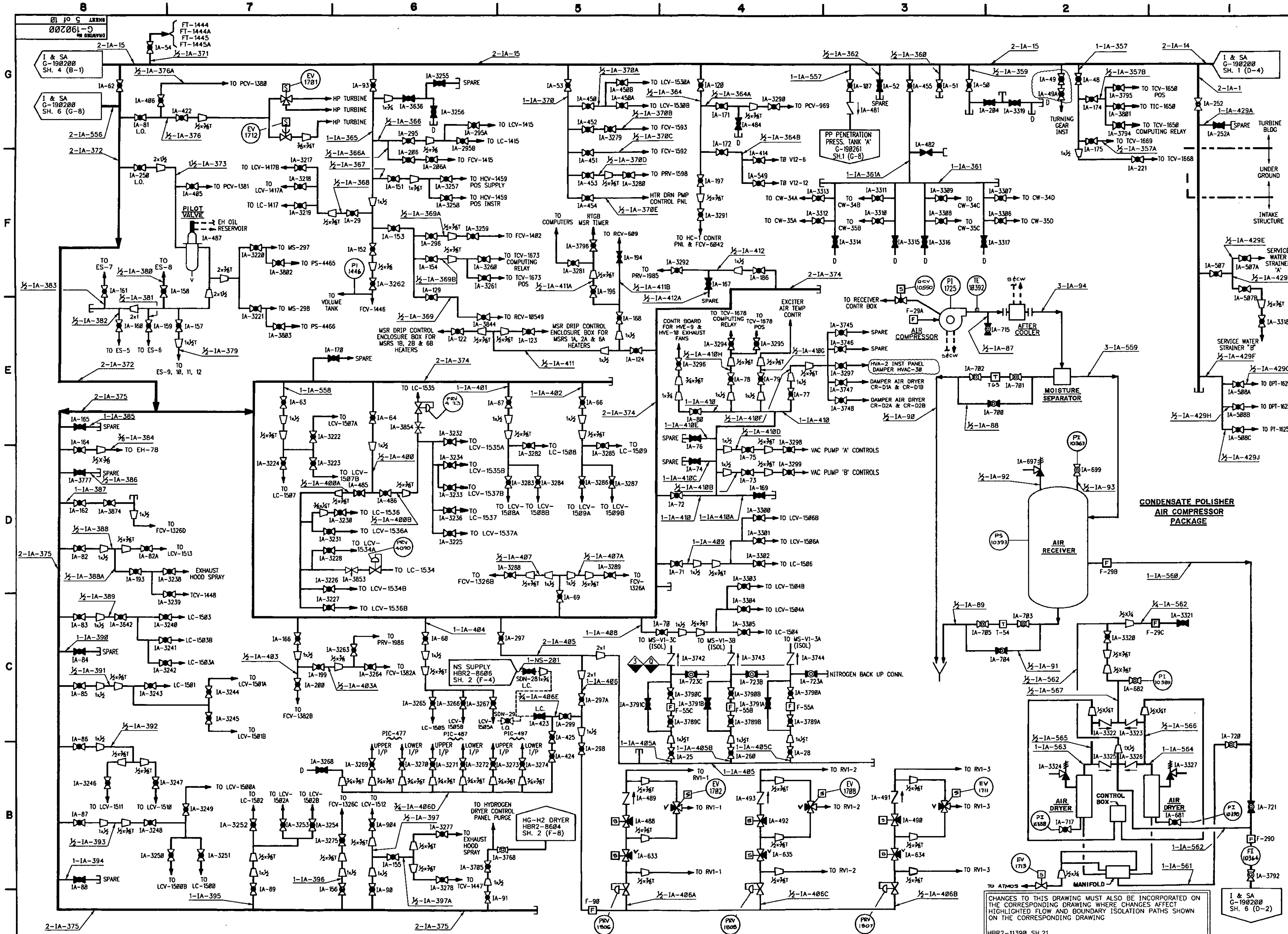
REVISIONS		
12	DRN. 85-264	REVISED & REDRAWN TO SUPERSEDE G-190200 SH.3, REV. 11; DCR: 85-1004
13	BY: HAROLD E.L. LLOYD; CHK: W. JOHNSON	DCR: 86-985
14	MOD: 897; BY: H.E.L. LLOYD; CHK: W. JOHNSON	DCR: 87-29
15	MOD: 840; BY: STEVE MILES; CHK: W. JOHNSON	DCR: 86-1183
16	MOD: 875	DCR: 87-1848
17	BY: J. WALTERS; CHK: W. JOHNSON	DCR: 88-701
18	BY: H.E.L. LLOYD; CK: W. JOHNSON	DCR: 88-693
19	BY: J. WALTERS; CHK: W. JOHNSON	DCR: 88-1920; MOD: M-982
20	BY: J. WALTERS; CK: W. JOHNSON	DCR: 89-380
21	BY: H.E.L. LLOYD; CK: CAL	DCR: 90-1852
22	BY: H.E.L. LLOYD; CK: J. WALTERS	DCR: 92-1059
23	BY: H.E.L. LLOYD; CK: J. WALTERS	DCR: 92-1266, 1117
24	BY: H.E.L. LLOYD; CK: J. WALTERS	DCR: 93-1915
25	BY: G. YAKEN	DCR: 93-1957
26	BY: G. YAKEN	DCR: 95-849
27	BY: G. YAKEN; CHK: R. MACDONALD	DCR: 95-1895
28	BY: E. CROCKETT; CK: J. WALTERS	DCR: 95-1046
29	BY: D.M. EDWARDS; CHK: J. WALTERS	DCR: 96-131
30	BY: J. WALTERS	DCR: 97-346
31	BY: R. MACDONALD; CHK: F.W. GRANTHAM	DCR: 98-320; ESR 9700525
32	BY: R. MACDONALD; CHK: E. S. PERKINS; APPR: C. L. OLIVER 3/12/98	DCR: 98-541; CR 98-785
33	BY: E. S. PERKINS; CHK: D. M. EDWARDS; APPR: J. HARRELSON 5/12/98	DCR: 98-819; ESR 98-00356
34	BY: E. S. PERKINS; CHK: F. W. GRANTHAM; APPR: C. L. OLIVER 11/19/98	
35	EC 65141	ELECTRONICALLY SIGNED
36	EC 73296	ELECTRONICALLY SIGNED
37	EC 74840	ELECTRONICALLY SIGNED

DRN: R.D. HENRY
CHK: W. JOHNSON
DSGN:
DRFT. APPR:
ENG:
APPR:
DATE: 2-25-85

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT — No.2 HARTSVILLE, S.C.

INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM

VENDOR No. | SIZE E | DRAWING No. G-190200 | REV 37
SCALE none | SHEET 3 OF 10



CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING

HBR2-11390 SH.21

REVISIONS

REV	DESCRIPTION
30	DCR: 01-121, DCR: 99-359; BY: F.W. GRANTHAM, CHK: E.S. PERKINS, APPR: C.L. OLIVER 5/5/01
31	DCR: 01-310, AR: 28986; BY: E.S. PERKINS, CHK: C.L. OLIVER, APPR: C.L. OLIVER 6/28/01
32	DCR: 02-35; BY: E.S. PERKINS, CHK: J.L. WALTERS, APPR: C.L. OLIVER 1/9/02
33	EC 45629; BY: E.S. PERKINS, CHK: F.W. GRANTHAM, APPR: C.L. OLIVER 9/11/02
34	EC 54792 R1; ELECTRONICALLY SIGNED
35	EC 62763; ELECTRONICALLY SIGNED
36	EC 63832; ELECTRONICALLY SIGNED
37	EC 72099; ELECTRONICALLY SIGNED
38	EC 73615; ELECTRONICALLY SIGNED
39	EC 82043; ELECTRONICALLY SIGNED
40	EC 82944; ELECTRONICALLY SIGNED
27	DCR: 98-10, DCF: 98-P-0007; BY: R. MACDONALD, CHK: C.L. OLIVER, APPR: C.L. OLIVER 2/5/98
28	DCR: 98-594, ESR 98-00285; BY: J. WALTERS, CHK: E.S. PERKINS, APPR: C.L. OLIVER 7/14/98
29	DCR: 99-984; BY: E.S. PERKINS, CHK: D.M. EDWARDS, APPR: C.L. OLIVER 11/3/99

DRN W BLANCHARD · CHK N JOHNSON · APPR [signature] · DATE 2-21-[illegible]

CAROLINA POWER & LIGHT CO.
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE
INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING No	REV
	E	G-190200	40

SCALE NONE · SHEET 5 of 10

DRAWING NO. G-190200 SHEET 7 OF 10

8 7 6 5 4 3 2 1

G F E D C B A

½-1A-459 1A-286 ½x⅜ 1A-3489 TO SI-855 1A-3788 D

SPENT DEMIN. ROOM 51 PUMP ROOM ½-1A-457 1A-532 ½x⅜ 1A-3486 TO CVC-244 1A-284

¾-1A-455 1A-36 TO 'A' WASTE EVAPORATOR PANEL

¾-1A-454 1A-34 TO GAS STRIPPER 'A' PANEL

¾-1A-453 1A-35 TO GAS STRIPPER 'B' PANEL

¾-1A-450 1A-32 TO B.A. EVAP. 'A' PANEL

HALL

1A-126 ½-1A-458 TO LT-182 TO LT-183 51 PUMP ROOM OUTSIDE AT TANK FARM 1A-285 ½x⅜ 1A-3487 TO PT-1065 1A-3488 TO PT-1066 ½-1A-458A

¾-1A-460 ¾x⅜ 1A-3490 TO SI-856B ¾x⅜ 1A-3491 TO SI-856A 1A-37

2-1A-47

51 PUMP ROOM PIPE ALLEY

TO WD-1700 1A-3494 TO HCV-1069 1A-3493 ½-1A-461B ½x⅜ 1A-537

½-1A-456 ½-1A-456A IA-3787 TO EMERGENCY DIESEL GEN. 'A' TCV-1660 1A-101 ½-1A-456B 1A-102 ½x⅜ 1A-3485 TO TCV-1681 DIESEL GEN. 'B'

½-1A-461C ½x⅜ 1A-538 TO WD-1689 1A-3496 TO WP-1692 1A-3495

TO WASTE EVAPORATOR 'A' (INSTRUMENT REMOVED) 1A-3442 ½x⅜ ½-1A-606

1-1A-452 1A-33

1-1A-452A TO LCV-2012 1A-3443 ½x⅜ 1½ 1A-527 ½-1A-452B TO LCV-2007 1A-3440 ½x⅜ 1A-526 TO LCV-2008 1A-3441 ½x⅜ 1x½ ½-1A-452A

½-1A-452D 1A-528 ½x⅜ 1A-3445 TO PS-2035 1A-3444 TO PCV-2035

1A-128 ½-1A-451 1A-1288 1x½ 1A-3013 ½x¼ 1A-3014 1A-128A SPARE ½-1A-451 1A-3010 S-93 PRV 4063 I 1A-3012 ½x¼ ½-1A-451A

1-1A-54 1A-26 PIPE ALLEY SPENT DEMIN. VALVE GALLERY ROOM 1A-536 ½-1A-461A ½x⅜ 1A-3492 TO LT-1005

1x½ 1A-540 ½x⅜ 1A-3498 TO PT-1006 1A-461 ½-1A-461D 1A-539 ½x⅜ 1A-3497 TO FT-1068

1-1A-452 TO FCV-1-181 1A-3446 1x⅜ 1A-529

¾-1A-452F F F-27 1A-529A 1x¾ 1-1A-452E TO PCV-1046 PIPE ALLEY PRV 4070

FP- LOOP 'G' HBR2-8255 SH. 5 (E-2) 1A-3017 1A-3015

1A-112 PIPE ALLEY SPENT FUEL PIT HEAT EXCHANGE 1x½ ½x⅜ FAN ROOM 'A' 1A-3500 1A-3488 1A-3489 TO HUMIDITY CONTROL PANEL TO HVE-15 TO HVE-21 TO HVS-4

PIPE ALLEY HOLD-UP TANKS ROOM ½-1A-462A ½x⅜ 1A-3502 TO PCV-1049 ½-1A-462C 1A-3504 TO PCV-1027 ½-1A-462E 1A-535 ½-1A-462 1-1A-51 ½-1A-462B 1x½ TO PIC-165 1A-3505 TO LC-161 1A-3501 TO LC-162 1A-3503 TO LC-163 1A-3506 ½-1A-462D

1-1A-452G TO FCV-2-181 1A-3445 1x⅜ 1A-530 1-1A-452H 1x¾ 1A-530A F F-26

TO WCT PUMP 'B' TO LT-1013 1A-3436 1A-3437 TO WCT PUMP 'A' TO LT-1012 1A-3434 1A-3435 ⅜x¼ ½-1A-448C ½-1A-448D 1A-42 TO CHARGING PUMP SEAL LEAK OFF TK. 1A-282 1x½ 1A-281 ½x⅜

1-1A-52 1A-534 PIPE ALLEY NEW FUEL STORAGE BUILDING

1-1A-448 1x½ 1A-288 1A-30 1x½ 1A-283 ½-1A-448B 1-1A-448 ½-1A-448A 1A-207 ½-1A-448A ½x⅜ TO TCV-145 1A-207A TO RCV-145 1A-3438 TO LT-1000A

1A-31 ¾-1A-449 TO B.A. EVAP. 'B' PANEL

GAS DECAY TANK ROOM UNDERGROUND 2-1A-47

1-1A-465 1A-38 2x1 ½-1A-465B ½x⅜ 1A-3509 TO RCV-014 1A-3510 TO PCV-1040 1A-3511 TO WD-1629 1A-3512 TO PCV-1036A ½-1A-465A ½x⅜ 1A-3513 TO PCV-1037A 1A-3514 TO WD-1630

1A-39 ½-1A-466A 1A-44 2x½ ⅜" (TYP) 1A-3515 TO PT-1038 ½-1A-466E ½x⅜ 1A-3523 TO PCV-1037B 1A-3522 TO PCV-1036B ½-1A-466D ½x⅜ 1A-3524 TO PCV-1038B 1A-3525 TO PCV-1039B ½-1A-466B ½x⅜ 1A-3526 TO WD-1632 1A-3527 TO PCV-1039A 1A-3528 TO PCV-1038A 1A-3529 TO WD-1631 ½-1A-466C 1A-3516 TO PT-1039 1A-3517 TO FC-1000B 1A-3518 1A-3519 TO LT-1000B 1A-3520 TO PT-1037 2-1A-611 1A-3521 TO PT-1036

1-1A-466

1-1A-464 1A-125E 1A-3881 1-1A-689 1A-125C P1 125 1A-125D ¼-1A-463 1A-3882 1A-3883 1-1A-690 1-1A-691 1A-125B

¾x½ 1A-3447 PRV 4046 ¾x½ 1A-3457 PRV 4065 ¾x½ TO HCV-1-197 1A-3448 TO HCV-1-198B 1A-3449 TO LT-1-196 1A-3458 TO HCV-1-198C 1A-3450 TO TT-1-196 1A-3459 TO LCV-1-196 1A-3451 TO TT-1-195 1A-3460 TO HCV-1-194A 1A-3452 TO HCV-2-197 1A-3467 TO TT-1-194 1A-3461 TO HCV-1-198A 1A-3453 TO HCV-2-198B 1A-3468 TO PT-1-194 1A-3462 TO HCV-1-194B 1A-3454 TO HCV-2-198C 1A-3469 TO FT-1-195 1A-3463 TO HCV-1-195A 1A-3455 TO HCV-2-198D 1A-3470 TO PT-1-197 1A-3464 TO HCV-1-195B 1A-3456 TO HCV-2-194A 1A-3471 ¾-1A-608 ¾-1A-607

PRV 4047 ¾x½ 1A-3466 ¾x½ 1A-3476 PRV 4048 ¾x½ TO TT-2-196 1A-3478 TO TT-2-195 1A-3479 TO TT-2-194 1A-3480 ¾-1A-609

1A-3472 TO HCV-2-198A 1A-3473 TO HCV-2-194B 1A-3474 TO HCV-2-195A 1A-3475 TO HCV-2-195B 1A-3481 TO PT-2-194 1A-3482 TO FT-2-195 1A-3483 TO PT-2-197 1A-3484

¾-1A-610 ⅜" (TYP UN)

1-1A-50 1A-201 DECONTAMINATION AREA 1A-125 1A-125A 1-1A-464 1-1A-464A

(NOTE- UNVERIFIABLE LINE CONNECTION) 1-1A-53 SPENT FUEL PIT BUILDING HOT TAP TEE T 1A-3847 SPENT FUEL PIT BUILDING 1A-110 1A-111

HOT MACHINE SHOP 1A-3797 1A-3507 TO FCV-6413 (ABANDONED IN PLACE) 2x½ 1A-421 ½x⅜ TO HVE-14 HVE-20 HVS-2 FCV-6043 FAN ROOM 'B'

I&SA- G-190200 SH 8 (G-8) 2-1A-49

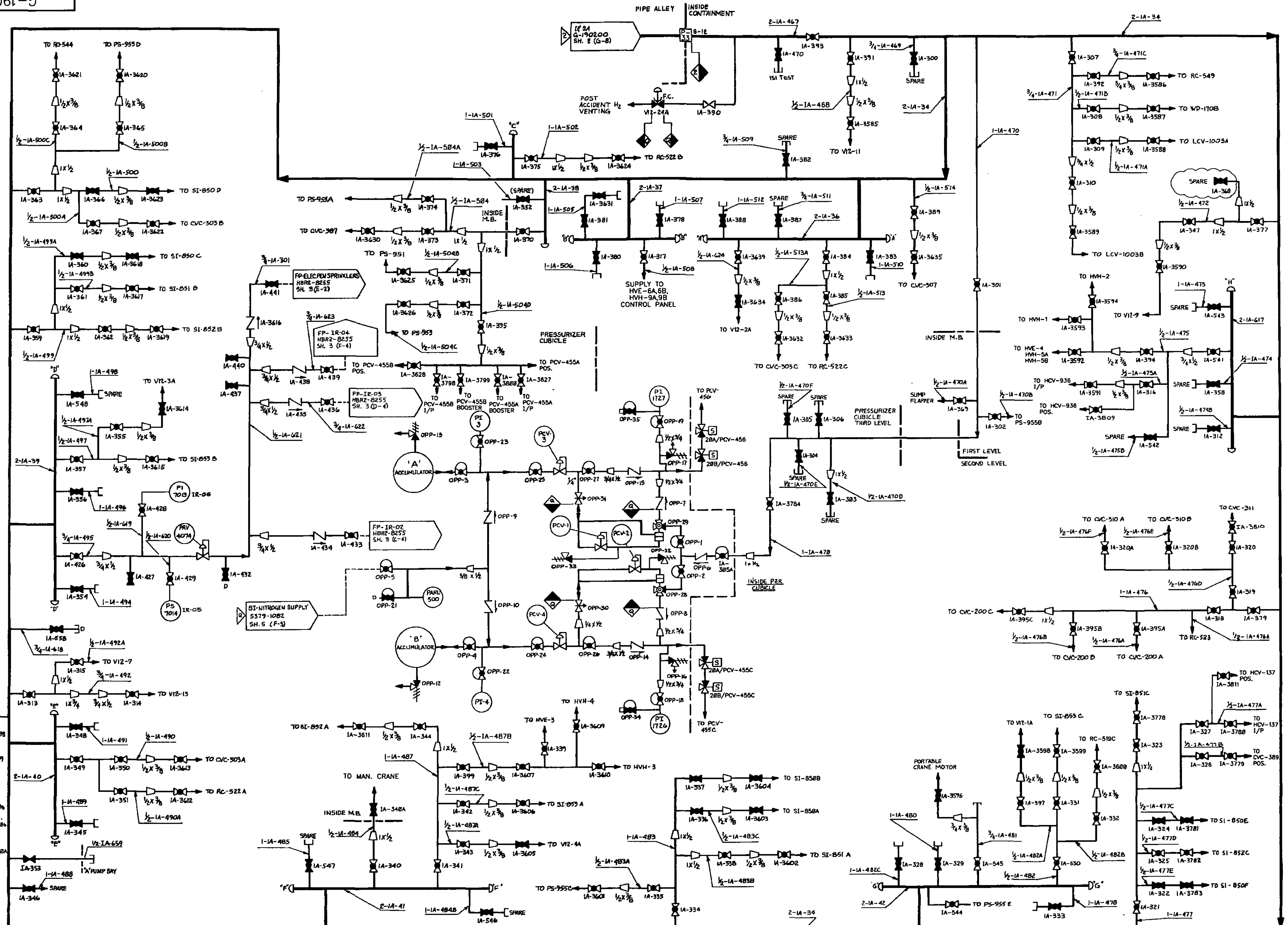
½-1A-605 TO COMPRESSOR 'A' 1A-3431 COMPRESSOR TEMPERATURE CONTROL TO COMPRESSOR 'B' 1A-3432 1A-98 2-1A-47

I&SA- INSTR. AIR G-190200 SH. 2 (D-1)

REVISIONS																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
DWN	BY: HAROLD E.L. LLOYD	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: R. MACDONALD	BY: R. MACDONALD	BY: T. HARRISON	BY: D.M. EDWARDS	BY: R. MACDONALD	BY: E.S. PERKINS	BY: E.S. PERKINS	BY: E.S. PERKINS	ELECTRONICALLY SIGNED	ELECTRONICALLY SIGNED	ELECTRONICALLY SIGNED
CHK	W. JOHNSON	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	F.W. GRANTHAM	F.W. GRANTHAM	C.L. OLIVER		
APPR	W. JOHNSON	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.C. WILLARD	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER		
DCR	87-1031	88-0139	88-095	88-337	88-1125	89-1354	89-2353	91-2602	92-0077	91-2602	91-2556	98-1268	49794	38673, 54948	54948	68289	68325

DWN: HAROLD E.L. LLOYD	CAROLINA POWER & LIGHT CO.
CHK: W. JOHNSON	H.B. ROBINSON S.E. PLANT
DSGN:	UNIT - No. 2 HARTSVILLE, S.C.
DEPT. APPR:	TITLE: INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM
ENG.	
APPR:	
DATE: 2-25-92	VENDOR No. — SIZE E — DRAWING No. G-190200 — REV. 17
	SCALE — SHEET 7 OF 10

G-190200
SHEET 9 OF 10



REVISIONS		
24	EC 77582	ELECTRONICALLY SIGNED
3	DCR: 87-1110 MOD: 418	BY: H.E.L. LLOYD CK: W. JOHNSON APPR: C.D. [signature]
4	DCR: 87-1852	BY: J. WALTERS CHK: W. JOHNSON APPR: C. [signature]
5	DCR: 88-097	BY: J. WALTERS CHK: W. JOHNSON APPR: [signature] 7-12-88
6	DCR: 88-1922 MOD: 918	BY: J. WALTERS APPR: C. [signature]
7	DCR: 89-79 MOD: 948-8	BY: H.E.L. LLOYD CK: W. JOHNSON APPR: C. [signature]
8	DCR: 89-239	BY: H.E.L. LLOYD CK: W. JOHNSON APPR: C. [signature]
9	DCR: 89-396	BY: H.E.L. LLOYD CK: W. JOHNSON APPR: C. [signature]
10	DCR: 92-809 MOD: 1064	BY: H.E.L. LLOYD CK: J. WALTERS APPR: C.K. [signature] 4/9/92
11	DCR: 92-902	BY: H.E.L. LLOYD CK: J.L. WALTERS APPR: C.K. [signature]
12	DCR: 92-1060	BY: H.E.L. LLOYD CK: J. WALTERS APPR: C.K. Oliver
13	DCR: 93-1123, 1920	BY: G. YAKEN CHK: C.L. OLIVER APPR: C.K. Oliver
14	DCR: 94-134	BY: R. MACDONALD CHK: G. YAKEN APPR: C.K. Oliver
15	DCR: 96-321 DCF 96-P-3464	BY: G. CROCKER CHK: G. YAKEN APPR: C.K. Oliver
16	DCR: 96-129 MOD:	BY: J. WALTERS CHK: R. MACDONALD APPR: C.K. Oliver
17	MOD: PCP 96-P-1788	BY: J. WALTERS CHK: F.W. GRANTHAM APPR: C.K. Oliver
18	DCR: 97-213 ESR: 97-382	BY: R. MACDONALD CHK: F.W. GRANTHAM APPR: C.K. Oliver
19	DCR 98-315	BY: D.M. EDWARDS CHK: C.L. OLIVER APPR: C.L. OLIVER 4/28/98
20	DCR 01-260 ESR 00-00072	BY: J.L. WALTERS CHK: E.S. PERKINS APPR: C.L. OLIVER 3/1/01
21	EC 62618	ELECTRONICALLY SIGNED
22	EC 71440	ELECTRONICALLY SIGNED
23	EC 77409	ELECTRONICALLY SIGNED

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11360 SH. 12

DRN: HAROLD E.L. LLOYD
CHK: W. JOHNSON
DSGN:
DRFT. APPR:
ENG:
APPR: [signature]
DATE: 2-25-85

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT — No. 2 HARTSVILLE, S.C.

TITLE: INSTRUMENT & STATION AIR SYSTEM FLOW DIAGRAM

VENDOR No	SIZE	DRAWING No.	REV
	E	G-190200	24

SCALE NONE SHEET 9 OF 10

DWG. NO. G-190202 SH. 3 OF 8

NOTE: SEE SHEET 1 FOR NOTES

FC & AE-AUX FW PUMP G-190197 SH.1 (A-7)

SERVICE WATER G-190199 SH.11 (D-4)

DEEPWELL PUMPS

CONDENSATE STORAGE TANK G-190197 SH.1 (B-7)

CST RECYCLE PUMP

DEGASIFIER

INTEGRAL STORAGE TANK 200Ø GALLONS

POLISHER BLDG LEAN-TO

POLISHER BUILDING LEAN-TO

GAS EJECTOR A

GAS EJECTOR B

SIGHT GLASS

ATMOSPHERIC AIR IN

VACUUM PUMP A

VACUUM PUMP B

VACUUM PUMP C

TO ATMOSPHERE

TRANSFER PUMPS

AIR RELEASE

TO STORM DRAIN

SPOOL PIECE (NORMALLY REMOVED)

BELOW GROUND ABOVE GROUND INSIDE ENCLOSURE

"B" EDG ROOM

"A" EDG ROOM

S&CW- G-190199 SH. 6 SH. 6 (B-4)

S&CW- G-190199 SH. 6 SH. 6 (B-3)

P&WW-PRIMARY MIX BED INLET G-190202 SH.4 (H-10)

P&WW-DEMIN SEAL WATER G-190202 SH.1 (D-3)

P&WW-ANALYZER ALT WATER G-190202 SH.7 (E-6)

CP ANALYZER ALT WATER HBR2-9895 SH.9 (B-6)

R-37 PURGE

I.A. SOURCE

D/P CELL

POLISHER BLDG

YARD

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11398 SH. 18

REV	QA	STRUC	NUC	MECH	ELECT	I&C
3						

REV	DATE	DESCRIPTION	DWN	CHK	APPR'D
29	5/2/85	EC 59019, 59017	ESP	FWG	CLO 5/2/85
32		EC 79453	ELECTRONICALLY SIGNED		
31		EC 70530 & 69641	ELECTRONICALLY SIGNED		
30		EC 64527	ELECTRONICALLY SIGNED		

DPE E.W.O'NEIL,JR.

PROFESSIONAL ENGINEER HUBERT P. HINES REG. NO. S.C. 10655

NON CONTAMINATED

CAROLINA POWER & LIGHT COMPANY

ROBINSON ENGINEERING SUPPORT SECTION

PLANT: ROBINSON PLANT - UNIT 2

TITLE: PRIMARY & MAKE-UP WATER SYSTEM FLOW DIAGRAM

DWG. NO. G-190202

SCALE: NONE

SHEET 3 OF 8

REV. NO. 32

DRAWING NO G-190204-A SHEET 2 OF 3

NOTE:
SEE SHEET NO. 1 FOR NOTES.

DIESEL GENERATOR "A" ENGINE

EDG TURBO-CHARGER G-190204-A SHT. 1 (D-8)

EDG TURBO-CHARGER G-190204-A SHT. 1 (C-8)

EDG TURBO-CHARGER G-190204-A SHT. 1 (C-8)

AIR COOLERS

ENGINE RECEIVER

JACKET WATER HEADER

JACKET WATER PUMP 'A' (ENGINE DRIVEN)

ENGINE DRIVEN LUBE OIL PUMP 'A'

ENGINE CRANKCASE

VACUUM MANOMETER

L.O. SUMP

STRAINER

PRE-LUBE OIL PUMP 'A'

L.O. FILTER 'A'

L.O. STRAINER 'A'

STAND-BY HEATER 'A' (18 KW(CH.)

STAND-BY CIRC. COOLANT PUMP 'A' ½ H.P. (CPM)

3-WAY VALVE TO READ INLET OR OUTLET PRESSURE

3-WAY VALVE TO READ OUTLET OR INLET PRESSURE

JACKET WATER HX. 'A'

LUBE OIL HX. 'A'

AFTER COOLANT HX. 'A'

AFTER COOLANT PUMP 'A' (ENGINE DRIVEN)

EXPANSION TANK 'A'

STAND BY CIRCULATION PUMP 'A'

OIL HEATER 'A' 6 KW (CH.)

EDG TURBO CHGR. SHAFT LUBE G-190204-A SHT 1 (C-6)

EDG TURBO CHGR. SHAFT LUBE G-190204-A SHT 1 (C-6)

PENNW-DRWR. WTR. G-190202 SH. 1 (F-2)

TO ATMOS.

FILL

OVER FLOW

FLOOR DRAIN

THERMOSTATIC BY-PASS VALVE (TYP-5 PLACES)

DG-43A PETTOCK VALVE

DG-36A PETTOCK VALVE

REVISIONS																			
NO.	13	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
DATE	3-15-74	4-5-68	5-16-68	8-1-68	1-7-69	1-10-69	1-30-69	2-4-69	2-11-69	2-24-69	3-3-69	3-5-69	3-31-69	4-1-69	4-2-69	4-3-69			
BY	K. FULBRIGHT	K. FULBRIGHT	R. HOLLOWELL	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	D. HELLOYD	J. WALTERS	J. WALTERS	J. WALTERS	J. WALTERS	R. MACDONALD	J. WALTERS	J. WALTERS	J. WALTERS	E. S. PERKINS	
CHK	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	J. WALTERS	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	J. WALTERS	
APPR	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	W. JOHNSON	
DCP			DCP 80-722																
DCR								DCR-82-1078								DCR-88-00893			
MOD				MOD.	MOD	MOD	MOD			MOD		MOD							

DRWN	T. BLANTON
CHK	W. JOHNSON
DSGN	ACCEPTABLE
ENG	AS BUILT
APPR	Acceptable
DEPT APPR	
NEXT USED ON	

CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.

TITLE: EMERGENCY DIESEL GENERATOR SYSTEM FLOW DIAGRAM

VENDOR NO | SIZE E | DRAWING NO G-190204-A | REV 18

SCALE NONE | SHEET 2 OF 3

FILE: 32816

DWG. NO. SK-71917-E-3016 SH. 1

FOR DIESEL GENERATOR "B" FUSE BLOCKS LOCATION.

VOLTAGE REGULATOR CHASSIS

REAR BARRIER FRONT VIEW
Δ=CUST CONNECTIONS

FACE PANEL REAR VIEW

FOR DIESEL GENERATOR "A" FUSE BLOCKS LOCATION.

NOTE
TOP — BM PAGE
BOTTOM — LINE #

REV	DATE	DESCRIPTION	DWN	CHK	APPVD
C		EC 71917/75917	NJH		
B		EC 71917/75917	CSP		
A	1/1	EC 71917/75917	CSP		

PROFESSIONAL ENGINEER:
QUALITY LEVEL:

PROGRESS ENERGY ENGINEERING SECTION

PLANT: ROBINSON PLANT — UNIT 2

SCALE: NONE

TITLE:
EMERGENCY DIESEL GENERATOR
CONN. DIAGRAM

DWG NO. 5379-2693 REV. 12

SCH NO. SK-71917-E-3016 SHT. 1

DRAWING NO. G-190204-D SHEET 1 OF 4

EAST YARD | "C" AUX. BOILER SHED | ATMOSPHERE | "C" AUX. BOILER SHED | UNDERGROUND

LP TANK

AUXILIARY BOILER "C"

LP NOZZLE

OIL FLAME NOZZLE

AUX. BOILER "C" AIR COMPRESSOR

AUX. BOILER "C" DAY TANK

AUX. BOILER "C" FUEL OIL PUMP

FUEL OIL USAGE TOTALIZER

AUXILIARY BOILER "B"

FLAME NOZZLE

AUX. BOILER "B" AIR COMPRESSOR

AUXILIARY BOILER "A"

FLAME NOZZLE

AUX. BOILER "A" AIR COMPRESSOR

AUX. BOILER'S FUEL OIL PUMP "A"

AUX. BOILER'S FUEL OIL PUMP "B"

FO-FUEL OIL USAGE TOTALIZER G-190284D SH. 3 (G-8)

FO-ALT. FUEL OIL TANKS G-190284D SH. 4 (E-5)

UNDERGROUND PIPING ABANDONED IN PLACE, ENDS CAPPED AND WELDED SHUT.

UNDERGROUND ABOVE GROUND NEAR TURBINE BLDG.

WEST YARD | GROUND FLOOR TURBINE BUILDING

WEST YARD | DEDICATED SHUTDOWN DIESEL GEN. TRAILER

DEDICATED SHUTDOWN DIESEL FUEL OIL TANK

DEDICATED SHUTDOWN DIESEL GENERATOR FUEL OIL DAY TANK

D.S. FUEL OIL PUMP

FUEL PRIME PUMP

ENGINE DRIVEN FUEL PUMP

HAND PRIMING PUMP

FUEL BLOCK MANIFOLD

ENGINE FUEL MANIFOLD

BYPASS FUEL SIGHT GLASS

RETURN FUEL SIGHT GLASS

DIESEL ENGINE (DEDICATED SHUTDOWN)

FUEL INJECTOR (TYP.)

NOTES:

1. PIPING WAS LABELED WITHOUT REFERENCE TO MATERIAL SPECIFICATION IF THE EXACT ASTM SPEC. COULD NOT BE DETERMINED AT THE TIME OF THE VERIFICATION WALK-DOWN.
2. VALVE EV-4541 IS A 2-WAY SOLENOID-CHECK WITH A MANUAL OVERRIDE.
3. VALVE LCV-4535 IS MOTOR OPERATED, BUT DOES NOT HAVE A LIMITORQUE MOTOR ACTUATOR. VALVE AND MOTOR MADE BY PITTSBURGH BRASS MFG. CO.
4. UNDERGROUND PIPING SHALL BE RED THREAD II FIBERGLASS REINFORCED PIPE (A.O. SMITH) OR APPROVED EQUAL.
5. ABOVE GROUND PIPING SHALL BE ASTM A106 GR. B SCH.40 CARBON STEEL PIPE, EXCEPT FOR WATER DRAIN WHICH IS SCH. 160.
6. OVERFILL PREVENTION VALVE WILL AUTOMATICALLY CLOSE WHEN TANK IS FILLED TO APPROX. 95% LEVEL.
7. ABANDONED BY ESR 01-00195.

REFERENCE DRAWINGS:

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS (W)	G-675176
INSTRUMENTATION SCHEMATICS	A-190301
AUX. STEAM FLOW DIAGRAM	G-190204B
EMERGENCY DIESEL GENERATOR (D.S.) FLOW DIAGRAM	HBR2-8076
FIRE-PROTECTION SYSTEM FLOW DIAGRAM	HBR2-8255

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

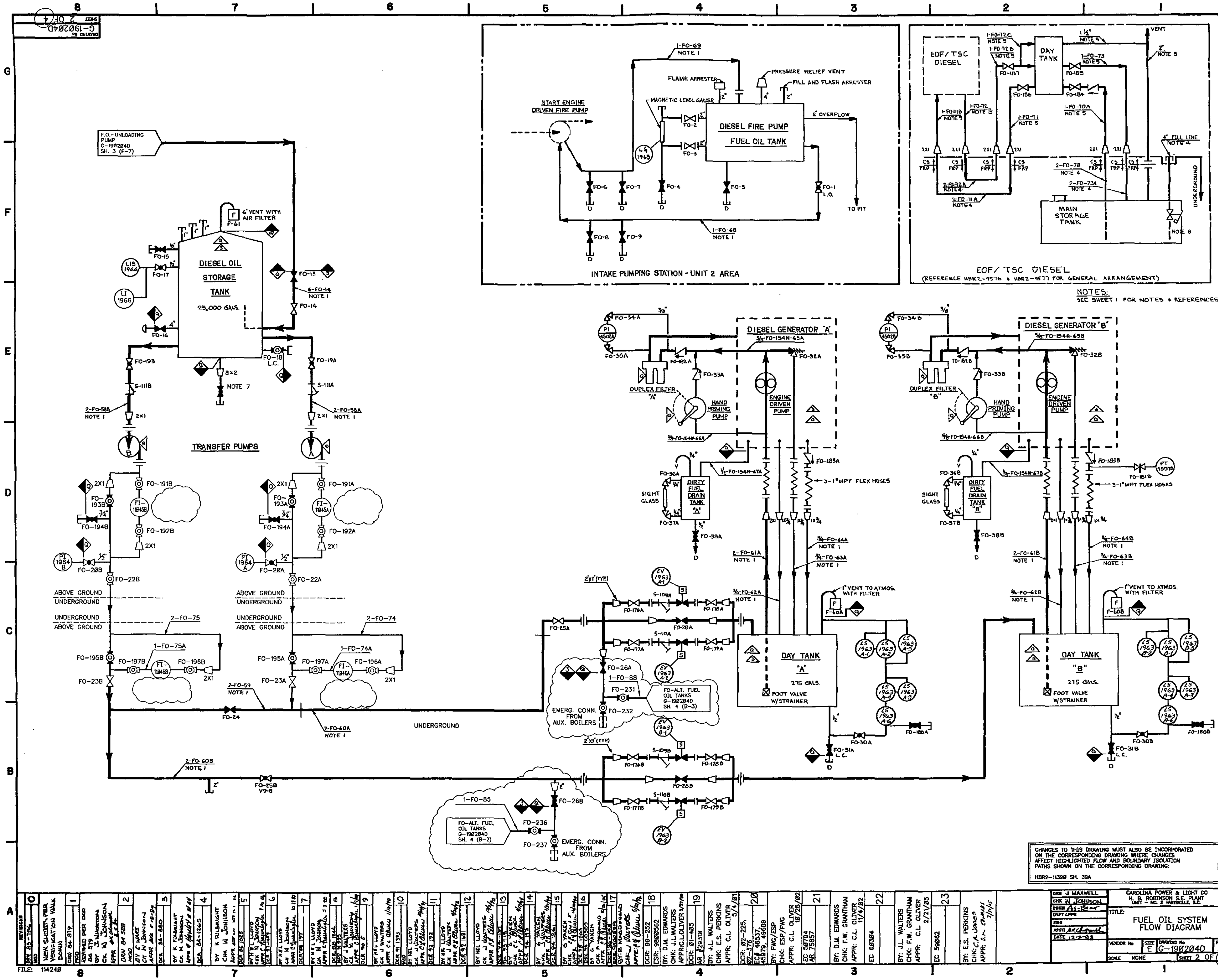
HBR2-11398 SH. 39

REVISIONS																	
ITEM	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
ERN	ISSUED FOR WALKDOWN	WALKDOWN CORRECTIONS	DCR 90-154	DCR 91-327	DCR 98-1218	DCR 98-1219	DCR 98-1220	DCR 98-1221	DCR 98-1222	DCR 98-1223	OCR: 99-251 ESR: 9888562	OCR: 88-43 ESR: 9888563	OCR: 81-713 AR: 28318	OCR: 82-226 EC# 46537	EC 49697	EC 59862	EC 61287	EC 63655
BY	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	R.E.L. LLOYD	D.M. EDWARDS	E. S. PERKINS	E. S. PERKINS	F.W. GRANTHAM	E.S. PERKINS	E.S. PERKINS	E.S. PERKINS	E.S. PERKINS
CHK	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	J.L. WALTERS	F.W. GRANTHAM	J.L. WALTERS	E.S. PERKINS	F.W. GRANTHAM	F.W. GRANTHAM	F.W. GRANTHAM	F.W. GRANTHAM
APPR											C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	C.L. OLIVER	D.M. EDWARDS	C.L. OLIVER
DATE	11-8-84	12-20-84	1-10-90	2-19-91	2-19-98	2-19-98	2-19-98	2-19-98	2-19-98	2-19-98	5/27/99	18/26/81	2-19-81	18/25/82	7/15/84	6/29/85	3/30/85	6/29/85

ELECTRONICALLY SIGNED

FILE: 114225

DRW K FULBRIGHT	CAROLINA POWER & LIGHT CO
CHK M JOHNSON	H. B. ROBINSON S.E. PLANT
DESIGN	UNIT - NO. 2 HARTSVILLE, S.C.
DEPT APPR AS-BUILT	TITLE:
ENG	FUEL OIL SYSTEM
APPR AS-BUILT	FLOW DIAGRAM
DATE 11-8-84	VENDOR No. — SIZE E — DRAWING No. G-190204D — REV. 17
	SCALE NONE — SHEET 1 OF 4



DRAWING No G-190204D SHEET 2 OF 4
F.O.-UNLOADING PUMP G-190204D SH. 3 (F-7)
6" VENT WITH AIR FILTER
F-61
DIESEL OIL STORAGE TANK
25,000 GALS.
LIS 1966
LI 1966
FO-15
FO-17
FO-16
FO-13
6-FO-14 NOTE 1
FO-14
FO-18 L.C.
FO-19B
FO-19A
S-111B
S-111A
2-FO-58B NOTE 1
2-FO-58A NOTE 1
3×2
NOTE 7
TRANSFER PUMPS
FO-191B
FO-191A
FO-193B
FO-193A
FI-11045B
FI-11045A
FO-194B
FO-194A
FO-192B
FO-192A
PI 1964 B
PI 1964 A
FO-20B
FO-20A
FO-22B
FO-22A
ABOVE GROUND
UNDERGROUND
2-FO-75
2-FO-74
1-FO-75A
1-FO-74A
FO-195B
FO-195A
FO-197B
FO-197A
FI-11046B
FI-11046A
FO-196B
FO-196A
FO-23B
FO-23A
2-FO-59 NOTE 1
FO-24
2-FO-60A NOTE 1
2-FO-60B NOTE 1
FO-25B V9-8
UNDERGROUND
START ENGINE DRIVEN FIRE PUMP
1-FO-69 NOTE 1
FLAME ARRESTER
PRESSURE RELIEF VENT
FILL AND FLASH ARRESTER
MAGNETIC LEVEL GAUGE
LG 1963
DIESEL FIRE PUMP FUEL OIL TANK
2" OVERFLOW
TO PIT
FO-1 L.O.
FO-2
FO-3
FO-4
FO-5
FO-6
FO-7
FO-8
FO-9
1-FO-68 NOTE 1
INTAKE PUMPING STATION - UNIT 2 AREA
EOF/TSC DIESEL
DAY TANK
VENT
1-FO-72C NOTE 5
1-FO-72B NOTE 5
1-FO-73 NOTE 5
1 1/2" NOTE 5
2" NOTE 5
FO-187
FO-185
FO-186
FO-184
1-FO-71B NOTE 5
1-FO-72 NOTE 5
1-FO-71 NOTE 5
1-FO-70A NOTE 5
4" FILL LINE NOTE 4
2-FO-70 NOTE 4
2-FO-73A NOTE 4
2-FO-72A NOTE 4
2-FO-71A NOTE 4
MAIN STORAGE TANK
UNDERGROUND
NOTE 6
EOF/TSC DIESEL
(REFERENCE HBR2-9576 & HBR2-9577 FOR GENERAL ARRANGEMENT)
NOTES:
SEE SHEET 1 FOR NOTES & REFERENCES.
DIESEL GENERATOR "A"
5/8-FO-154N-65A
DIESEL GENERATOR "B"
5/8-FO-154N-65B
PI 4502A
PI 4502B
FO-34A
FO-35A
FO-34B
FO-35B
FO-182A
FO-182B
FO-33A
FO-33B
FO-32A
FO-32B
DUPLEX FILTER "A"
DUPLEX FILTER "B"
HAND PRIMING PUMP
ENGINE DRIVEN PUMP
5/8-FO-154N-66A
5/8-FO-154N-66B
1/2-FO-154N-67A
1/2-FO-154N-67B
FO-183A
FO-183B
3-1" MPT FLEX HOSES
FO-181B
PT 4557B
FO-36A
FO-37A
FO-36B
FO-37B
SIGHT GLASS
DIRTY FUEL DRAIN TANK "A"
DIRTY FUEL DRAIN TANK "B"
FO-38A
FO-38B
2-FO-61A NOTE 1
2-FO-61B NOTE 1
3/4-FO-64A NOTE 1
3/4-FO-63A NOTE 1
3/4-FO-62A NOTE 1
3/4-FO-64B NOTE 1
3/4-FO-63B NOTE 1
3/4-FO-62B NOTE 1
1" VENT TO ATMOS. WITH FILTER
F-60A
F-60B
DAY TANK "A" 275 GALS.
DAY TANK "B" 275 GALS.
FOOT VALVE W/STRAINER
LS 1963 A-1
LS 1963 A-2
LS 1963 A-3
LS 1963 A-4
LS 1963 A-5
LS 1963 A-6
LS 1963 B-1
LS 1963 B-2
LS 1963 B-3
LS 1963 B-4
LS 1963 B-5
LS 1963 B-6
FO-30A
FO-30B
FO-31A L.C.
FO-31B L.C.
FO-180A
FO-180B
2"x1" (TYP)
EV 1963 A-1
EV 1963 A-2
EV 1963 B-1
EV 1963 B-2
S-109A
S-110A
S-109B
S-110B
FO-176A
FO-177A
FO-178A
FO-179A
FO-176B
FO-177B
FO-178B
FO-179B
FO-28A
FO-28B
FO-25A
FO-26A
FO-26B
1-FO-88
1-FO-85
FO-231
FO-232
FO-236
FO-237
FO-ALT. FUEL OIL TANKS G-190204D SH. 4 (B-3)
FO-ALT. FUEL OIL TANKS G-190204D SH. 4 (B-2)
EMERG. CONN. FROM AUX. BOILERS
CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:
HBR2-11390 SH. 39A
REVISIONS
NEW SHEET, PER VERIFICATION WALK DOWN
REVISED PER DCR 84 379
BY: D.M. EDWARDS CHK: J.L. WALTERS
BY: J.L. WALTERS CHK: E.S. PERKINS APPR: C.L. OLIVER 5/4/01
BY: FWG/ESP CHK: ESP/FWG APPR: C.L. OLIVER 10/25/02
BY: D.M. EDWARDS CHK: F.W. GRANTHAM APPR: C.L. OLIVER 11/4/02
BY: J.L. WALTERS CHK: F.W. GRANTHAM APPR: C.L. OLIVER 2/21/05
EC 59062
BY: E.S. PERKINS
DRN J MAXWELL
CHK W JOHNSON
DATE 12-2-83
CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO. 2 HARTSVILLE, S.C.
TITLE: FUEL OIL SYSTEM FLOW DIAGRAM
SIZE E
DRAWING No G-190204D
REV 23
SCALE NONE
SHEET 2 OF 4
FILE: 114240

SHEET 1 OF 2

G-190234

STEAM GENERATOR "A"

STEAM GENERATOR "B"

STEAM GENERATOR "C"

INSIDE CONTAINMENT

OUTSIDE CONTAINMENT

NS-HBR2-8686 SH. 2 (A-3)

SGB-4-WAY VALVE G-190234 SH. 2 (E-5)

SGB-SA FLASH TK. G-190234 SH. 2 (G-8)

SGB-SB FLASH TK. G-190234 SH. 2 (G-8)

SGB-4-WAY VALVE G-190234 SH. 2 (D-5)

SGB-SC FLASH TK. G-190234 SH. 2 (G-8)

SS-SAMPLE COOLER HBR2-9006 SH. 2 (F-2)

SS-SAMPLE COOLER HBR2-9006 SH. 2 (D-2)

SS-SAMPLE COOLER HBR2-9006 SH. 2 (B-2)

CHEMICAL DRAIN TANK ROOM

PIPE ALLEY

SAMPLE ROOM

TURBINE BUILDING

VENT TO ATMOS

SG BLOWDOWN HEAT EXCHANGER

SGB G-190234 SH. 2 (E-8)

SGB G-190234 SH. 2 (F-8)

SGB G-190234 SH. 2 (D-8)

SGB G-190234 SH. 2 (C-8)

FC & AE G-190197 SH. 2 (D-2)

REFERENCE DRAWINGS

FLOW DIAGRAM LEGEND & SYMBOLS	HBR2-7063
FLOW DIAGRAM SYMBOLS (M) E. SPEC.	G-279176
INSTRUMENTATION SCHEMATICS	A-190301
REACTOR CONTR. BLDG. PIPING PENET.	B-190178
INSTRUMENT & STATION AIR SYSTEM	G-190100
PRIMARY MAKE-UP WATER SYSTEM	G-190202
F.W. COND. ANE EVACUATION SYSTEM	G-190197
SECONDARY SAMPLING SYSTEM	HBR2-9006
COMPONENT COOLING WATER SYSTEM	5379-376
FLOW ACCELERATED CORROSION ISO'S	HBR2-11517

CHANGES TO THIS DRAWING MUST ALSO BE INCORPORATED ON THE CORRESPONDING DRAWING WHERE CHANGES AFFECT HIGHLIGHTED FLOW AND BOUNDARY ISOLATION PATHS SHOWN ON THE CORRESPONDING DRAWING:

HBR2-11388 SH. 18

REVISIONS	
DRN	84-10566
MOD	REVISED LEGEND TO REFLECT NO 4 INCH 900# GATE VALVE
DCR	84-1138
MOD	85-1251
DCR	85-1251
MOD	85-1254
DCR	85-1254
MOD	UPDATED PER AS-BUILT
DCR	87-1185
MOD	87-1251
DCR	87-1251
MOD	88-1254
DCR	88-1254
MOD	UPDATED PER AS-BUILT
DCR	92-1185
MOD	93-1191
DCR	93-1191
DCR	93-1231
MOD	94-1178
DCR	94-1178
MOD	UPDATED PER AS-BUILT
DCR	94-1185
DCR	94-1198
DCR	95-1368
DCR	95-1368
MOD	96-1155
DCR	96-1155
MOD	UPDATED PER AS-BUILT
DCR	98-813
ESR	98-71
DCR	98-813
DCR	98-89423
DCR	98-571
ESR	97084.29 R1
EC	49688
EC	53838
EC	54331
EC	82483
	ELECTRONICALLY SIGNED

DSN	M. MILES
DM	R.A. CHENNING
DEPT APPR	
DSGN	
DRN	
APPR	R. A. KENNON FOR N.P.
DATE	11-2-84

CAROLINA POWER & LIGHT CO
H.B. ROBINSON S.E. PLANT
UNIT - No 2 HARTSVILLE, S.C.

TITLE: STEAM GENERATOR BLOW-DOWN AND WET LAYUP SYSTEM FLOW DIAGRAM

VENDOR No: E | SIZE: D | DRAWING No: G-190234 | REV: 39

SCALE: NONE | SHEET 1 OF 2

NOTE: REFER TO SHT 1 OF 4 FOR GENERAL NOTES & REF DWGS.

PENETRATION PRESSURIZATION AIR RECEIVER 'C'

PENETRATION PRESSURIZATION AIR RECEIVER 'D'

PP-AIR RECIVER G-190261 SH. 1 (E-8)

PPS AIR RCVR ROOM

2ND FLR HALLWAY

PIPE TUNNEL

RHR PIT

B.I.T. ROOM

SLEEVE AT PEN-46 (RHR)

SLEEVE AT PEN-47 (RHR)

SEE DETAIL "P" G-190261 SH.1 (TYPICAL) (NOTE 22)

PURGE EXHAUST SEE DETAIL "E" G-190261 SH.4

POST ACCIDENT H_2 VENTING SEE DETAIL "H" G-190261 SH.4

FUEL TRANSFER SEE DETAIL "F" G-190261 SH. 4

PRESSURE RELIEF & POST ACCIDENT HYDROGEN VENTING SEE DETAIL "G" G-190261 SH. 4

SUPPLY TO CV ISOLATION VALVES SEE DETAIL "K" G-190261 SH. 4

SLV-23, PEN 35 & 36 SEE DETAIL "B" G-190261 SH. 4

SEE DETAIL "G" SHEET 4

HEADER "C" MECHANICAL PENETRATIONS OUTSIDE C.V. SEE DETAIL "L" G-190261 SH. 3

I & SA - IA SUPPLY G-190269 SH. 8 (F-5)

I & SA - IA SUPPLY G-190269 SH. 3 (D-3)

NS - N_2 SUPPLY HSR2-8686 SH. 1 (F-1)

N_2 HEADER

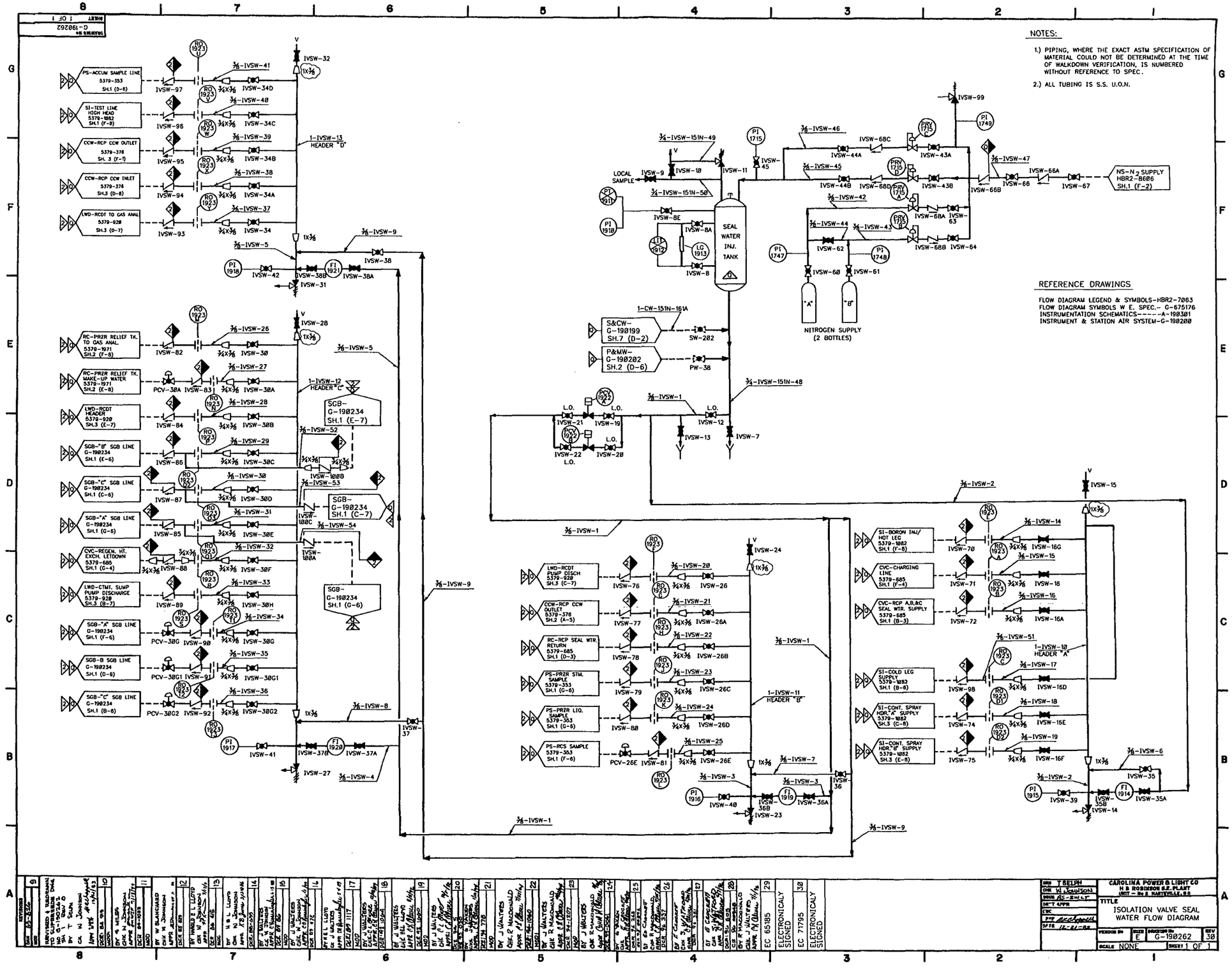
LOCAL PRESSURE SUPPLY

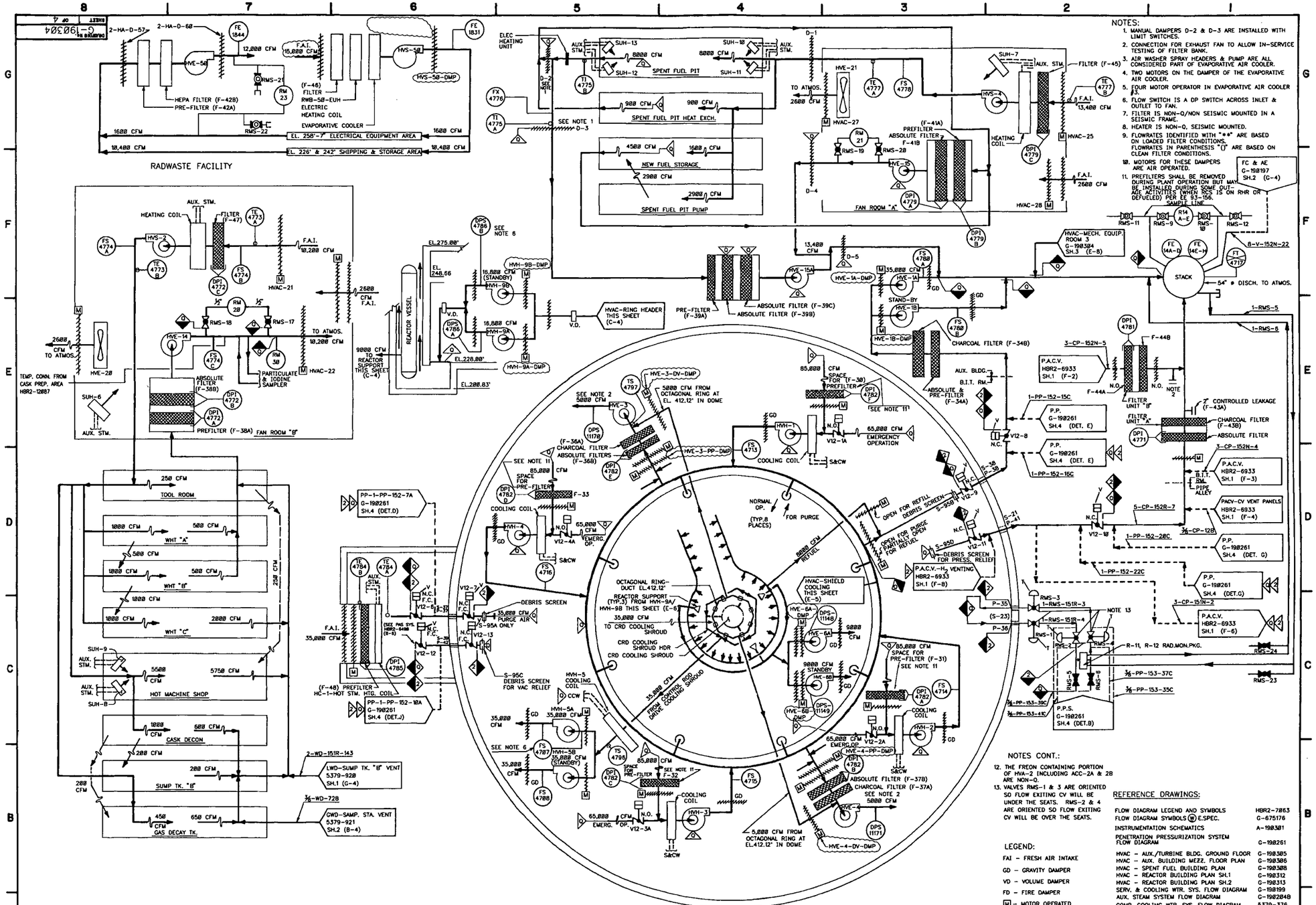
PP-AIR RCVR 'B' G-190261 SH. 1 (D-8)

PP-AIR RCVR 'A' G-190261 SH. 1 (D-4)

REVISIONS																														
NO.	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
DWN	B5-1735																													
CHK																														
DESCRIPTION	ADD PAIR PER INSTR. ZONAL & PHOTO SHT. 2																													
BY	B.F. RHODES	BY: S.M. SPATCHER	BY: W. BLANCHARD	BY: HAROLD E.I. LLOYD	BY: E.L. LLOYD	BY: E.L. LLOYD	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: J. WALTERS	BY: R. MACDONALD	BY: R. MACDONALD	BY: R. MACDONALD	BY: R. MACDONALD	BY: R. MACDONALD	BY: F.N. GRANTHAM	BY: F.N. GRANTHAM	BY: F.N. GRANTHAM	BY: F.N. GRANTHAM	BY: F.N. GRANTHAM	BY: E.S. PERKINS			
CHK	J.L.E. Walther																													
APPR																														
DCR	84-593	DCR 84-722		DCR 85-219	DCR 88-311		DCR 88-1525	MOD: 1065	DCR 91-1631	MOD: 1094	DCR: 92-128	MOD:	DCR: 94-250	MOD:	DCR: 94-1061	MOD:	DCR: 95-1888	ESR: 95-0088	ESR: 95-0150	ESR: 95-0150	DCR: 95-1955	MOD:	ESR: 96-0168	DCR: 96-286	ESR: 96-0168	DCR: 97-193	ESR: 97-0088	DCR: 97-155	DCR: 97-158	DCR 97-336	DCR 82-136

DRN: B.F. RHODES	CAROLINA POWER & LIGHT CO.
CHK: J.L.E Walther	H.B. ROBINSON S.E. PLANT
DSGN: AS-BUILT	UNIT — No. 2, HARTSVILLE, S.C.
DRFT APPV:	TITLE: PENETRATION PRESSURIZATION FLOW DIAGRAM
ENGR APPV:	
APPR:	
DATE: 12-20-83	VENDOR No. — SIZE: E — DRAWING No.: G-190261 — REV: 30
	SCALE: NONE — SHEET 2 OF 4


NOTES:
1.) PIPING, WHERE THE EXACT ASTM SPECIFICATION OF MATERIAL COULD NOT BE DETERMINED AT THE TIME OF WALKDOWN VERIFICATION, IS NUMBERED WITHOUT REFERENCE TO SPEC.
2.) ALL TUBING IS S.S. U.O.N.
REFERENCE DRAWINGS
FLOW DIAGRAM LEGEND & SYMBOLS-HBR2-7063
FLOW DIAGRAM SYMBOLS W E. SPEC.- G-675176
INSTRUMENTATION SCHEMATICS-----A-198381
INSTRUMENT & STATION AIR SYSTEM-G-198208
SEAL WATER INJ. TANK
NITROGEN SUPPLY (2 BOTTLES)
LOCAL SAMPLE
PS-ACCUM SAMPLE LINE 5379-353 SH.1 (D-8)
SI-TEST LINE HIGH HEAD 5379-1882 SH.1 (F-8)
CCW-RCP CCW OUTLET 5379-376 SH. 3 (F-7)
CCW-RCP CCW INLET 5379-376 SH.3 (D-8)
LWD-RCDT TO GAS ANAL 5379-928 SH.3 (D-7)
RC-PRZR RELIEF TK. TO GAS ANAL 5379-1971 SH.2 (F-8)
RC-PRZR RELIEF TK. MAKE-UP WATER 5379-1971 SH.2 (E-8)
LWD-RCDT HEADER 5379-928 SH.3 (E-7)
SGB-"B" SGB LINE G-198234 SH.1 (E-6)
SGB-"C" SGB LINE G-198234 SH.1 (C-6)
SGB-"A" SGB LINE G-198234 SH.1 (G-6)
CVC-REGEN. HT. EXCH. LETDOWN 5379-685 SH.1 (C-4)
LWD-CTMT. SUMP PUMP DISCHARGE 5379-928 SH.3 (B-7)
SGB-"A" SGB LINE G-198234 SH.1 (F-6)
SGB-B SGB LINE G-198234 SH.1 (D-6)
SGB-"C" SGB LINE G-198234 SH.1 (B-6)
S&CW- G-198199 SH.7 (D-2)
P&MW- G-198202 SH.2 (D-6)
SGB- G-198234 SH.1 (E-7)
SGB- G-198234 SH.1 (C-7)
SGB- G-198234 SH.1 (G-6)
LWD-RCDT PUMP DISCH 5379-928 SH.3 (C-7)
CCW-RCP CCW OUTLET 5379-376 SH.2 (A-5)
RC-RCP SEAL WTR. RETURN 5379-685 SH.1 (D-3)
PS-PRZR STM. SAMPLE 5379-353 SH.1 (G-8)
PS-PRZR LIQ. SAMPLE 5379-353 SH.1 (G-8)
PS-RCS SAMPLE 5379-353 SH.1 (F-8)
SI-BORON INJ/ HOT LEG 5379-1882 SH.1 (F-8)
CVC-CHARGING LINE 5379-685 SH.1 (F-4)
CVC-RCP A,B,&C SEAL WTR. SUPPLY 5379-685 SH.1 (B-3)
SI-COLD LEG SUPPLY 5379-1882 SH.1 (B-8)
SI-CONT. SPRAY HDR."A" SUPPLY 5379-1882 SH.3 (C-8)
SI-CONT. SPRAY HDR."B" SUPPLY 5379-1882 SH.3 (C-8)
NS-N2 SUPPLY HBR2-8686 SH.1 (F-2)
1-IVSW-13 HEADER "D"
1-IVSW-12 HEADER "C"
1-IVSW-11 HEADER "B"
1-IVSW-10 HEADER "A"
1-CW-151N-161A
SW-282
PW-38
3/4-IVSW-151N-48
3/4-IVSW-151N-49
3/4-IVSW-151N-50
3/8-IVSW-1
3/8-IVSW-2
3/8-IVSW-9
3/8-IVSW-5
3/8-IVSW-8
3/8-IVSW-4
IVSW-99
IVSW-66B
IVSW-66
IVSW-67
IVSW-10
IVSW-11
IVSW-8
IVSW-8A
IVSW-8E
IVSW-45
IVSW-62
IVSW-60
IVSW-61
IVSW-63
IVSW-64
IVSW-68A
IVSW-68B
IVSW-68C
IVSW-68D
IVSW-43A
IVSW-43B
IVSW-44A
IVSW-44B
IVSW-9
IVSW-21
IVSW-19
IVSW-22
IVSW-28
IVSW-12
IVSW-13
IVSW-7
IVSW-15
IVSW-24
IVSW-28
IVSW-31
IVSW-37
IVSW-38
IVSW-38A
IVSW-38B
IVSW-41
IVSW-42
IVSW-27
IVSW-36
IVSW-36A
IVSW-36B
IVSW-23
IVSW-48
IVSW-39
IVSW-35
IVSW-35A
IVSW-35B
IVSW-14
IVSW-70
IVSW-71
IVSW-72
IVSW-74
IVSW-75
IVSW-76
IVSW-77
IVSW-78
IVSW-79
IVSW-80
IVSW-81
IVSW-82
IVSW-83
IVSW-84
IVSW-85
IVSW-86
IVSW-87
IVSW-88
IVSW-89
IVSW-90
IVSW-91
IVSW-92
IVSW-93
IVSW-94
IVSW-95
IVSW-96
IVSW-97
IVSW-98
PCV-38A
PCV-38G
PCV-38G1
PCV-38G2
PCV-26E
IVSW-34
IVSW-34A
IVSW-34B
IVSW-34C
IVSW-34D
IVSW-30
IVSW-30A
IVSW-30B
IVSW-30C
IVSW-30D
IVSW-30E
IVSW-30F
IVSW-30G
IVSW-30G1
IVSW-30G2
IVSW-30H
IVSW-100A
IVSW-100B
IVSW-100C
IVSW-26
IVSW-26A
IVSW-26B
IVSW-26C
IVSW-26D
IVSW-26E
IVSW-16
IVSW-16A
IVSW-16B
IVSW-16C
IVSW-16D
IVSW-16E
IVSW-16F
IVSW-16G
ELECTRONICALY SIGNED
EC 65185
EC 71795
CAROLINA POWER & LIGHT CO
H B ROBINSON S.E. PLANT
UNIT - No 2 HARTSVILLE, S.C.
TITLE
ISOLATION VALVE SEAL WATER FLOW DIAGRAM
DRAWING NO E G-190262
REV 30
SCALE NONE
SHEET 1 OF 1


RADWASTE FACILITY
EL. 258'-7" ELECTRICAL EQUIPMENT AREA
EL. 226' & 242' SHIPPING & STORAGE AREA
SPENT FUEL PIT
SPENT FUEL PIT HEAT EXCH.
NEW FUEL STORAGE
SPENT FUEL PIT PUMP
FAN ROOM "A"
FAN ROOM "B"
REACTOR VESSEL
STACK
TOOL ROOM
WHT "A"
WHT "B"
WHT "C"
HOT MACHINE SHOP
CASK DECON
SUMP TK. "B"
GAS DECAY TK.
TEMP. CONN. FROM CASK PREP. AREA H8R2-12887
TO ATMOS.
HVAC-RING HEADER THIS SHEET (C-4)
HVAC-MECH. EQUIP. ROOM 3 G-198384 SH.3 (E-8)
SAMPLE LINE
FC & AE G-198197 SH.2 (G-4)
LWD-SUMP TK. "B" VENT 5379-928 SH.1 (G-4)
GWD-SAMP. STA. VENT 5379-921 SH.2 (B-4)
PP-1-PP-152-7A G-198261 SH.4 (DET.D)
PP-1-PP-152-10A G-198261 SH.4 (DET.J)
HVAC-SHIELD COOLING THIS SHEET (E-5)
OCTAGONAL RING-DUCT EL.412.12'
REACTOR SUPPORT (TYP.3) FROM HVH-9A/HVH-9B THIS SHEET (E-6)
TO CRD COOLING SHROUD
CRD COOLING SHROUD HDR
CRD COOLING SHROUD
FROM CONTROL ROD DRIVE COOLING SHROUD
5,000 CFM FROM OCTAGONAL RING AT EL.412.12' IN DOME
5000 CFM FROM OCTAGONAL RING AT EL. 412.12' IN DOME
DEBRIS SCREEN
DEBRIS SCREEN FOR VAC RELIEF
PURGE AIR
OPEN FOR REFUEL
OPEN FOR PURGE
OPEN FOR PURGE OR REFUEL
DEBRIS SCREEN FOR PRESS. RELIEF
P.A.C.V.-H2 VENTING HBR2-6933 SH.1 (F-8)
P.A.C.V. HBR2-6933 SH.1 (F-1)
P.A.C.V. HBR2-6933 SH.1 (F-3)
P.A.C.V. HBR2-6933 SH.1 (F-4)
P.A.C.V. HBR2-6933 SH.1 (F-6)
PACV-CV VENT PANELS HBR2-6933 SH.1 (F-4)
P.P.S. G-198261 SH.4 (DET.B)
P.P. G-198261 SH.4 (DET. E)
P.P. G-198261 SH.4 (DET. G)
R-11, R-12 RAD.MON.PKG.
CONTROLLED LEAKAGE (F-43A)
CHARCOAL FILTER (F-43B)
ABSOLUTE FILTER
PIPE ALLEY
B.I.T. RM.
AUX. BLDG.
NOTES:
1. MANUAL DAMPERS D-2 & D-3 ARE INSTALLED WITH LIMIT SWITCHES.
2. CONNECTION FOR EXHAUST FAN TO ALLOW IN-SERVICE TESTING OF FILTER BANK.
3. AIR WASHER SPRAY HEADERS & PUMP ARE ALL CONSIDERED PART OF EVAPORATIVE AIR COOLER.
4. TWO MOTORS ON THE DAMPER OF THE EVAPORATIVE AIR COOLER.
5. FOUR MOTOR OPERATOR IN EVAPORATIVE AIR COOLER F3.
6. FLOW SWITCH IS A DP SWITCH ACROSS INLET & OUTLET TO FAN.
7. FILTER IS NON-Q/NON SEISMIC MOUNTED IN A SEISMIC FRAME.
8. HEATER IS NON-Q, SEISMIC MOUNTED.
9. FLOWRATES IDENTIFIED WITH "##" ARE BASED ON LOADED FILTER CONDITIONS. FLOWRATES IN PARENTHESIS "()" ARE BASED ON CLEAN FILTER CONDITIONS.
10. MOTORS FOR THESE DAMPERS ARE AIR OPERATED.
11. PREFILTERS SHALL BE REMOVED DURING PLANT OPERATION BUT MAY BE INSTALLED DURING SOME OUTAGE ACTIVITIES (WHEN RCS IS ON RHR OR DEFUELED) PER EE 93-156.
NOTES CONT.:
12. THE FREON CONTAINING PORTION OF HVA-2 INCLUDING ACC-2A & 2B ARE NON-Q.
13. VALVES RMS-1 & 3 ARE ORIENTED SO FLOW EXITING CV WILL BE UNDER THE SEATS. RMS-2 & 4 ARE ORIENTED SO FLOW EXITING CV WILL BE OVER THE SEATS.
LEGEND:
FAI - FRESH AIR INTAKE
GD - GRAVITY DAMPER
VD - VOLUME DAMPER
FD - FIRE DAMPER
M - MOTOR OPERATED
REFERENCE DRAWINGS:
FLOW DIAGRAM LEGEND AND SYMBOLS HBR2-7863
FLOW DIAGRAM SYMBOLS (W) E.SPEC. G-675176
INSTRUMENTATION SCHEMATICS A-190381
PENETRATION PRESSURIZATION SYSTEM FLOW DIAGRAM G-198261
HVAC - AUX./TURBINE BLDG. GROUND FLOOR G-198305
HVAC - AUX. BUILDING MEZZ. FLOOR PLAN G-198306
HVAC - SPENT FUEL BUILDING PLAN G-198308
HVAC - REACTOR BUILDING PLAN SH.1 G-198312
HVAC - REACTOR BUILDING PLAN SH.2 G-198313
SERV. & COOLING WTR. SYS. FLOW DIAGRAM G-198199
AUX. STEAM SYSTEM FLOW DIAGRAM G-198284B
COMP. COOLING WTR. SYS. FLOW DIAGRAM 5379-376
POST ACCIDENT CONTAINMENT VENTING HBR2-6933
INST. & STATION AIR SYSTEM G-198288
HVAC CONTROL DIAGRAMS G-198389, G-198311
CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT - NO.2 HARTSVILLE, S.C.
HVAC - TURB, FUEL, AUX, REACTOR & RADWASTE BUILDING
VENDOR No.
SIZE
DRAWING No. G-190304
REV 53
SCALE NONE
SHEET 1 OF 4
DES: Spooner
CHK: R.A. CHEWNING
DRFT APPR:
DESR:
ENG:
APPR:
DATE: 3-6-87
REVISIONS
EC's 58644, 58645, 58646, 58647
EC 56662
EC 58289
EC 62351
EC 67725
EC 71877 & 78473
DCR 87-1314
DCR 87-1289
DCR 88-2021
DCR 89-1195
DCR 89-1199
DCR 90-146
DCR 90-160
DCR 94-496
DCR 94-1173
DCR 96-1282
DCR 98-1013
DCR 98-1022
DCR 98-1025
DCR 98-1026
DCR 98-1027
DCR 98-1028
DCR 98-1029
DCR 98-1030
DCR 98-1031
DCR 98-1032
DCR 98-1033
DCR 98-1034
DCR 98-1035
DCR 98-1036
DCR 98-1037
DCR 98-1038
DCR 98-1039
DCR 98-1040
DCR 98-1041
DCR 98-1042
DCR 98-1043
DCR 98-1044
DCR 98-1045
DCR 98-1046
DCR 98-1047
EC 52661
EC 54837
EC 54448 & 55769
EC 54948
ELECTRONICALLY SIGNED

HBR2-6490

NOTES:
1. PIPING WAS LABELED WITHOUT REFERENCE TO MATERIAL SPECIFICATION IF THE EXACT ASTM SPEC. COULD NOT BE DETERMINED AT THE TIME OF THE VERIFICATION WALK-DOWN.

AUXILIARY BUILDING
PIPE ALLEY

PIPE ALLEY | GAS ANALYZER ROOM

PIPE ALLEY
REACTOR CONTAINMENT VESSEL

TRAP T-54C
TRAP T-54B
TRAP T-54A
TRAP T-55

VACUUM PUMP

REMOVABLE SAMPLE BOMBS A B

GWD-N_2 SUPPLY 5379-921 SHT 1 (F-6)
GWD-GAS ANALYZER 5379-921 SH 1 (F-5)

TO CONTAINMENT VESSEL LOW POINT
TO CONTAINMENT VESSEL MIDPOINT
TO CONTAINMENT VESSEL HIGHPOINT

MAKE-UP SPOOL

REFERENCE DRAWINGS:
FLOW DIAGRAM LEGEND & SYMBOLS — HBRE-7068
FLOW DIAG. SYMBOLS (W) E. SPEC. — G-675176
INSTRUMENTATION SCHEMATICS — A-140301
REACTOR CONT BLDG. PIPING PENETRATIONS — B-190178
HVAC SYSTEM FLOW DIAGRAM — G-190304

1	2	3	4	5	6	7	8	9	10	11	12	13	
REVISIONS	BY T. WIKE CHK R.A. GRANNIA APPR [illegible] DCR 86-592	BY J.W. SPENCER CHK N. JOHNSON APPR [illegible] DCR 86-1158	BY HAROLD E. LLOYD CHK N. JOHNSON APPR [illegible] DCR 86-1078	BY HAROLD E. LLOYD CHK N. JOHNSON APPR [illegible] DCR 86-1078	BY HAROLD E. LLOYD CHK N. JOHNSON APPR [illegible] DCR 90-244	BY J. WALTERS CHK R.A. GRANNIA APPR [illegible] DCR 91-1061 MOD	BY J. WALTERS CHK HAL LLOYD APPR [illegible] DCR 91-1062 MOD	BY J. WALTERS CHK HAL LLOYD APPR [illegible] DCR 91-1062	BY J. WALTERS CHK HAL LLOYD APPR [illegible] DCR 91-1062	BY J. WALTERS CHK HAL LLOYD APPR [illegible] DCR 91-1062	BY HAL LLOYD CHK J. WALTERS APPR [illegible] DCR 93-1325	BY N. GRANTHAM CHK D. [illegible] APPR [illegible]	

DRN	CLINT PARVIS
CHK	R.A. GRANNIA
DESIGN	[illegible]
QUALITY APPR	
ENG	
APPR	[illegible]
DATE	12-9-93

CAROLINA POWER & LIGHT CO
H. B. ROBINSON S.E. PLANT
UNIT - NO 2 HARTSVILLE, S.C.

CONTAINMENT VAPOR AND PRESSURE SAMPLING SYSTEM FLOW DIAGRAM

VENDOR No | SIZE E | DRAWING No HBR2-6490 | REV 13
SCALE NONE | SHEET 1 OF 1

FILE: 28924

DRAWING NO. HBR2-6933 SHEET 1 OF 1

NOTES:
1. CONNECTION FOR EXHAUST FAN TO ALLOW IN-SERVICE TESTING OF FILTER BANK.
2. NITROGEN SUPPLY (TWO BOTTLES) LOCATED AT C.V. VENTING PANELS.
3. ASTM SPECIFICATION OF STAINLESS STEEL PIPING/TUBING OF THIS SYSTEM COULD NOT BE CONFIRMED AT TIME OF WALKDOWN VERIFICATION.

REFERENCE DRAWINGS:
FLOW DIAGRAM LEGEND & SYMBOLS — HBR2-7063
FLOW DIAGRAM SYMBOLS (W) E. SPEC — G-675176
INSTRUMENT SCHEMATICS — A-190301
REACTOR CONT. BLDG. PIPING PENETRATIONS — B-190178, B-190173
INSTRUMENT & STATION AIR — G-190200
HVAC SYSTEM FLOW — G-190304

REVISIONS																						
DRN. 83-1751 MOD.	DRN. 84-971 MOD. 750	REVISED PER WALKDOWN TO SHOW CHANGES TO HBR2-6933, REV. 2. BY: CLINT PARVIN CHK: R.A. CHEWNING APPR: [illegible] DATE: [illegible]	DRN. 84-1222 MOD:	BY: W. BLANCHARD CHK: N. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 85-29	BY: HAROLD E. LLOYD CHK: W. JOHNSON APPR: [illegible] DATE: [illegible]	DRN: 88-0003 MOD:	BY: J. WALTERS CHK: N. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 88-0316	BY: HAROLD E. LLOYD CHK: N. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 88-0324	BY: HAROLD E. LLOYD CHK: W. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 90-199 MOD: 982	BY: HAROLD E. LLOYD CHK: W. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 90-199	BY: HAROLD E. LLOYD CHK: W. JOHNSON APPR: [illegible] DATE: [illegible]	DCR: 91-0165	BY: J. WALTERS CHK: [illegible] APPR: [illegible] DATE: [illegible]	DCR: 91-0165	BY: HAROLD E. LLOYD CHK: J. WALTERS APPR: [illegible] DATE: [illegible]	DCR: 92-0255	BY: R. WALSH CHK: [illegible] APPR: [illegible] DATE: [illegible]	DCR: 93-0261	BY: D.M. EDWARDS CHK: D. MOORE APPR: [illegible] DATE: [illegible]	DCR: 94-0272, 94-0273	BY: [illegible] APPR: [illegible] DATE: [illegible]	DCR: 94-0278	BY: E.S. PERKINS CHK: J.J. WALTERS APPR: C.L. OLIVER 4/29/99	DCR: 98-189	ELECTRONICALLY SIGNED	EC 55834	ELECTRONICALLY SIGNED	EC 67122

DRN: CLINT PARVIN
CHK: R.A. CHEWNING
DSGN: [illegible]
DRFT APPR:
ENG. AS BUILT: [illegible]
APPR: [illegible]
DATE: 12-7-92

CAROLINA POWER & LIGHT CO.
H.B. ROBINSON S.E. PLANT
UNIT — NO. 2 HARTSVILLE, SC

POST ACCIDENT CONTAINMENT VENTING FLOW DIAGRAM

VENDOR NO. E | SIZE | DRAWING NO. HBR2-6933 | REV 21
SCALE NONE | SHEET 1 OF 1

NOTE:
SEE SH. 1 FOR GENERAL NOTES & REFERENCE.

HOT MACHINE SHOP
CASK PREP. AREA
SPENT FUEL PIT
RHR PUMP PIT AREA (OUTSIDE)
FP-WEST YARD HBR2-8255 SH. 6 (F-2)
OUTSIDE
INSIDE AUX. BLDG
FP-CV HOSE STATIONS HBR2-8255 SH. 3 (E-1)
FP-CV ELECT. PENET. SPRINKLERS HBR2-8255 SH. 3 (D-1)
INSIDE REACTOR AUXILIARY BUILDING
OUTSIDE
HAGAN ROOM HOSE STA FOR LOOP 'E' DET'S SEE DWG. HBR2-8255 SH.5 (B-7)
FOR LOOP 'E' DET'S SEE DWG. HBR2-8255 SH. 4
FOR LOOP 'F' DET'S SEE DWG. HBR2-8255 SH.5 (C-4)
FOR LOOP 'G' DET'S SEE DWG. HBR2-8255 SH.5 (C-1)
HOSE STA. 'B' WEST EVAP. ROOM
PIPE TUNNEL HOSE STA
SOLID WASTE HANDLING ROOM SPRINKLER SYSTEM NOTE 5
AUX BUILDING HALLWAY SPRINKLER SYSTEM NOTE 5
NORTH END OF CORRIDOR EL.226'-8"
MIDDLE OF CORRIDOR
MIDDLE OF CORRIDOR
BORIC ACID BATCH TANK ROOM
ELEC. EQUIP. AREA
SOUTH END OF CORRIDOR
AUXILIARY BUILDING
AUX BUILDING TURBINE BUILDING
CCW PUMP ROOM
CCW PUMP ROOM AND TURBINE GENERATOR MONITORING ROOM SPRINKLER SYSTEM
TURBINE BUILDING
OIL HOUSE SPRINKLER SYSTEM NOTE 5
LUBE OIL RESERVOIR SPRINKLER SYS. NOTE 5
LUBE OIL STORAGE TANK SPRINKLER SYSTEM NOTE 5
FP-SS SPRINKLER SYS. NOTE 5
A MAIN XFMR SPRINKLER SYSTEM SEE NOTE 5
B MAIN XFMR SPRINKLER SYSTEM SEE NOTE 5
C MAIN XFMR SPRINKLER SYSTEM SEE NOTE 5
AUX. XFMR SPRINKLER SYSTEM SEE NOTE 5
SU XFMR SPRINKLER SYSTEM SEE NOTE 5
H2 SEAL OIL SPRINKLER SYSTEM SEE NOTE 5
FOR LOOP "G" DETAILS SEE DWG. HBR2-8255 SHT. 5 SEE NOTE 5
UNIT #1 FP SYSTEM HBR2-8255 SH. 1 (E-8)
EXHAUST FACILITY HBR2-8255 SH.6 (E-8)
FP- FIRE PUMPS HBR2-8255 SH. 1 (D-8)

DRN W BLANCHARD	CAROLINA POWER & LIGHT CO.
CHK W JOHNSON	H. B. ROBINSON S.E. PLANT
DSGN [illegible]	UNIT - NO. 2 HARTSVILLE, S.C.
ENG MDG	TITLE: FIRE PROTECTION SYSTEM FLOW DIAGRAM
APPR [illegible]	
DRFT APPR 10/31/73	
NEXT USED ON	
VENDOR No	SIZE E DRAWING No HBR2-8255 REV 34
SCALE NONE	SHEET 2 OF 8