

SOUTH TEXAS PROJECT
ELECTRIC GENERATING STATION
UNIT 1

HOUSTON LIGHTING AND POWER
COMPANY

PUMP AND VALVE
INSERVICE TEST PLAN

Prepared by:	<u><i>K. L. Hight</i></u>	<u>1-17-86</u>
	Recognizant Engineer	Date
Approved by:	<u><i>G. L. Parley</i></u>	<u>1-17-86</u>
	Technical Support Manager	Date
Approved by:	<u><i>Warren H. Kinsey</i></u>	<u>1-19-86</u>
	Plant Manager	Date

Revision 0

8602050017 860128
PDR ADDCK 05000478
E PDR

TABLE OF CONTENTS

Rev. 0

- 1.0 INTRODUCTION
 - 1.1 General
 - 1.2 Scope
 - 1.3 Effective Period
 - 1.4 Plan Revisions
- 2.0 INSERVICE TESTING OF PUMPS
 - 2.1 Requests for Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements
- 3.0 INSERVICE TESTING OF VALVES
 - 3.1 Requests for Relief from ASME boiler and Pressure Vessel Code Section XI Requirements and Clarifications of Valve Testing Methods
- 4.0 DRAWINGS

1.0 INTRODUCTION

1.1 General

This document is prepared in accordance with the requirements of the Code of Federal Regulations 10CFR50.55a(g). Regulatory Guide 1.26, Revision 3, was used for safety-related classification determination for the pumps included in this plan. Draft Regulatory Guide, Task MS 901-4, "Identification of Valves for Inclusion in Inservice Testing Programs", was used as guidance for determining the valves subject to the testing requirements of Subsection IWV of the ASME Boiler and Pressure Vessel Code.

1.2 Scope

This document provides a description of the pump and valve inservice testing plan for the South Texas Project Electric Generating Station Unit 1 prepared in accordance with the requirements of Subsections IWP and IWV of the ASME Boiler and Pressure Vessel Code Section XI, 1980 Edition through Winter 1981 Addenda. This plan is referenced by South Texas Project Electric Generating Station Unit 1 Technical Specification 4.0.5.

1.3 Effective Period

This document shall go into effect prior to fuel load and shall then remain in effect through the first 120 month interval of commercial operation.

1.4 Plan Revisions

As a minimum, this plan will be reviewed and revised as necessary for compliance with the ASME code in effect 12 months prior to the end of the the first 120 months of commercial operation. Similarly, this plan will be reviewed and revised for each subsequent 120 month interval. Houston Lighting and Power Company reserves the right to submit plan revisions which may enhance or improve this pump and valve inservice test plan at any time within the effective period.

2.0 INSERVICE TESTING OF PUMPS

The table "IST Pump List" describes the inservice test plan for pumps subject to the requirements of Subsection IWP of the ASME Boiler and Pressure Vessel Code Section XI, 1980 Edition through Winter 1981 Addenda. The table provides the following information:

- a. Identification of the pumps to be tested,
- b. Applicable ASME code class,
- c. P&ID and P&ID grid coordinates (See Section 4.0, Drawings),
- d. Test parameters to be measured,
- e. Test interval,
- f. Relief requests,
- g. Remarks.

Relief from the requirements of Section XI is requested where full compliance with the code is not practical. In such cases, specific information is provided in Section 2.1 which identifies the applicable code requirements, justification for the relief request, and the alternate testing to be performed.

IST Pump List
Auxiliary Feedwater - AF

Page 1 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Auxiliary Feedwater Pump 11	3	F00024	F7	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Auxiliary Feedwater Pump 12	3	F00024	D7	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
Auxiliary Feedwater Pump 13	3	F00024	B7	4. Flow Rate (Q)	Quarterly	-	
				5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Auxiliary Feedwater - AF

Page 2 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Auxiliary Feedwater Pump 14	3	F00024	H7	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
				3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
				5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Quarterly	-	

IST Pump List
Component Cooling Water - CC

Page 3 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Component Cooling Water Pump 1A	3	F05017	B7	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Component Cooling Water Pump 1B	3	F05018	B7	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
Component Cooling Water Pump 1C	3	F05019	B7	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Essential Chilled Water - CH

Page 4 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Essential Chilled Water Pump 1A	3	V10001	F7	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Essential Chilled Water Pump 1B	3	V10001	D7	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
Essential Chilled Water Pump 1C	3	V10001	A7	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Containment Spray - CS

Page 5 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Containment Spray Pump 1A	2	F05037	G3	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Containment Spray Pump 1B	2	F05037	E3	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
Containment Spray Pump 1C	2	F05037	C3	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Chemical and Volume Control - CV

Page 6 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Boric Acid Transfer Pump 1A	3	F05009	D5	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Boric Acid Transfer Pump 1B	3	F05009	C5	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
				5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Chemical and Volume Control - CV

Page 7 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Centrifugal Charging Pump 1A	2	F05007	D5	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Centrifugal Charging Pump 1B	2	F05007	B5	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
				4. Flow Rate (Q)	Quarterly	-	
				5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Essential Cooling Water - EW

Page 8 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Essential Cooling Water Pump 1A	3	F05038	G3	1. Inlet Pressure (Pi)	Quarterly	RR2	
				2. Outlet Pressure (Po)	Quarterly	-	
Essential Cooling Water Pump 1B	3	F05038	E3	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	RR2	
				4. Flow Rate (Q)	Quarterly	-	
Essential Cooling Water Pump 1C	3	F05038	B3	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Essential Cooling Water - EW

Page 9 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Essential Cooling Water Screen Wash Booster Pump 1A	3	F05039	D7	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Essential Cooling Water Screen Wash Booster Pump 1B	3	F05039	D4	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	-	
Essential Cooling Water Screen Wash Booster Pump 1C	3	F05039	D2	4. Flow Rate (Q)	Quarterly	-	
				5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Annually	-	
				7. Lubricant Level or Pressure	Observe Quarterly	-	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Residual Heat Removal - RH

Page 10 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Residual Heat Removal Pump 1A	2	F20000	B6	1. Inlet Pressure (P _i)	Quarterly	RR3	
				2. Outlet Pressure (P _o)	Quarterly	RR3	
Residual Heat Removal Pump 1B	2	F20000	D6	3. Differential Pressure ($\Delta P = P_o - P_i$)	Not Applicable	RR3	
				4. Flow Rate (Q)	Quarterly	RR3	
Residual Heat Removal Pump 1C	2	F20000	G6	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (T _b)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Safety Injection - SI

Page 11 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
High Head Safety Injection Pump 1A	2	F05013	F4	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
High Head Safety Injection Pump 1B	2	F05014	G3	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	RR4	
				4. Flow Rate (Q)	Quarterly	RR4	
High Head Safety Injection Pump 1C	2	F05015	F3	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

IST Pump List
Safety Injection - SI

Page 12 of 12
Rev. 0

Pump Identification	ASME Code Class	P&ID	P&ID Grid Coordinates	Measured Test Parameters	Test Interval	Relief Requests	Remarks
Low Head Safety Injection Pump 1A	2	F05013	C3	1. Inlet Pressure (Pi)	Quarterly	-	
				2. Outlet Pressure (Po)	Quarterly	-	
Low Head Safety Injection Pump 1B	2	F05014	D3	3. Differential Pressure ($\Delta P = P_o - P_i$)	Quarterly	RR4	
				4. Flow Rate (Q)	Quarterly	RR4	
Low Head Safety Injection Pump 1C	2	F05015	D3	5. Vibration Amplitude (V)	Quarterly	-	
				6. Bearing Temperature (Tb)	Not Applicable	RR1	
				7. Lubricant Level or Pressure	Not Applicable	RR1	
				8. Speed (N)	Not Applicable	-	

Pump and Valve
Inservice Test Plan

Rev. 0

2.1 Requests for Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements

RR-1

Test Requirement

Table IWP-3100-1 requires that proper lubricant level or pressure be observed and bearing temperature be measured during each inservice test.

Basis for Relief

The bearings of the Containment Spray Pumps, the Boric Acid Transfer Pumps, the Essential Cooling Water Pumps, the Residual Heat Removal Pumps, the High Head Safety Injection Pumps, and the Low Head Safety Injection Pumps are lubricated and cooled by the pumped fluid making it impractical to verify proper lubricant level or pressure and measure bearing temperature.

Alternate Testing

Lubricant level or pressure will not be observed and bearing temperature will not be measured for these pumps.

RR-2

Test Requirement

IWP-4200 requires direct measurement of pressure.

Basis for Relief

The Essential Cooling Water Pumps are vertical submerged suction centrifugal pumps with no direct means to measure inlet pressure as required.

Alternate Testing

The inlet pressure will be calculated based on the water level above the pump inlet.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-3

Test Requirement

IWP-3100 requires that the resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value, and Table IWP-3100-1 requires that inlet pressure be measured before pump startup and during the test and that differential pressure be measured during the test.

Basis for Relief

The inlet pressure of the Residual Heat Removal (RHR) pumps is measured using a local pressure indicator inside the reactor containment building and is considered inaccessible during power operation. The designed test flow path for these pumps consists of a closed-loop fixed-resistance recirculation flow path (See Piping and Instrumentation Diagram 5R169F20000, Residual Heat Removal System, in Section 4.0). As a result of this design, test values for initial inlet pressure, dynamic inlet pressure, and flowrate should not vary between tests. Outlet pressure at a given flow rate will be the true indicator of pump performance.

Alternate Testing

Pump testing will be performed at least once every three months as follows:

- 1) The RHR train to be tested will be lined up with the boundary valves of the test flow path closed and the recirculation valve open, creating the closed-loop fixed-resistance recirculation flow path desired.
- 2) Outlet pressure will be measured and compared to specific acceptance criteria to ensure the closed-loop system is filled. Note that the inlet pressure of the pump is equal to the outlet pressure in this line-up during static conditions.
- 3) The pump will be started and all parameters required by the Code except for inlet pressure and differential pressure will be measured. Flow will be verified to be correct, and outlet pressure (P_o) will be compared to the reference value for outlet pressure (P_{or}) with the following acceptance criteria:

Acceptable Range = $.93 P_{or} \leq P_o \leq 1.02 P_{or}$

Alert Range = $.90 P_{or} \leq P_o < .93 P_{or}$ or
 $1.02 P_{or} < P_o \leq 1.03 P_{or}$

Action Range = $P_o < .90 P_{or}$ or
 $P_o > 1.03 P_{or}$

Pump and Valve
Inservice Test Plan

Rev. 0

RR-4

Test Requirement

IWP-3100 requires that the resistance of the system shall be varied until either the measured differential pressure or the measured flow rate equals the corresponding reference value.

Basis for Relief

Both the High Head Safety Injection Pumps and the Low Head Safety Injection Pumps have a recirculation flow path containing a restricting orifice which limits flow through the recirculation line to a specific, fixed flow rate. When these pumps are tested using their respective fixed-resistance flow paths, the flow rates will be approximately the same each time the tests are conducted.

Alternate Testing

Pump testing will be performed using the fixed-resistance flow paths. The measured differential pressure will be compared to the allowable ranges given in Table IWP-3100-2 in order to determine pump operability.

3.0 INSERVICE TESTING OF VALVES

The table "IST Valve List" describes the inservice test plan for valves subject to the requirements of Subsection IWV of the ASME Boiler and Pressure Vessel Code Section XI, 1980 Edition through Winter 1981 Addenda. The table provides the following information:

- a. Identification of the valves to be tested,
- b. Description of valve function,
- c. Applicable ASME code class,
- d. P&ID and P&ID grid coordinates (See Section 4.0, Drawings),
- e. Section XI valve category,
- f. Valve size,
- g. Valve type,
- h. Valve actuator type,
- i. Normal position during power operation,
- j. Failure position,
- k. Test requirements and alternate testing,
- l. Relief requests and/or clarification (if necessary),
- m. Stroke time limit (if applicable).

Relief from the requirements of Section XI is requested where full compliance with the code is not practical. In such cases, specific information is provided in Section 3.1 which identifies the applicable code requirements, justification for the relief request, and the alternate testing to be performed. In certain cases, relief is not requested, but the code-required testing is performed in an unusual or complicated manner. In such cases, clarifications are provided in Section 3.1 to explain the actual testing method to be used.

Some valves have a fail-safe position. Valves which fail open or fail closed are tested to their failure positions during the exercising tests. The test method used meets the requirements of IWV-3415 in every case, since remote valve control switch operation removes actuator power from each fail-safe valve.

Pump and Valve
Inservice Test Plan

Rev. 0

Rapid-acting valves are valves which have very short stroke times less than or equal to 2 seconds, and are not trended in accordance with IWV-3417(a). Instead, stroke times are compared to the specified stroke time limits and corrective actions (if required) are taken in accordance with IWV-3417(b).

Pump and Valve
Inservice Test Plan

Rev. 0

IST Valve List Legend

VALVE ID - Valve Identification

The alphanumeric valve designator used as a unique identifier for each valve.

VALVE FUNCTION - Valve Function Description

A brief description of the function of each valve.

CL - Code Class

The appropriate ASME code classification (Safety Class 1,2,3 or NS (Non-Safety Related)) for each valve.

P&ID - Piping and Instrumentation Diagram

The P&ID showing the location of each valve in the system (See Section 4.0, Drawings).

GC - P&ID Grid Coordinates

The grid coordinates describing where each valve appears on each P&ID.

CAT - Section XI Category

The category applicable to each valve per IWV-2200.

SIZE - Valve Size

The size of the valve (inside diameter) in inches.

TYPE - Valve Type

The type of valve described by the following:

A = Angle
ARC= Auto Recirc Check
B = Butterfly
BL = Ball
CK = Check
D = Diaphragm
GL = Globe
GT = Gate
PR = Pressure Relief or Safety
SCK= Stop Check
TW = Three-way Control Valve

ACT - Actuator Type

The type of actuator on each valve described by the following:

AO = Air Operated
HO = Hydraulic Operated
M = Manual
MO = Motor Operated
SA = Self/System Actuated
SO = Solenoid Operated

NORM. POS. - Normal Position

The normal position of each valve during power operation described by the following:

NC = Normally Closed
NO = Normally Open
NI = Normally Intermittent (Open or Closed)
NT = Normally Throttled or Controlling

FAIL POS. - Fail-safe Position

The position of each valve when actuator power or air is secured as described by the following:

FC = Fails Closed
FO = Fails Open
FAI = Fails As Is
- = Not Applicable

TEST REQUIREMENT - Test Requirements (Alternate Testing)

The test requirements (or alternate testing) required for each valve as described by the following:

CV = Exercise check valves to the position required to fulfill their function at least once every three (3) months.
LT = Valves are leak tested per Appendix J to 10CFR50 at each refueling outage or by alternate testing method.
MT = Stroke time measurements are taken and compared to the stroke time limiting value per Section XI Article IWV-3410.

Pump and Valve
Inservice Test Plan

Rev. 0

- Q = Exercise valves (full stroke) for operability at least once every three (3) months except when the other train(s) of a redundant system are inoperable. Nonredundant valves in the remaining train(s) should not be cycled if their failure would cause a total loss of system function.
- R = Remote valve position indicator is used during valve stroking and must be calibrated at least once every two (2) years.
- SRV = Safety and relief valves are tested per Section XI Article IWW-3510.
- (CP) = Containment Purge Valves are leak tested per plant Technical Specifications.
- (CS) = Exercise valve (full stroke) for operability during each cold shutdown and at each refueling outage. In case of frequent cold shutdowns, valve testing is not required to be performed more often than once every three (3) months.
- Valve testing will commence not later than 48 hours after an unscheduled cold shutdown and continue until complete or until plant is ready to return to power. Completion of all valve testing is not a prerequisite to return to power. Any testing not completed at one cold shutdown should be performed during the subsequent cold shutdowns to meet the code-specified testing frequency.
- (CSP)= Exercise valve (partial stroke) for operability at least once every three (3) months and exercise valve (full stroke) at each cold shutdown not to exceed once every three (3) months.
- (CSR)= Exercise valve (partial stroke) for operability at each cold shutdown not to exceed once every three (3) months and exercise valve (full stroke) at each refueling outage.
- (DI) = Disassemble and inspect check valve at each refueling outage.
- (NA) = No testing required.
- (NST)= No stroke time measurements are taken.
- (NT) = Stroke time not trended due to very short stroke times (valves are classified as rapid-acting).

Pump and Valve
Inservice Test Plan

Rev. 0

- (PIV)= Reactor Coolant System Pressure Isolation Valves are leak tested per plant Technical Specifications.
- (PO) = Valve seat leak tightness is demonstrated during normal plant operation.
- (PRR)= Exercise valve (partial stroke) for operability at least once every three (3) months and exercise valve (full stroke) at each refueling outage.
- (PSO)= Valve receives partial stroke testing only. Full stroke testing is not practical.
- (PSR)= Valve receives partial stroke testing only at each refueling outage. Full stroke testing is not practical.
- (RR) = Exercise valve (full stroke) for operability at each refueling outage not to exceed once every two (2) years.
- (5YR)= Valve receives partial stroke testing only every five (5) years. Full stroke testing is not practical.

RR/C - Relief Request/Clarification

The appropriate relief request for each valve when alternate testing is proposed or clarification of testing method if required (See Section 3.1).

ST - Stroke Time

The stroke time limiting value for power-operated valves in seconds.

IST Valve List
Auxiliary Feedwater - AF

Page 1 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
AF-0036	AFW Pump No.11 Auto Recirc.	3	F00024	F6	BC	4	ARC	SA	NC	--	CV	--	--
AF-0058	AFW Pump No.12 Auto Recirc.	3	F00024	D6	BC	4	ARC	SA	NC	--	CV	--	--
AF-0091	AFW Pump No.13 Auto Recirc.	3	F00024	B6	BC	4	ARC	SA	NC	--	CV	--	--
AF-0011	AFW Pump No.14 Auto Recirc.	3	F00024	H5	BC	4	ARC	SA	NC	--	CV	--	--

FV-7517	AFW Pump No.11 Disch.Crosstie	3	F00024	F4	B	4	GL	AO	NC	FC	Q,R,MT	--	
FV-7516	AFW Pump No.12 Disch.Crosstie	3	F00024	D4	B	4	GL	AO	NC	FC	Q,R,MT	--	
FV-7515	AFW Pump No.13 Disch.Crosstie	3	F00024	B4	B	4	GL	AO	NC	FC	Q,R,MT	--	
FV-7518	AFW Pump No.14 Disch.Crosstie	3	F00024	G4	B	4	GL	AO	NC	FC	Q,R,MT	--	

FV-7525	AFW Pump No.11 Disch.Control	3	F00024	F4	B	4	GL	MO	NO	FAI	Q,R,MT	--	
FV-7524	AFW Pump No.12 Disch.Control	3	F00024	D4	B	4	GL	MO	NO	FAI	Q,R,MT	--	
FV-7523	AFW Pump No.13 Disch.Control	3	F00024	B4	B	4	GL	MO	NO	FAI	Q,R,MT	--	
FV-7526	AFW Pump No.14 Disch.Control	3	F00024	H3	B	4	GL	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Auxiliary Feedwater - AF

Page 2 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0048	AFW Pump No.11 Disch.Stop Ck.	2	F00024	F2	B	4	SCK	MO	NC	FAI	Q,R,MT	RR1,2	
					BC			SA	NC	--	CV(CS)	RR1,2	--
MOV-0065	AFW Pump No.12 Disch.Stop Ck.	2	F00024	D2	B	4	SCK	MO	NC	FAI	Q,R,MT	RR1,2	
					BC			SA	NC	--	CV(CS)	RR1,2	--
MOV-0085	AFW Pump No.13 Disch.Stop Ck.	2	F00024	B2	B	4	SCK	MO	NC	FAI	Q,R,MT	RR1,2	
					BC			SA	NC	--	CV(CS)	RR1,2	--
MOV-0019	AFW Pump No.14 Disch.Stop Ck.	2	F00024	H2	B	4	SCK	MO	NC	FAI	Q,R,MT	RR1,2	
					BC			SA	NC	--	CV(CS)	RR1,2	--

AF-0119	AFW to SG1A Check	2	F00024	F1	BC	8	CK	SA	NC	--	CV(CS)	RR2,3	--
AF-0120	AFW to SG1B Check	2	F00024	D1	BC	8	CK	SA	NC	--	CV(CS)	RR2,3	--
AF-0121	AFW to SG1C Check	2	F00024	C1	BC	8	CK	SA	NC	--	CV(CS)	RR2,3	--
AF-0122	AFW to SG1D Check	2	F00024	H1	BC	8	CK	SA	NC	--	CV(CS)	RR2,3	--

IST Valve List
Auxiliary Feedwater - AF

Page 3 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0143	AFW Pump Turbine Stop	2	F00024	G8	BC	4	SCK	MO	NO	FAI	Q,R,MT	--	
								SA	NC	--	CV	--	--
FV-0143	AFW Pump Turbine Stop Bypass	2	F00024	G8	B	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	
MOV-0514	AFW Pump Turbine Control	3	F00024	G7	B	4	GT	MO	NC	FAI	Q,R,MT	--	

IST Valve List
Post Accident Sampling - AP

Page 4 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-2453	Containment Sump Sample	2	Z47501	G7	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2454	RHR Sample	2	Z47501	E7	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2455	RCS Sample	2	Z47501	D7	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2455A	RCS Sample	2	Z47501	D7	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2456	Containment Atmosphere Sample	2	Z47501	C7	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2457	Gaseous PASS Return	2	Z47501	C2	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-2458	Liquid PASS Return	2	Z47501	E2	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--

IST Valve List
Breathing Air - BA

Page 5 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
BA-0004	Breathing Air to CTMT OB Isol.	2	F05044	F6	A	1	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
BA-0006	Breathing Air to CTMT IB Check	2	F05044	G6	AC	1	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

IST Valve List
Component Cooling Water - CC

Page 6 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0642	CCW HTX 1A Bypass	3	F05017	B6	B	16	B	MO	NC	FAI	Q,R,MT	--	
MOV-0644	CCW HTX 1B Bypass	3	F05018	B6	B	16	B	MO	NC	FAI	Q,R,MT	--	
MOV-0646	CCW HTX 1C Bypass	3	F05019	B6	B	16	B	MO	NC	FAI	Q,R,MT	--	

MOV-0643	CCW HTX 1A Outlet	3	F05017	B5	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0645	CCW HTX 1B Outlet	3	F05018	B5	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0647	CCW HTX 1C Outlet	3	F05019	B5	B	24	B	MO	NO	FAI	Q,R,MT	--	

MOV-0057	CCW to RCFC 11A,12A OB Isol.	2	F05017	D2	B	14	B	MO	NC	FAI	Q,R,MT	--	
MOV-0136	CCW to RCFC 11B,12B OB Isol.	2	F05018	D2	B	14	B	MO	NC	FAI	Q,R,MT	--	
MOV-0197	CCW to RCFC 11C,12C OB Isol.	2	F05019	D2	B	14	B	MO	NC	FAI	Q,R,MT	--	

MOV-0059	CHW to RCFC 11A,12A OB Isol.	2	F05017	D2	B	8	B	MO	NO	FAI	Q,R,MT	--	10
MOV-0137	CHW to RCFC 11B,12B OB Isol.	2	F05018	D2	B	8	B	MO	NO	FAI	Q,R,MT	--	10
MOV-0199	CHW to RCFC 11C,12C OB Isol.	2	F05019	D2	B	8	B	MO	NO	FAI	Q,R,MT	--	10

IST Valve List
Component Cooling Water - CC

Page 7 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CC-0058	CCW to RCFC 11A,12A IB Ck.	2	F05017	D2	BC	14	CK	SA	NO	--	CV	--	--
CC-0138	CCW to RCFC 11B,12B IB Ck.	2	F05018	D2	BC	14	CK	SA	NO	--	CV	--	--
CC-0198	CCW to RCFC 11C,12C IB Ck.	2	F05019	D2	BC	14	CK	SA	NO	--	CV	--	--

MOV-0068	CCW from RCFC 11A,12A IB Isol.	2	F05017	D4	B	14	B	MO	NO	FAI	Q,R,MT	--	
MOV-0147	CCW from RCFC 11B,12B IB Isol.	2	F05018	D4	B	14	B	MO	NO	FAI	Q,R,MT	--	
MOV-0208	CCW from RCFC 11C,12C IB Isol.	2	F05019	D4	B	14	B	MO	NO	FAI	Q,R,MT	--	

MOV-0069	CCW from RCFC 11A,12A OB Isol.	2	F05017	D4	B	14	B	MO	NC	FAI	Q,R,MT	--	
MOV-0148	CCW from RCFC 11B,12B OB Isol.	2	F05018	D4	B	14	B	MO	NC	FAI	Q,R,MT	--	
MOV-0210	CCW from RCFC 11C,12C OB Isol.	2	F05019	D4	B	14	B	MO	NC	FAI	Q,R,MT	--	

MOV-0070	CHW from RCFC 11A,12A OB Isol.	2	F05017	C4	B	8	B	MO	NO	FAI	Q,R,MT	--	10
MOV-0149	CHW from RCFC 11B,12B OB Isol.	2	F05018	C4	B	8	B	MO	NO	FAI	Q,R,MT	--	10
MOV-0209	CHW from RCFC 11C,12C OB Isol.	2	F05019	C4	B	8	B	MO	NO	FAI	Q,R,MT	--	10

IST Valve List
Component Cooling Water - CC

Page 8 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0012	CCW to RHR 1A HTX OB Isol.	2	F05017	E2	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0122	CCW to RHR 1B HTX OB Isol.	2	F05018	E2	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0182	CCW to RHR 1C HTX OB Isol.	2	F05019	E2	B	16	B	MO	NO	FAI	Q,R,MT	--	

CC-0013	CCW to RHR 1A HTX IB Check	2	F05017	E2	BC	16	CK	SA	NC	--	CV	--	--
CC-0123	CCW to RHR 1B HTX IB Check	2	F05018	E2	BC	16	CK	SA	NC	--	CV	--	--
CC-0183	CCW to RHR 1C HTX IB Check	2	F05019	E2	BC	16	CK	SA	NC	--	CV	--	--

FV-4531	RHR 1A HTX Outlet	3	F05017	G2	B	16	B	AO	NC	FO	Q,R,MT	--	
FV-4548	RHR 1B HTX Outlet	3	F05018	G2	B	16	B	AO	NC	FO	Q,R,MT	--	
FV-4565	RHR 1C HTX Outlet	3	F05019	G2	B	16	B	AO	NC	FO	Q,R,MT	--	

MOV-0049	CCW from RHR 1A IB Isol.	2	F05017	G4	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0129	CCW from RHR 1B IB Isol.	2	F05018	G4	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0189	CCW from RHR 1C IB Isol.	2	F05019	H4	B	16	B	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Component Cooling Water - CC

Page 9 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0050	CCW from RHR 1A OB Isol.	2	F05017	G4	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0130	CCW from RHR 1B OB Isol.	2	F05018	G4	B	16	B	MO	NO	FAI	Q,R,MT	--	
MOV-0190	CCW from RHR 1C OB Isol.	2	F05019	H4	B	16	B	MO	NO	FAI	Q,R,MT	--	

CC-0746	CCW Surge Tank Vacuum Breaker	3	F05017	F6	BC	1	CK	SA	NC	--	CV(DI)	RR7	--
---------	-------------------------------	---	--------	----	----	---	----	----	----	----	--------	-----	----

CC-0315	CCW A Supply Hdr. Check	3	F05020	F7	BC	24	CK	SA	NO	--	CV	--	--
CC-0313	CCW B Supply Hdr. Check	3	F05020	E7	BC	24	CK	SA	NO	--	CV	--	--
CC-0311	CCW C Supply Hdr. Check	3	F05020	E7	BC	24	CK	SA	NO	--	CV	--	--

MOV-0768	CCW A Supply to Chg. Pmp. Clr.	3	F05020	G7	B	6	B	MO	NO	FAI	Q,R,MT	--	
MOV-0770	CCW B Supply to Chg. Pmp. Clr.	3	F05020	G7	B	6	B	MO	NO	FAI	Q,R,MT	--	
MOV-0771	CCW C Supply to Chg. Pmp. Clr.	3	F05020	G7	B	6	B	MO	NO	FAI	Q,R,MT	--	

FV-4656	CCW Supply to Chg. Pmp. Clrs.	3	F05020	G7	B	6	B	AO	NO	FC	Q,R,MT	--	
---------	-------------------------------	---	--------	----	---	---	---	----	----	----	--------	----	--

IST Valve List
Component Cooling Water - CC

Page 10 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0447	CCW to Spent Fuel Pool HTX	3	F05020	E7	B	18	B	MO	NO	FAI	Q,R,MT	--	
MOV-0032	CCW to Spent Fuel Pool HTX	3	F05020	E6	B	18	B	MO	NO	FAI	Q,R,MT	--	

MOV-0235	CCW to NNS Loop Isol.	3	F05020	D7	B	18	B	MO	NO	FAI	Q,R,MT	--	
MOV-0236	CCW to NNS Loop Isol.	3	F05020	D6	B	18	B	MO	NO	FAI	Q,R,MT	--	

FV-4540	CCW to PASS Isol.	3	F05020	D8	B	1.5	GT	SO	NO	FC	Q,R,MT(NT)	RR8	
FV-4541	CCW to PASS Isol.	3	F05020	D8	B	1.5	GT	SO	NO	FC	Q,R,MT(NT)	RR8	

MOV-0772	CCW A Ret. from Chg. Pp. Clr.	3	F05020	B7	B	6	B	MO	NO	FAI	Q,R,MT	--	
MOV-0774	CCW B Ret. from Chg. Pp. Clr.	3	F05020	B7	B	6	B	MO	NO	FAI	Q,R,MT	--	
MOV-0775	CCW C Ret. from Chg. Pp. Clr.	3	F05020	B7	B	6	B	MO	NO	FAI	Q,R,MT	--	

FV-4657	CCW Ret. from Chg. Pp. Clr.	3	F05020	B7	B	6	B	AO	NO	FC	Q,R,MT	--	
---------	-----------------------------	---	--------	----	---	---	---	----	----	----	--------	----	--

IST Valve List
Component Cooling Water - CC

Page 11 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0297	CCW to CTMT HTX OB Isol.	3	F05021	G8	B	6	B	MO	NO	FAI	Q,R,MT	--	
MOV-0392	CCW to RCDT HTX IB Isol.	3	F05021	G3	B	4	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0393	CCW to Excess Letdown HTX IB Isol.	3	F05021	G3	B	6	B	MO	NO	FAI	Q,R,MT	--	

MOV-0052	CCW A Return Isolation	3	F05020	D7	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0132	CCW B Return Isolation	3	F05020	C7	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0192	CCW C Return Isolation	3	F05020	C7	B	24	B	MO	NO	FAI	Q,R,MT	--	

MOV-0316	CCW A Supply Isolation	3	F05020	E7	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0314	CCW B Supply Isolation	3	F05020	E7	B	24	B	MO	NO	FAI	Q,R,MT	--	
MOV-0312	CCW C Supply Isolation	3	F05020	F7	B	24	B	MO	NO	FAI	Q,R,MT	--	

MOV-0291	CCW to RCP OB Isolation	2	F05021	H8	B	12	B	MO	NO	FAI	Q,R,MT	--	
MOV-0318	CCW to RCP OB Isolation	2	F05021	H8	B	12	B	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Component Cooling Water - CC

Page 12 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0403	CCW from RCP IB Isolation	2	F05021	B1	B	12	B	MO	NO	FAI	Q,R,MT	--	
MOV-0542	CCW from RCP IB Isolation	2	F05021	B1	B	12	B	MO	NO	FAI	Q,R,MT	--	

MOV-0404	CCW from RCP OB Isolation	2	F05021	H1	B	12	B	MO	NO	FAI	Q,R,MT	--	
FV-4493	CCW from RCP OB Isolation	2	F05021	H1	B	12	B	AO	NO	FC	Q,R,MT	--	

MOV-0060	CCW to RCFC 12A Isol.	3	F05017	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0139	CCW to RCFC 12B Isol.	3	F05018	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0200	CCW to RCFC 12C Isol.	3	F05019	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	

MOV-0063	CCW from RCFC 12A Isol.	3	F05017	C4	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0142	CCW from RCFC 12B Isol.	3	F05018	C4	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0203	CCW from RCFC 12C Isol.	3	F05019	C4	B	10	B	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Component Cooling Water - CC

Page 13 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0064	CCW to RCFC 11A Isol.	3	F05017	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0143	CCW to RCFC 11B Isol.	3	F05018	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0204	CCW to RCFC 11C Isol.	3	F05019	D2	B	10	B	MO	NO	FAI	Q,R,MT	--	

MOV-0067	CCW from RCFC 11A Isol.	3	F05017	E4	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0146	CCW from RCFC 11B Isol.	3	F05018	E4	B	10	B	MO	NO	FAI	Q,R,MT	--	
MOV-0207	CCW from RCFC 11C Isol.	3	F05019	E4	B	10	B	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Essential Chilled Water - CH

Page 14 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0254	CHW to Containment OB Isol.	2	V00021	H4	A	4	B	MO	NO	FAI	Q(CS),R,MT	RR2,6, 9	10
											LT	--	--
CH-0255	CHW to Containment IB Check	2	V00021	H4	AC	4	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--

MOV-0268	CHW from Containment IB Isol.	2	V00021	F1	A	4	B	MO	NO	FAI	Q(CS),R,MT	RR2,6, 9	10
											LT	--	--
MOV-0269	CHW from Containment OB Isol.	2	V00021	E1	A	4	B	MO	NO	FAI	Q(CS),R,MT	RR2,6, 9	10
										--	LT	--	--

CH-0286	CHW Pump 1A Disch. Check	3	V10001	F7	BC	8	CK	SA	NO	--	CV	--	--
CH-0295	CHW Pump 1B Disch. Check	3	V10001	D7	BC	8	CK	SA	NO	--	CV	--	--
CH-0304	CHW Pump 1C Disch. Check	3	V10001	A7	BC	8	CK	SA	NO	--	CV	--	--

IST Valve List
Essential Chilled Water - CH

Page 15 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
TV-9476	EAB Cont. Rm. AHU TCV	3	V10002	F6	B	4	TW	AO	NT	FO	Q(PSO), MT(NST)	RR11	---
TV-9477	EAB Main AHU TCV	3	V10002	C6	B	6	TW	AO	NT	FO	Q(PSC), MT(NST)	RR11	---
TV-9486	EAB Cont. Rm. AHU TCV	3	V10002	F4	B	4	TW	AO	NT	FO	Q(PSO), MT(NST)	RR11	---
TV-9487	EAB Main AHU TCV	3	V10002	C4	B	6	TW	AO	NT	FO	Q(PSO), MT(NST)	RR11	---
TV-9496	EAB Cont. Rm. AHU TCV	3	V10002	F1	B	4	TW	AO	NT	FO	Q(PSO), MT(NST)	RR11	---
TV-9497	EAB Main AHU TCV	3	V10002	C1	B	6	TW	AO	NT	FO	Q(PSO), MT(NST)	RR11	---

IST Valve List
Containment Hydrogen Monitoring - CM

Page 16 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4135	CTMT Sample IB Isol.	2	Z00046	F4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4101	CTMT Sample OB Isol.	2	Z00046	F4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4127	CTMT Sample Return OB Isol.	2	Z00046	E4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4128	CTMT Sample Return IB Isol.	2	Z00046	E5	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4136	CTMT Sample IB Isol.	2	Z00046	D5	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4104	CTMT Sample OB Isol.	2	Z00046	D4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4133	CTMT Sample Return OB Isol.	2	Z00046	C4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4134	CTMT Sample Return IB Isol.	2	Z00046	C5	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--

IST Valve List
Containment Spray - CS

Page 17 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0015A	Spray Additive Tank 1A Outlet	3	F05037	G6	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0015B	Spray Additive Tank 1B Outlet	3	F05037	E6	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0015C	Spray Additive Tank 1C Outlet	3	F05037	C6	B	2	D	MO	NC	FAI	Q,R,MT	--	

CS-0018A	Spray Additive Tank 1A Outlet	2	F05037	G4	BC	2	CK	SA	NC	--	CV	--	--
CS-0018B	Spray Additive Tank 1B Outlet	2	F05037	E4	BC	2	CK	SA	NC	--	CV	--	--
CS-0018C	Spray Additive Tank 1C Outlet	2	F05037	C4	BC	2	CK	SA	NC	--	CV	--	--

MOV-0001A	CS Pump 1A Disch. OB Isol.	2	F05037	G5	B	8	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--
MOV-0001B	CS Pump 1B Disch. OB Isol.	2	F05037	E5	B	8	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--
MOV-0001C	CS Pump 1C Disch. OB Isol.	2	F05037	C5	B	8	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--

IST Valve List
Containment Spray - CS

Page 18 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CS-0002	CS Pump 1A Disch. IB Check	2	F05037	G7	BC	8	CK	SA	NC	--	CV(5YR)	RR12	--
											LT	--	--
CS-0004	CS Pump 1B Disch. IB Check	2	F05037	E8	BC	8	CK	SA	NC	--	CV(5YR)	RR12	--
											LT	--	--
CS-0005	CS Pump 1B Disch. IB Check	2	F05037	D8	BC	8	CK	SA	NC	--	CV(5YR)	RR12	--
											LT	--	--
CS-0006	CS Pump 1C Disch. IB Check	2	F05037	C7	BC	8	CK	SA	NC	--	CV(5YR)	RR12	--
											LT	--	--

IST Valve List
Chemical and Volume Control - CV

Page 19 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0033A	RCP 1A Seal Injection OB Isol.	2	F05005	C8	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--
MOV-0033B	RCP 1B Seal Injection OB Isol.	2	F05005	C8	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--
MOV-0033C	RCP 1C Seal Injection OB Isol.	2	F05005	C8	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--
MOV-0033D	RCP 1D Seal Injection OB Isol.	2	F05005	C8	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--

CV-0034A	RCP 1A Seal Injection IB Check	2	F05005	C8	AC	2	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--
CV-0034B	RCP 1B Seal Injection IB Check	2	F05005	C8	AC	2	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--
CV-0034C	RCP 1C Seal Injection IB Check	2	F05005	C8	AC	2	CK	SA	NO	--	CV(RR)	RR1C	--
											LT	--	--
CV-0034D	RCP 1D Seal Injection IB Check	2	F05005	C8	AC	2	CK	SA	NO	--	CV(RR)	RR10	--

IST Valve List
Chemical and Volume Control - CV

Page 20 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CV-0078	RCP Seal Inj. Return IB Ck.	2	F05005	F3	AC	.75	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--
MOV-0077	RCP Seal Inj. Return IB Isol.	2	F05005	F3	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--
MOV-0079	RCP Seal Inj. Return OB Isol.	2	F05005	F3	A	2	D	MO	NO	FAI	Q(CS),R,MT	RR2,6,13	10
											LT	--	--

LCV-0465	Letdown Isolation	1	F05005	H8	B	4	GT	MO	NO	FAI	Q,R,MT	--	
LCV-0468	Letdown Isolation	1	F05005	H7	B	4	GT	MO	NO	FAI	Q,R,MT	--	

CV-0022	Letdown IB Check	2	F05005	H3	AC	.75	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--
MOV-0023	Letdown IB Isolation	2	F05005	H3	A	4	GT	MO	NO	FAI	Q,R,MT	--	15
											LT	--	--
MOV-0024	Letdown OB Isolation	2	F05005	H3	A	4	GT	MO	NO	FAI	Q,R,MT	--	15
											LT	--	--

IST Valve List
Chemical and Volume Control - CV

Page 21 of 62
Rev. 9

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CV-0157	RC Purification OB Isolation	2	F05006	F2	A	4	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
CV-0158	RC Purification IB Check	2	F05006	F2	AC	4	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

MOV-0113A	VCT Outlet Valve	2	F05007	E4	B	6	GT	MO	NO	FAI	Q(CS),R,MT	RR 2,6,14	
MOV-0112B	VCT Outlet Valve	2	F05007	E4	B	6	GT	MO	NO	FAI	Q(CS),R,MT	RR 2,6,i4	

CV-0224	RWST to Chg. Pump Suction	2	F05007	C3	BC	6	CK	SA	NC	--	CV(CS)	RR2,15	--
MOV-0113B	RWST to Chg. Pump Suction	2	F05007	C4	B	6	GT	MO	NC	FAI	Q(CS),R,MT	RR 2,6,15	
MOV-0112C	RWST to Chg. Pump Suction	2	F05007	C4	B	6	GT	MO	NC	FAI	Q(CS),R,MT	RR 2,6,15	

CV-235A	Cent. Chg. Pp. 1A Disch. Ck.	2	F05007	B6	BC	3	CK	SA	NC	--	CV	--	--
CV-235B	Cent. Chg. Pp. 1B Disch. Ck.	2	F05007	D6	BC	3	CK	SA	NC	--	CV	--	--

IST Valve List
Chemical and Volume Control - CV

Page 22 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CV-234A	Cent. Chg. Pp. 1A Recirc. Ck.	2	F05007	C6	BC	2	CK	SA	NC	--	CV	--	--
CV-234B	Cent. Chg. Pp. 1B Recirc. Ck.	2	F05007	D6	BC	2	CK	SA	NC	--	CV	--	--

FCV-0201	Cent. Chg. Pp. 1A Recirc.	2	F05007	C6	B	2	GL	AO	NC	FO	Q,R,MT	--	
FCV-0202	Cent. Chg. Pp. 1B Recirc.	2	F05007	D6	B	2	GL	AO	NC	FO	Q,R,MT	--	

FCV-0205	Charging Flow Control Valve	2	F05007	E7	B	3	GL	AO	NT	FO	Q(CS),R, MT(NST)	RR2,16	--
----------	-----------------------------	---	--------	----	---	---	----	----	----	----	---------------------	--------	----

MOV-0025	Charging OB Isolation	2	F05005	G3	A	4	GT	MO	NO	FAI	Q(CS),R,MT	RR 2,6,17	15
											LT	--	--
CV-0026	Charging IB Check	2	F05005	G3	AC	4	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--

CV-0001	Normal Charging Check	1	F05005	G8	BC	4	CK	SA	NO	--	CV	--	--
CV-0002	Normal Charging Check	1	F05005	G8	BC	4	CK	SA	NO	--	CV	--	--

IST Valve List
Chemical and Volume Control - CV

Page 23 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CV-0004	Alternate Charging Check	1	F05005	F8	BC	4	CK	SA	NC	--	CV	--	--
CV-0005	Alternate Charging Check	1	F05005	F8	BC	4	CK	SA	NC	--	CV	--	--

LV-3119	Aux. Press. Spray Control Vlv.	1	F05005	F7	B	2	GL	AO	NC	FC	Q(CS),R,MT	RR 2,4,18	
CV-0009	Aux. Press. Spray Check	1	F05005	F8	BC	2	CK	SA	NC	--	CV(CS)	RR2,18	--

CV-0334	Eoric Acid Gravity Feed Check	3	F05009	D3	BC	3	CK	SA	NC	--	CV(CS)	RR2,19	--
---------	-------------------------------	---	--------	----	----	---	----	----	----	----	--------	--------	----

CV-0338	Boric Acid Trans. Pump 1A Disch. Check	3	F05009	D6	BC	4	CK	SA	NC	--	CV	--	--
CV-0349	Boric Acid Trans. Pump 1B Disch. Check	3	F05009	C6	BC	4	CK	SA	NC	--	CV	--	--

CV-0351	Boric Acid Trans. Pump 1A Recirc. Check	3	F05009	E6	BC	.75	CK	SA	NC	--	CV	--	--
CV-0346	Boric Acid Trans. Pump 1B Recirc. Check	3	F05009	D5	BC	.75	CK	SA	NC	--	CV	--	--

MOV-0218	Boric Acid Trans. To Chg. Pump Suction	2	F05007	B3	B	4	GT	MO	NC	FAI	Q,R,MT	--	
CV-0217	Boric Acid Trans. To Chg. Pump Suction	2	F05007	B3	BC	4	CK	SA	NC	--	CV(CS)	RR2,19	--

IST Valve List
Chemical and Volume Control - CV

Page 24 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
CV-0670	Chg. Pump Disch. Check	2	F05007	D6	BC	4	CK	SA	NO	--	CV	--	--

MOV-0003	Normal Charging Isolation	2	F05005	G7	B	4	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0006	Alternate Charging Isolation	2	F05005	G7	B	4	GT	MO	NC	FAI	Q,R,MT	--	

MOV-0012	Letdown Flow Orifice Isolation	2	F05005	H5	B	2	D	MO	NI	FAI	Q,R,MT	--	
MOV-0013	Letdown Flow Orifice Isolation	2	F05005	H6	B	2	D	MO	NI	FAI	Q,R,MT	--	
MOV-0014	Letdown Flow Orifice Isolation	2	F05005	H6	B	2	D	MO	NI	FAI	Q,R,MT	--	

MOV-0082	Excess Letdown Isolation	1	F05005	F5	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0083	Excess Letdown Isolation	1	F05005	F5	B	2	D	MO	NC	FAI	Q,R,MT	--	

MOV-8377A	CCP 1A Discharge Isolation	2	F05007	D6	B	3	GT	MO	NO	FAI	Q,R,MT	--	
MOV-8377B	CCP 1B Discharge Isolation	2	F05007	C6	B	3	GT	MO	NO	FAI	Q,R,MT	--	

MOV-8348	CCP 1A to Seal Water Isolation	2	F05007	B6	B	2	GL	MO	NC	FAI	Q,R,MT	--	
----------	--------------------------------	---	--------	----	---	---	----	----	----	-----	--------	----	--

IST Valve List
Demineralized Water - DW

Page 25 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPF	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
DW-0501	DW To CTMT OB Isolation	2	F05034	F4	A	2	D	M	NC	--	Q(NA)	RR4	--
											LT	--	--
DW-0502	DW To CTMT IB Check	2	F05034	F3	AC	2	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

IST Valve List
Radioactive Vents and Drains - ED

Page 26 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0064	CTMT Sump Disch. IB Isol.	2	F05030	G7	A	3	GT	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--
FV-7800	CTMT Sump Disch. OB Isol.	2	F05030	G6	A	3	GT	AO	NO	FC	Q,R,MT	--	10
											LT	--	--

IST Valve List
Essential Cooling Water - EW

Page 27 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
EW-0006	ECW Pump 1A Disch. Check	3	F05038	H4	BC	30	CK	SA	NO	--	CV	--	--
EW-0042	ECW Pump 1B Disch. Check	3	F05038	E4	BC	30	CK	SA	NO	--	CV	--	--
EW-0079	ECW Pump 1C Disch. Check	3	F05038	C4	BC	30	CK	SA	NO	--	CV	--	--

MOV-0121	ECW Pump 1A Disch. Isolation	3	F05038	H4	B	30	B	MO	NO	FAI	Q,R,MT	--	
MOV-0137	ECW Pump 1B Disch. Isolation	3	F05038	E4	B	30	B	MO	NO	FAI	Q,R,MT	--	
MOV-0151	ECW Pump 1C Disch. Isolation	3	F05038	C4	B	30	B	MO	NO	FAI	Q,R,MT	--	

EW-0253	ECW Screen Wash Pump 1A Discharge Check	3	F05039	D7	BC	3	CK	SA	NO	--	CV	--	--
EW-0254	ECW Screen Wash Pump 1B Discharge Check	3	F05039	D5	BC	3	CK	SA	NO	--	CV	--	--
EW-0255	ECW Screen Wash Pump 1C Discharge Check	3	F05039	D2	BC	3	CK	SA	NO	--	CV	--	--

FV-6914	ECW Screen Wash Pump 1A Discharge Isolation	3	F05039	D7	B	3	GL	AO	NO	FO	Q,R,MT	--	
FV-6924	ECW Screen Wash Pump 1B Discharge Isolation	3	F05039	D5	B	3	GL	AO	NO	FO	Q,R,MT	--	
FV-6934	ECW Screen Wash Pump 1C Discharge Isolation	3	F05039	D3	B	3	GL	AO	NO	FO	Q,R,MT	--	

IST Valve List
Essential Cooling Water - EW

Page 28 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
EW-0262	ECW Loop A to Essential CHW Chillers	3	F05038	H6	BC	14	CK	SA	NO	--	CV	--	--
EW-0263	ECW Loop B to Essential CHW Chillers	3	F05038	F6	BC	14	CK	SA	NO	--	CV	--	--
EW-0264	ECW Loop C to Essential CHW Chillers	3	F05038	C6	BC	14	CK	SA	NO	--	CV	--	--

FV-6935	ECW Loop A Drain to ECW Sump	3	F05038	F7	B	4	GT	AO	NO	FC	Q,R,MT	--	
FV-6936	ECW Loop B Drain to ECW Sump	3	F05038	C7	B	4	GT	AO	NO	FC	Q,R,MT	--	
FV-6937	ECW Loop C Drain to ECW Sump	3	F05038	A7	B	4	GT	AO	NO	FC	Q,R,MT	--	

IST Valve List
Spent Fuel Pool Cooling and Cleanup System - FC

Page 29 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
XFC-0006C	In CTMT Spent Fuel Cooling IB Isolation	2	F05028	B5	A	10	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XFC-0007C	In CTMT Spent Fuel Cooling OB Isolation	2	F05028	B4	A	10	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

XFC-0013E	In CTMT Spent Fuel Cooling OB Isolation	2	F05028	B6	A	10	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XFC-0013F	In CTMT Spent Fuel Cooling IB Isolation	2	F05028	B6	A	10	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XFC-0050	In CTMT Refueling Cavity IB Isolation	2	F05028	B6	A	3	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

IST Valve List
Fire Protection - FP

Page 30 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0756	Fire Prot. to CTMT OB Isol.	2	F05047	E8	A	6	GT	MO	NC	FAI	Q,R,MT	--	10
											LT	--	--
FP-0943	Fire Prot. to CTMT IB Isol.	2	F05047	E8	AC	6	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

IST Valve List
Feedwater - FW

Page 31 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-7141	FWIV	2	F00063	G8	B	18	GT	HO	NO	FC	Q(CSP),R,MT	RR2,6, 20	5
FV-7142	FWIV	2	F00063	G6	B	18	GT	HO	NO	FC	Q(CSP),R,MT	RR2,6, 20	5
FV-7143	FWIV	2	F00063	G4	B	18	GT	HO	NO	FC	Q(CSP),R,MT	RR2,6, 20	5
FV-7144	FWIV	2	F00063	G2	B	18	GT	HO	NO	FC	Q(CSP),R,MT	RR2,6, 20	5

FV-7148A	FWIV Bypass	2	F00063	G7	E	3	GL	AO	NC	FC	Q,R,MT	--	5
FV-7147A	FWIV Bypass	2	F00063	G5	B	3	GL	AO	NC	FC	Q,R,MT	--	5
FV-7146A	FWIV Bypass	2	F00063	G3	B	3	GL	AO	NC	FC	Q,R,MT	--	5
FV-7145A	FWIV Bypass	2	F00063	G1	B	3	GL	AO	NC	FC	Q,R,MT	--	5

FV-7189	FW to AF Warm-up	2	F00063	F8	B	3	GL	AO	NC	FC	Q,R,MT	--	
FV-7190	FW to AF Warm-up	2	F00063	F6	B	3	GL	AO	NC	FC	Q,R,MT	--	
FV-7191	FW to AF Warm-up	2	F00063	F4	B	3	GL	AO	NC	FC	Q,R,MT	--	
FV-7192	FW to AF Warm-up	2	F00063	F2	B	3	GL	AO	NC	FC	Q,R,MT	--	

IST Valve List
Feedwater - FW

Page 32 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL. POS.	TEST REQUIREMENT	RR/C	ST
FCV-0551	FW Regulator Valve	NS	F00063	D8	B	16	A	AO	NT	FC	Q(CS),R,MT	RR2,6, 21	
FCV-0552	FW Regulator Valve	NS	F00063	D6	B	16	A	AO	NT	FC	Q(CS),R,MT	RR2,6, 21	
FCV-0553	FW Regulator Valve	NS	F00063	D4	B	16	A	AO	NT	FC	Q(CS),R,MT	RR2,6, 21	
FCV-0554	FW Regulator Valve	NS	F00063	D2	B	16	A	AO	NT	FC	Q(CS),R,MT	RR2,6, 21	

FV-7151	FW Regulator Bypass	NS	F00063	D7	B	4	GL	AO	NC	FC	Q(CS),R,MT	RR2,6, 22	
FV-7152	FW Regulator Bypass	NS	F00063	D5	B	4	GL	AO	NC	FC	Q(CS),R,MT	RR2,6, 22	
FV-7153	FW Regulator Bypass	NS	F00063	D3	B	4	GL	AO	NC	FC	Q(CS),R,MT	RR2,6, 22	
FV-7154	FW Regulator Bypass	NS	F00063	D1	B	4	GL	AO	NC	FC	Q(CS),R,MT	RR2,6, 22	

IST Valve List
Reactor Containment Building Purge - HC

Page 33 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0007	Normal Purge Supply OB Isol.	2	V00018	G3	A	48	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 23	60
											LT(CP)	--	--
MOV-0008	Normal Purge Supply IB Isol.	2	V00018	G2	A	48	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 23	60
											LT(CP)	--	--

MOV-0009	Normal Purge Exhaust IB Isol.	2	V00018	C7	A	48	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 23	60
											LT(CP)	--	--
MOV-0010	Normal Purge Exhaust OB Isol.	2	V00018	C6	A	48	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 23	60
											LT(CP)	--	--

MOV-0001	Supplementary Purge Supply OB Isol.	2	V00019	F4	A	18	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 24	10
											LT(CP)	--	--
MOV-0003	Supplementary Purge Supply OB Isol.	2	V00019	F3	A	18	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 24	10
											LT(CP)	--	--

IST Valve List
Reactor Containment Building Purge - HC

Page 34 of 62
 Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0005	Supplementary Purge Exhaust IB Isol.	2	V00019	C7	A	18	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 24	10
											LT(CP)	--	--
MOV-0006	Supplementary Purge Exhaust IB Isol.	2	V00019	C6	A	18	B	MO	NC	FAI	Q(CS),R,MT	RR2,6, 24	10
											LT(CP)	--	--

IST Valve List
Instrument Air - IA

Page 35 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
IA-0541	Inst. Air to CTMT IB Check	2	F05040	D4	AC	2	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--
FV-8565	Inst. Air to CTMT OB Isol.	2	F05040	D4	A	2	BL	AO	NO	FC	Q(CS),R,MT	RR2,6, 25	10
											LT	--	--

IST Valve List
Main Steam - MS

Page 36 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
PV-7411	Main Steam Line 1 Porv	2	F00016	H6	B	10	GT	HO	NC	FC	Q(CS),R, MT(NST)	RR2,26	--
PV-7421	Main Steam Line 2 Porv	2	F00016	F6	B	10	GT	HO	NC	FC	Q(CS),R, MT(NST)	RR2,26	--
PV-7431	Main Steam Line 3 Porv	2	F00016	E6	B	10	GT	HO	NC	FC	Q(CS),R, MT(NST)	RR2,26	--
PV-7441	Main Steam Line 4 Porv	2	F00016	C6	B	10	GT	HO	NC	FC	Q(CS),R, MT(NST)	RR2,26	--

PSV-7410	Main Steam Line 1 Safety	2	F00016	H6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7410A	Main Steam Line 1 Safety	2	F00016	H6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7410B	Main Steam Line 1 Safety	2	F00016	H5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7410C	Main Steam Line 1 Safety	2	F00016	H5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7410D	Main Steam Line 1 Safety	2	F00016	H5	C	6x10	PR	SA	NC	--	SRV	--	--

PSV-7420	Main Steam Line 2 Safety	2	F00016	F6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7420A	Main Steam Line 2 Safety	2	F00016	F6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7420B	Main Steam Line 2 Safety	2	F00016	F5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7420C	Main Steam Line 2 Safety	2	F00016	F5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7420D	Main Steam Line 2 Safety	2	F00016	F5	C	6x10	PR	SA	NC	--	SRV	--	--

IST Valve List
Main Steam - MS

Page 37 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
PSV-7430	Main Steam Line 3 Safety	2	F00016	E6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7430A	Main Steam Line 3 Safety	2	F00016	E6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7430B	Main Steam Line 3 Safety	2	F00016	E5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7430C	Main Steam Line 3 Safety	2	F00016	E5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7430D	Main Steam Line 3 Safety	2	F00016	E5	C	6x10	PR	SA	NC	--	SRV	--	--

PSV-7440	Main Steam Line 4 Safety	2	F00016	C6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7440A	Main Steam Line 4 Safety	2	F00016	C6	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7440B	Main Steam Line 4 Safety	2	F00016	C5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7440C	Main Steam Line 4 Safety	2	F00016	C5	C	6x10	PR	SA	NC	--	SRV	--	--
PSV-7440D	Main Steam Line 4 Safety	2	F00016	C5	C	6x10	PR	SA	NC	--	SRV	--	--

FV-7900A	Main Steam Line 1 Drain	2	F00016	G4	B	2	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-7901A	Main Steam Line 2 Drain	2	F00016	E4	B	2	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-7902A	Main Steam Line 3 Drain	2	F00016	D4	B	2	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-7903A	Main Steam Line 4 Drain	2	F00016	B4	B	2	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5

IST Valve List
Main Steam - MS

Page 38 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FSV-7414	MSIV	2	F00016	G4	B	30	GT	AO	NO	FC	Q(CSP),R,MT	RR2,6, 27	5
FSV-7424	MSIV	2	F00016	F4	B	30	GT	AO	NO	FC	Q(CSP),R,MT	RR2,6, 27	5
FSV-7434	MSIV	2	F00016	D4	B	30	GT	AO	NO	FC	Q(CSP),R,MT	RR2,6, 27	5
FSV-7444	MSIV	2	F00016	C4	B	30	GT	AO	NO	FC	Q(CSP),R,MT	RR2,6, 27	5

FV-7412	MSIV Bypass	2	F00016	G4	B	4	GT	AO	NC	FC	Q,R,MT	--	10
FV-7422	MSIV Bypass	2	F00016	F4	B	4	GT	AO	NC	FC	Q,R,MT	--	10
FV-7432	MSIV Bypass	2	F00016	D4	B	4	GT	AO	NC	FC	Q,R,MT	--	10
FV-7442	MSIV Bypass	2	F00016	C4	B	4	GT	AO	NC	FC	Q,R,MT	--	10

IST Valve List
Reactor Coolant Pump Oil Changing System - PO

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM.	FAIL	TEST	RR/C	ST
PO-0203	RCP Oil Supply OB Isol.	2	F05042	E3	A	2	D	M	NC	--	Q(NA)	RR4	--
											LT	--	--
PO-0204	RCP Oil Supply IB Isol.	2	F05042	E3	A	2	D	M	NC	--	Q(NA)	RR4	--
											LT	--	--

PO-0217	RCP Oil Drain IB Isol.	2	F05042	B3	A	2	D	M	NC	--	Q(NA)	RR4	--
											LT	--	--
PO-0218	RCP Oil Drain OB Isol.	2	F05042	B3	A	2	D	M	NC	--	Q(NA)	RR4	--
											LT	--	--

IST Valve List
Primary Plant Sampling - PS

Page 40 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4450	Press. Vapor Sample IB Isol.	2	Z00045	G8	A	1	GT	SO	NC	FC	Q, R, MT(NT)	RR8	10
											LT	--	--
FV-4450A	Press. Vapor Sample IB Isol.	2	Z00045	G8	A	1	GT	SO	NC	FC	Q, R, MT(NT)	RR8	10
											LT	--	--
FV-4452	Press. Vapor Sample OB Isol.	2	Z00045	G7	A	1	GL	AO	NC	FC	Q, R, MT	--	10
											LT	--	--
FV-4451	Press. Liquid Sample IB Isol.	2	Z00045	G8	A	1	GT	SO	NC	FC	Q, R, MT(NT)	RR8	10
											LT	--	--
FV-4451A	Press. Liquid Sample IB Isol.	2	Z00045	G8	A	1	GT	SO	NC	FC	Q, R, MT(NT)	RR8	10
											LT	--	--
FV-4451B	Press. Liquid Sample OB Isol.	2	Z00045	G7	A	1	GL	AO	NC	FC	Q, R, MT	--	10
											LT	--	--

IST Valve List
Primary Plant Sampling - PS

Page 41 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4454	RC Hot Leg #1 Sample IB Isol.	2	Z00045	F8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4454A	RC Hot Leg #1 Sample IB Isol.	2	Z00045	F8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4455	RC Hot Leg #3 Sample IB Isol.	2	Z00045	E8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4455A	RC Hot Leg #3 Sample IB Isol.	2	Z00045	E8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4456	RC Hot Leg Sample OB Isol.	2	Z00045	F7	A	1	GL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--

FV-4823	RHR Sample IB Isol.	2	Z00045	D8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--
FV-4461	RHR Sample OB Isol.	2	Z00045	D7	A	1	GL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--

IST Valve List
Primary Plant Sampling - PS

Page 42 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4824	SI Accum. Sample IB Isol.	2	Z00045	B8	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	---	---
FV-4466	SI Accum. Sample OB Isol.	2	Z00045	B7	A	1	GL	AO	NC	FC	Q,R,MT	---	10
											LT	---	---

IST Valve List
Reactor Containment Building HVAC Radiation Monitoring - RA

Page 43 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0001	CTMT Rad. Mon. Inlet IB Isol.	2	V00017	G3	A	1	BL	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--
MOV-0003	CTMT Rad. Mon. Return IB Isol.	2	V00017	F3	A	1	BL	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--
MOV-0004	CTMT Rad. Mon. Inlet OB Isol.	2	V00017	G3	A	1	BL	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--
MOV-0006	CTMT Rad. Mon. Return OB Isol.	2	V00017	F3	A	1	BL	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--

IST Valve List
Reactor Coolant - RC

Page 44 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-3657A	Inboard Reactor Head Vent	1	F05001	E3	A	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	
											LT(PO)	C28	--
FV-3657B	Inboard Reactor Head Vent	1	F05001	D3	A	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	
											LT(PO)	C28	--
FV-3658A	Outboard Reactor Head Vent	1	F05001	E3	A	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	
											LT(PO)	C28	--
FV-3658B	Outboard Reactor Head Vent	1	F05001	D3	A	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	
											LT(PO)	C28	--

HCV-0601	Reactor Head Vent Block Valve	2	F05001	E2	B	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	
HCV-0602	Reactor Head Vent Block Valve	2	F05001	D2	B	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	

PSV-3450	Pressurizer Safety	1	F05003	F7	C	6x8	PR	SA	NC	--	SRV	--	--
PSV-3451	Pressurizer Safety	1	F05003	F6	C	6x8	PR	SA	NC	--	SRV	--	--
PSV-3452	Pressurizer Safety	1	F05003	F4	C	6x8	PR	SA	NC	--	SRV	--	--

IST Valve List
Reactor Coolant - RC

Page 45 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL FAIL	TEST REQUIREMENT	RR/C	ST
MOV-0001A	PORV Block Valve	1	F05003	D8	B	3	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0001B	PORV Block Valve	1	F05003	E8	B	3	GT	MO	NO	FAI	Q,R,MT	--	

PCV-0655A	PORV	1	F05003	D8	A	3	GL	SO	NC	FC	Q(CS),R,MT (NT)	RR2,8, 29	
											LT(PO)	C28	--
PCV-0656A	PORV	1	F05003	E8	A	3	GL	SO	NC	FC	Q(CS),R,MT (NT)	RR2,8, 29	
											LT(PO)	C28	--

FV-3652	Nitrogen to PRT OB Isol.	2	F05004	F3	A	1	BL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--
FV-3653	Nitrogen to PRT IB Isol.	2	F05004	F4	A	1	GT	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--

FV-3651	Reactor Makeup Water to PRT OB Isol.	2	F05004	E2	A	3	BL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--
XRC-0046	Reactor Makeup Water to PRT IB Check	2	F05004	E4	AC	3	CK	SA	NO	--	CV(RR)	RR10	--
											LT	--	--

IST Valve List
Reactor Head Degassing - RD

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
RD-0008	Degassing Line IB Isol.	2	F05046	E7	A	3	BL	M	NC	--	Q(NA)	RR4	--
											LT	--	--
RD-0010	Degassing Line OB Isol.	2	F05046	E7	A	3	BL	M	NC	--	Q(NA)	RR4	--
											LT	--	--

IST Valve List
Residual Heat Removal - RH

Page 47 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0060A	RHR Pump 1A IB Suction Isol.	1	F20000	B8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	
MOV-0060B	RHR Pump 1B IB Suction Isol.	1	F20000	D8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	
MOV-0060C	RHR Pump 1C IB Suction Isol.	1	F20000	G8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	

MOV-0061A	RHR Pump 1A OB Suction Isol.	1	F20000	B8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	
MOV-0061B	RHR Pump 1B OB Suction Isol.	1	F20000	D8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	
MOV-0061C	RHR Pump 1C OB Suction Isol.	1	F20000	G8	A	12	GT	MO	NC	FAI	Q(CS),R,MT	RR2,6, 30	

XRH-0065A	RHR Pump 1A Disch. Check	2	F20000	B6	BC	8	CK	SA	NC	--	CV(CSP)	RR2,31	--
XRH-0065B	RHR Pump 1B Disch. Check	2	F20000	D6	BC	8	CK	SA	NC	--	CV(CSP)	RR2,31	--
XRH-0065C	RHR Pump 1C Disch. Check	2	F20000	G6	BC	8	CK	SA	NC	--	CV(CSP)	RR2,31	--

IST Valve List
Residual Heat Removal - RH

Page 48 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
XRH-0063B	RHR Pump 1B to RWST IB Isol.	2	F20000	D6	A	8	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XRH-0064B	RHR Pump 1B to RWST OB Isol.	2	F20000	D5	A	8	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XRH-0063C	RHR Pump 1C to RWST IB Isol.	2	F20000	F6	A	8	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
XRH-0064C	RHR Pump 1C to RWST OB Isol.	2	F20000	F5	A	8	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

MOV-0067A	RHR Pump 1A Recirc.	2	F20000	A6	B	4	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0067B	RHR Pump 1B Recirc.	2	F20000	C6	B	4	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0067C	RHR Pump 1C Recirc.	2	F20000	F6	B	4	GT	MO	NC	FAI	Q,R,MT	--	

XRH-0068A	RHR Pump 1A Recirc. Check	2	F20000	A6	BC	4	CK	SA	NC	--	CV	--	--
XRH-0068B	RHR Pump 1B Recirc. Check	2	F20000	C6	BC	4	CK	SA	NC	--	CV	--	--
XRH-0068C	RHR Pump 1C Recirc. Check	2	F20000	F6	BC	4	CK	SA	NC	--	CV	--	--

IST Valve List
Residual Heat Removal - RH

Page 49 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0019A	RHR 1A to Hot Leg Injection	2	F20000	C3	B	8	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0019B	RHR 1B to Hot Leg Injection	2	F20000	E3	B	8	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0019C	RHR 1C to Hot Leg Injection	2	F20000	H3	B	8	GT	MO	NC	FAI	Q,R,MT	--	

XRH-0020A	RHR 1A to Hot Leg Check	1	F20000	C2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--
XRH-0020B	RHR 1B to Hot Leg Check	1	F20000	E2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--
XRH-0020C	RHR 1C to Hot Leg Check	1	F20000	G2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--

MOV-0031A	RHR 1A to Cold Leg Injection	2	F20000	B3	B	8	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0031B	RHR 1B to Cold Leg Injection	2	F20000	D3	B	8	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0031C	RHR 1C to Cold Leg Injection	2	F20000	G3	B	8	GT	MO	NO	FAI	Q,R,MT	--	

IST Valve List
Residual Heat Removal - RH

Page 50 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
XRH-0032A	RHR 1A to Cold Leg Check	1	F20000	B2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--
XRH-0032B	RHR 1B to Cold Leg Check	1	F20000	D2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--
XRH-0032C	RHR 1C to Cold Leg Check	1	F20000	G2	AC	8	CK	SA	NC	--	CV(CS)	RR2,32	--
											LT(PIV)	--	--

HCV-864	RHR 1A HTX Outlet	2	F20000	B4	B	8	B	AO	NC	FO	Q,R,MT(NST)	RR33	--
HCV-865	RHR 1B HTX Outlet	2	F20000	D4	B	8	B	AO	NC	FO	Q,R,MT(NST)	RR33	--
HCV-866	RHR 1C HTX Outlet	2	F20000	G4	B	8	B	AO	NC	FO	Q,R,MT(NST)	RR33	--

FCV-851	RHR 1A HTX Bypass	2	F20000	C5	B	8	B	AO	NC	FC	Q,R,MT(NST)	RR33	--
FCV-852	RHR 1B HTX Bypass	2	F20000	E5	B	8	B	AO	NC	FC	Q,R,MT(NST)	RR33	--
FCV-853	RHR 1C HTX Bypass	2	F20000	H5	B	8	B	AO	NC	FC	Q,R,MT(NST)	RR33	--

MOV-0066A	RHR 1A to CVCS Letdown	2	F20000	A4	B	4	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0066B	RHR 1B to CVCS Letdown	2	F20000	D2	B	4	GT	MO	NC	FAI	Q,R,MT	--	

IST Valve List
Reactor Makeup Water - RM

Page 51 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-7659	RM to CVCS Blend Isol.	3	F05033	F7	B	4	GL	AO	NO	FC	Q,R,MT	--	
FV-7663	RM to CVCS Blend Isol.	3	F05033	F7	B	4	GL	AO	NO	FC	Q,R,MT	--	

IST Valve List
Service Air - SA

Page 52 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
SA-0504	Service Air to CTMT OB Isol.	2	F05041	C4	A	2	BL	M	NC	--	Q(NA)	RR4	--
											LT	--	--
SA-0505	Service Air to CTMT IB Check	2	F05041	D4	AC	2	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

IST Valve List
Steam Generator Blowdown - SB

Page 53 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4189	SG 1A to Sec. Sampling Isol.	2	F20001	H5	B	1	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-4189A	SG 1A to Sec. Sampling Isol.	2	F20001	H5	B	1	GT	SO	NO	FC	Q,MT(NT)	RR8	5
FV-4188	SG 1B to Sec. Sampling Isol.	2	F20001	H1	B	1	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-4188A	SG 1B to Sec. Sampling Isol.	2	F20001	H1	B	1	GT	SO	NO	FC	Q,MT(NT)	RR8	5
FV-4187	SG 1C to Sec. Sampling Isol.	2	F20001	D1	B	1	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-4187A	SG 1C to Sec. Sampling Isol.	2	F20001	D1	B	1	GT	SO	NO	FC	Q,MT(NT)	RR8	5
FV-4186	SG 1D to Sec. Sampling Isol.	2	F20001	D5	B	1	GT	SO	NO	FC	Q,R,MT(NT)	RR8	5
FV-4186A	SG 1D to Sec. Sampling Isol.	2	F20001	D5	B	1	GT	SO	NO	FC	Q,MT(NT)	RR8	5

FV-4153	SG 1A to Flash Tank Isol.	2	F20001	G5	B	4	GT	A0	NO	FC	Q,R,MT	--	10
FV-4152	SG 1B to Flash Tank Isol.	2	F20001	G1	B	4	GT	A0	NO	FC	Q,R,MT	--	10
FV-4151	SG 1C to Flash Tank Isol.	2	F20001	C1	B	4	GT	A0	NC	FC	Q,R,MT	--	10
FV-4150	SG 1D to Flash Tank Isol.	2	F20001	C5	B	4	GT	A0	NC	FC	Q,R,MT	--	10

IST Valve List
Safety Injection - SI

Page 54 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0001A	RWST Isolation	2	F05013	G3	B	16	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0001B	RWST Isolation	2	F05014	H2	B	16	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0001C	RWST Isolation	2	F05015	H2	B	16	GT	MO	NO	FAI	Q,R,MT	--	

XSI-0002A	RWST Outlet Check	2	F05013	G3	BC	16	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0002B	RWST Outlet Check	2	F05014	H2	BC	16	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0002C	RWST Outlet Check	2	F05015	H2	BC	16	CK	SA	NC	--	CV(PRR)	RR34	--

FV-3936	RWST to SFPCCS RWPP	2	F05013	F2	B	3	GL	AO	NC	FC	Q,R,MT	--	
FV-3937	RWST to SFPCCS RWPP	2	F05013	F2	B	3	GL	AO	NC	FC	Q,R,MT	--	

MOV-0016A	Emergency Sump 1A Outlet	2	F05013	B5	B	16	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--
MOV-0016B	Emergency Sump 1B Outlet	2	F05014	B4	B	16	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--
MOV-0016C	Emergency Sump 1C Outlet	2	F05015	B4	B	16	GT	MO	NC	FAI	Q,R,MT	--	
											LT	--	--

IST Valve List
Safety Injection - SI

Page 55 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0014A	LHSI Pp. 1A Recirc.	2	F05013	D3	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0013A	LHSI Pp. 1A Recirc.	2	F05013	D3	B	2	D	MO	NO	FAI	Q,R,MT	--	
MOV-0014B	LHSI Pp. 1B Recirc.	2	F05014	E3	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0013B	LHSI Pp. 1B Recirc.	2	F05014	E3	B	2	D	MO	NO	FAI	Q,R,MT	--	
MOV-0014C	LHSI Pp. 1C Recirc.	2	F05015	D3	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0013C	LHSI Pp. 1C Recirc.	2	F05015	D3	B	2	D	MO	NO	FAI	Q,R,MT	--	

MOV-0018A	LHSI Pp. 1A Disch.	2	F05013	C4	B	8	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0018B	LHSI Pp. 1B Disch.	2	F05014	D4	B	8	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0018C	LHSI Pp. 1C Disch.	2	F05015	D4	B	8	GT	MO	NO	FAI	Q,R,MT	--	

XSI-0030A	LHSI Pp. 1A Disch. Check	2	F05013	D5	BC	8	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0030B	LHSI Pp. 1B Disch. Check	2	F05014	D4	BC	8	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0030C	LHSI Pp. 1C Disch. Check	2	F05015	D4	BC	8	CK	SA	NC	--	CV(PRR)	RR34	--

IST Valve List
Safety Injection - SI

Page 56 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0011A	HHSI Pp. 1A Recirc.	2	F05013	G4	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0012A	HHSI Pp. 1A Recirc.	2	F05013	G4	B	2	D	MO	NO	FAI	Q,R,MT	--	
MOV-0011B	HHSI Pp. 1B Recirc.	2	F05014	H3	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0012B	HHSI Pp. 1B Recirc.	2	F05014	H3	B	2	D	MO	NO	FAI	Q,R,MT	--	
MOV-0011C	HHSI Pp. 1C Recirc.	2	F05015	G4	B	2	D	MO	NC	FAI	Q,R,MT	--	
MOV-0012C	HHSI Pp. 1C Recirc.	2	F05015	G3	B	2	D	MO	NO	FAI	Q,R,MT	--	

MOV-0004A	HHSI Pp. 1A Disch.	2	F05013	F5	B	6	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0004B	HHSI Pp. 1B Disch.	2	F05014	G4	B	6	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0004C	HHSI Pp. 1C Disch.	2	F05015	F4	B	6	GT	MO	NO	FAI	Q,R,MT	--	

XSI-0005A	HHSI Pp. 1A Disch. Check	2	F05013	F6	BC	6	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0005B	HHSI Pp. 1B Disch. Check	2	F05014	G4	BC	6	CK	SA	NC	--	CV(PRR)	RR34	--
XSI-0005C	HHSI Pp. 1C Disch. Check	2	F05015	F5	BC	6	CK	SA	NC	--	CV(PRR)	RR34	--

IST Valve List
Safety Injection - SI

Page 57 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
MOV-0008A	HHSI Pp. 1A Hot Leg Inj.	2	F05013	F7	B	6	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0008B	HHSI Pp. 1B Hot Leg Inj.	2	F05014	G7	B	6	GT	MO	NC	FAI	Q,R,MT	--	
MOV-0008C	HHSI Pp. 1C Hot Leg Inj.	2	F05015	F7	B	6	GT	MO	NC	FAI	Q,R,MT	--	

MOV-0006A	HHSI Pp. 1A Cold Leg Inj.	2	F05013	E7	B	6	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0006B	HHSI Pp. 1B Cold Leg Inj.	2	F05014	F7	B	6	GT	MO	NO	FAI	Q,R,MT	--	
MOV-0006C	HHSI Pp. 1C Cold Leg Inj.	2	F05015	E7	B	6	GT	MO	NO	FAI	Q,R,MT	--	

XSI-0009A	HHSI Pp. 1A Hot Leg OB Check	1	F05013	F7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--
XSI-0009B	HHSI Pp. 1B Hot Leg OB Check	1	F05014	G7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--
XSI-0009C	HHSI Pp. 1C Hot Leg OB Check	1	F05015	F7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--

IST Valve List
Safety Injection - SI

Page 58 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
XSI-0010A	HHSI Pp. 1A Hot Leg IB Check	1	F05013	F8	AC	8	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--
XSI-0010B	HHSI Pp. 1B Hot Leg IB Check	1	F05014	G8	AC	8	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--
XSI-0010C	HHSI Pp. 1C Hot Leg IB Check	1	F05015	F8	AC	8	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--

XSI-0007A	HHSI Pp. 1A Cold Leg OB Check	1	F05013	E7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--
XSI-0007B	HHSI Pp. 1B Cold Leg OB Check	1	F05014	F7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--
XSI-0007C	HHSI Pp. 1C Cold Leg OB Check	1	F05015	E7	AC	6	CK	SA	NC	--	CV(RR)	RR35	--
											LT(PIV)	--	--

IST Valve List
Safety Injection - SI

Page 59 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-3983	SIS Accum. N2 Supply OB Isol.	2	F05016	G2	A	1	GL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--
SI-0058	SIS Accum. N2 Supply IB Check	2	F05016	G2	AC	1	CK	SA	NC	--	CV(RR)	RR5	--
											LT	--	--

XSI-0046A	SIS Accum. 1A OB Check	1	F05016	F6	AC	12	CK	SA	NC	--	CV(PSR)	RR37	--
											LT(PIV)	--	--
XSI-0046B	SIS Accum. 1B OB Check	1	F05016	D7	AC	12	CK	SA	NC		CV(PSR)	RR37	--
											LT(PIV)	--	--
XSI-0046C	SIS Accum. 1C OB Check	1	F05016	B7	AC	12	CK	SA	NC	--	CV(PSR)	RR37	--
											LT(PIV)	--	--

IST Valve List
Safety Injection - SI

Page 60 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	PR/C	ST
XSI-0038A	SI Cold Leg 1 IB Check	1	F05016	F7	AC	12	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--
XSI-0038B	SI Cold Leg 2 IB Check	1	F05016	D7	AC	12	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--
XSI-0038C	SI Cold Leg 3 IB Check	1	F05016	B7	AC	12	CK	SA	NC	--	CV(CSR)	RR2,36	--
											LT(PIV)	--	--

FV-3970	SIS Test Line IB Isol.	1	F05016	F7	A	.75	GL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--
FV-3971	SIS Test Line OB Isol.	1	F05016	F7	A	.75	GL	AO	NC	FC	Q,R,MT	--	10
											LT	--	--

IST Valve List
Steam Generator Sludge Lancing - SL

Page 61 of 62
Rev. 0

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
SL-0002	Hi Pressure OB Isol.	2	F05057	B5	A	2	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
SL-0004	Hi Pressure IB Isol.	2	F05057	B6	A	2	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

SL-0012	Low Pressure OB Isol.	2	F05057	E5	A	6	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
SL-0014	Low Pressure OB Isol.	2	F05057	E6	A	6	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

SL-0027	Chem. Cing. Ret. IB Isol.	2	F05057	G6	A	6	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--
SL-0029	Chem. Cing. Ret. OB Isol.	2	F05057	G5	A	6	GT	M	NC	--	Q(NA)	RR4	--
											LT	--	--

IST Valve List
Liquid Waste Processing - WL

VALVE ID	VALVE FUNCTION	CL	P&ID	GC	CAT	SIZE	TYPE	ACT	NORM. POS.	FAIL POS.	TEST REQUIREMENT	RR/C	ST
FV-4919	RCDT N2 Supply/Vent OB Isol.	2	F05022	G6	A	1	GL	AO	NO	FC	Q,R,MT	--	10
											LT	--	--
FV-4920	RCDT N2 Supply/Vent IB Isol.	2	F05022	G6	A	1	GL	SO	NC	FC	Q,R,MT(NT)	RR8	10
											LT	--	--

MOV-0312	RCDT Pump Disch. IB Isol.	2	F05022	E3	A	3	GT	MO	NO	FAI	Q,R,MT	--	10
											LT	--	--
FV-4913	RCDT Pump Disch. OB Isol.	2	F05022	F3	A	3	GL	AO	NO	FC	Q,R,MT	--	10
											LT	--	--

3.1 Requests for Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements and Clarifications of Valve Testing Methods

RR-1

Test Requirement

The stroke time of all power-operated valves shall be measured, and check valves shall be exercised for operability at least once every three (3) months.

Basis for Relief

This valve is a stop check valve with a motor operator. The motor operator may be safely stroked at power; however, the stop check valve can only be exercised (full-stroke) by directing Auxiliary Feedwater Flow into the Steam Generators. The initiation of Auxiliary Feedwater during power operation would result in unwanted thermal shock to the secondary portions of the Steam Generators. An introduction of cold water would also cause unwanted power transients.

Alternate Testing

The valve motor operator will be stroked and timed at least once every three (3) months as required; however, after leaving cold shutdown and prior to entering Mode 2 (Startup) Auxiliary Feedwater will be directed through the valve using one pump flow rate. Verification of flow through the valve will provide assurance that the valve has opened sufficiently to perform its function (full-stroke).

RR-2

Test Requirement

IWV-3417(b) and IWV-3523 state that when corrective action is required as a result of tests made during cold shutdown, the condition shall be corrected before startup. A retest showing acceptable operation shall be run following any corrective action before returning valve to service.

Basis for Relief

The plant Technical Specifications provide the requirements and plant conditions necessary for plant startup (i.e. mode changes).

Alternate Testing

The test requirement will be satisfied before the valve is required to be operable in accordance with the plant Technical Specifications.

RR-3

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

This check valve is normally closed during normal power operation and can only be exercised (full-stroke) by directing Auxiliary Feedwater flow into the Steam Generators. The initiation of Auxiliary Feedwater during normal power operation would result in unwanted thermal shock and power transients.

Alternate Testing

After leaving cold shutdown and prior to entering Mode 2 (Startup), Auxiliary Feedwater will be directed through the valve using one pump flow rate. Verification of flow through the valve will provide assurance that the valve has opened sufficiently to perform its function (full-stroke).

RR-4

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This valve is a normally closed containment isolation valve and is passive. The operability testing (full or partial stroke) during either power operation or cold shutdown provides no added assurance of an increase in safety.

Alternate Testing

This valve will be verified closed and leak-tight each refueling outage during performance of LLRT activities in accordance with 10CFR50 Appendix J.

RR-5

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

This valve is a normally closed containment isolation check valve and is passive. The operability testing (full or partial stroke) during either power operation or cold shutdown provides no added assurance of an increase in safety.

Alternate Testing

This valve will be verified closed and leak-tight each refueling outage during performance of LLRT activities in accordance with 10CFR50 Appendix J.

RR-6

Test Requirement

IWV-3417(a) states that if an increase in stroke time of 25% or more from the previous test for valves with stroke times greater than ten seconds or 50% or more for valves with stroke times less than or equal to ten seconds is observed, test frequency shall be increased to once each month until corrective action is taken.

Basis for Relief

Valves that are normally tested during cold shutdown cannot be tested once each month. Stroking these valves during normal plant operation may place the plant in an unsafe condition.

Alternate Testing

The required test frequency will be once each cold shutdown, not to exceed once every month.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-7

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

Operability testing (full or partial stroke) of this normally closed check valve is impractical due to plant design.

Alternate Testing

This valve will be required to be partially disassembled every refueling outage and the valve internals will be inspected to ensure no degradation has occurred.

RR-8

Test Requirement

IWV-3413(b) requires that the stroke time of all power-operated valves shall be measured to the nearest second for stroke times of 10 seconds or less. IWV-3417 requires that on any one test of power-operated valves, an increase in stroke time of 50% or more from the previous test for valves with stroke times of 10 seconds or less, the test frequency shall be increased to once each month until corrective action is taken.

Basis for Relief

These solenoid-operated valves have very short stroke times and are classified as "rapid-acting" valves. Accurate measurement of stroke time is not practical. In addition, stroke times may vary significantly due to system pressure and/or temperature changes from one test to another.

Alternate Testing

These valves will be required to be full stroked and timed to the nearest second quarterly. Acceptance of the test will be based only on the stroke time limit and not on the "50%" criteria of IWV-3417.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-9

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

The operability testing (full stroke) of this valve during normal plant operation would cause isolation of Chilled Water to the Reactor Cavity and Support Vent Cooling Coils and failure in the closed position would result in unacceptable containment temperatures.

Alternate Testing

This valve will be required to be exercised (full stroke) at each cold shutdown not to exceed once every three (3) months.

RR-10

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

Due to plant design, it is not practical to verify by any positive means, either directly or indirectly, the operability of these normally open check valves per the requirements of IWV-3522(a).

Alternate Testing

Valve closure will be verified during LLRT activities performed each refueling outage in accordance with 10CFR50 Appendix J.

RR-11

Test Requirement

Exercise valves for operability at least once every three (3) months, and the stroke time of all power-operated valves shall be measured.

Basis for Relief

These valves are three-way temperature control valves which bypass chilled water around the air handling unit cooling coils to regulate area temperature. The valve control logic only allows stroking the valve from this controlling position (throttled) to the full cooling position (bypass closed, coil return open). Therefore, the valves may only be partially stroked, and stroke times will not be consistent as the valve will not be throttled at the same position for each test.

Alternate Testing

These valves will be required to be partially stroked from its controlling position to full open (maximum cooling, bypass closed) quarterly. No stroke times will be taken.

RR-12

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

Operability testing (full or partial stroke) of these normally closed check valves is impractical during power operation or cold shutdown. Stroking these valves with flow would require the spraying of containment which is impractical and may cause equipment damage.

Alternate Testing

The check valves will be verified operable by performing an air test in conjunction with the Containment Spray Nozzle Verification Test required to be performed by Technical Specifications every five years during a refueling outage.

RR-13

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

These normally open valves supply clean, cool water for the RCP seals providing lubrication, cooling and pressurization of the pump seals. Failure of these valves in the closed position during stroking could significantly reduce seal life and possibly cause a plant outage.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three months.

RR-14

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

The operability testing (full stroke) of these valves would cause a loss of system function (loss of charging pump normal suction from VCT). Valves have no partial stroke provisions.

Alternate Testing

These valves will be required to be tested for operability (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-15

Test Requirement

Exercise valves and check valves for operability at least once every three (3) months.

Basis for Relief

Exercising of these normally closed valves and check valves at power would connect the suction of the Charging Pumps to the RWST resulting in concentrated boric acid injection into the RCS, causing a resultant power change which is undesired.

Alternate Testing

These valves and check valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-16

Test Requirement

Exercise valves for operability at least once every three (3) months, and the stroke time of all power-operated valves shall be measured.

Basis for Relief

This valve normally is throttled to control charging flow by a flow controller. The valve cannot be full stroked at power without isolating charging flow to the RCS which is undesirable. The stroke time of this flow control valve does not need to be measured as measurement of its stroke time provides no increase in the level of safety for this system.

Alternate Testing

This valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months. No stroke time will be taken.

RR-17

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This normally open valve supplies charging water to the RCS. It is undesirable to isolate charging at power.

Alternate Testing

This valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-18

Test Requirement

Exercise valves and check valves for operability at least once every three (3) months.

Basis for Relief

Exercising of this normally closed valve and check valve would require introduction of cold ($\leq 140^{\circ}\text{F}$) spray water into the pressurizer at power creating an undesired transient.

Alternate Testing

This valve and check valve will be required to be exercised for operability (full stroke) at each cold shutdown not to exceed once every three (3) months.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-19

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

Exercising of this normally closed check valve at power would result in injection of concentrated boric acid into the RCS via the operating charging pump(s) creating an undesired power transient.

Alternate Testing

This check valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-20

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This valve is normally open during power operations and cannot be full stroke tested without isolating Feedwater from the Steam Generators. Isolation of Feedwater would cause an undesirable power transient and possible turbine and reactor trip.

Alternate Testing

This valve will be required to be partial-stroke tested at least once every three (3) months and full-stroke tested each cold shutdown not to exceed once every three (3) months.

RR-21

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This valve is normally throttled open during power operations to maintain Steam Generator level by controlling feedwater flow. This valve cannot be tested without isolating Feedwater from the Steam Generators causing undesirable power transients and possible turbine and reactor trip.

Alternate Testing

This valve will be exercised (partial stroke) during the course of normal plant operations (although the frequency cannot be specified as stated in IWV-3414) and required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-22

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This valve is normally closed above approximately 20% power and controls Feedwater flow to the Steam Generators below 20% power during start-up. This valve cannot be tested without isolating or perturbing Feedwater flow to the Steam Generators causing undesirable power transients and possible turbine and reactor trip.

Alternate Testing

This valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-23

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

These 48 inch Containment Purge Valves are required by the Technical Specifications to be sealed closed during normal operation.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-24

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

These 18 inch Containment Purge Valves are allowed by the Technical Specifications to be opened a maximum of 2000 hours each year during normal plant operation. Failure of these valves during operation in the open position would cause a loss of primary containment integrity and necessitate a plant shutdown.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-25

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

This valve supplies Instrument Air to containment to operate various valves. Isolation of Instrument Air (and if valve fails closed and cannot be reopened) would cause a plant shutdown.

Alternate Testing

This valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-26

Test Requirement

Exercise valves for operability at least once every three (3) months, and the stroke time of all power-operated valves shall be measured.

Basis for Relief

The operability testing of these normally closed valves during power operation would result in undesirable power transients and could cause a plant shutdown if valves fail to close. Also, the measurement of stroke times for these valves provides no increase in the level of safety for this system as the valves' function is to relieve pressure and release steam (heat) rather than to stroke open or close in a definite time period.

Alternate Testing

This valve will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months. No stroke times will be taken.

RR-27

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

The operability testing (full stroke) of these normally open valves at power is not practical and will cause a plant shutdown.

Alternate Testing

These valves will be required to be partial-stroke exercised quarterly and full-stroke exercised each cold shutdown not to exceed once every three (3) months.

C-28

Test Requirement

IWV-3421 requires that Category A valves shall be leak tested except valves which function in the course of plant operation in a manner which demonstrates functionally adequate leak tightness need not be leak tested.

Testing Method

The leak tightness of these valves is demonstrated to be functionally adequate during normal plant operation. RCS is monitored for leakage per Technical Specification 3.4.6.2.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-29

Test Requirement

Exercise valves for operability at least once every three (3) months, and the stroke time of all power-operated valves shall be measured.

Basis for Relief

These valves are line-pressure-actuated valves and therefore require their block valves to be open to allow reactor pressure to stroke the valve. This is not feasible at power to stroke these valves as an unwanted RCS pressure and pressurizer level transient would occur possibly tripping the reactor. Acceptable maximum RCS pressure has been determined to be 67 psig at 300⁶ F, with initial pressurizer water level at 25%, to allow for full stroking of these valves without causing an uncontrollable transient.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three months.

RR-30

Test Requirement

Exercise valves for operability at least once every three (3) months.

Basis for Relief

These valves cannot be stroked at a RCS pressure greater than or equal to 750 psig due to an RCS pressure interlock.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

RR-31

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These valves cannot be exercised (full stroke) at power as the RHR Pumps have no provision for full flow testing except during cold shutdown conditions.

Alternate Testing

These valves will be required to be exercised (partial stroke) at least once every three (3) months using RHR Pump recirculation flow, and exercised (full stroke) each cold shutdown not to exceed once every three (3) months with the RHR Pumps aligned for normal shutdown cooling flows.

RR-32

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These valves cannot be tested for operability (full stroke) at power because the RHR pumps cannot overcome RCS pressure to allow flow through these check valves.

Alternate Testing

These valves will be required to be exercised (full stroke) each cold shutdown not to exceed once every three (3) months.

Pump and Valve
Inservice Test Plan

Rev. 0

RR-33

Test Requirement

The stroke time of all power-operated valves shall be measured.

Basis for Relief

The function of these valves is to control flow rather than to open or close in a definite amount of time.

Alternate Testing

These valves will be required to be exercised (full stroke) at least once every three (3) months. No stroke times will be taken.

RR-34

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These check valves can only be exercised (full stroke) by simulating LOCA conditions (pumping into the RCS with RCS at zero or very low pressure) in order to get full pump flows.

Alternate Testing

These check valves will be required to be exercised (partial stroke) at least once every three (3) months by running pumps at normal recirculation flows, and exercised (full stroke) each refueling outage by injecting into the RCS with the vessel head off using the appropriate pump(s) at full flow.

RR-35

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These check valves cannot be exercised (full stroke or partial stroke) at power as the HHSI pumps cannot develop discharge pressure greater than normal RCS pressure. These check valves cannot be exercised (full stroke or partial stroke) during cold shutdown as the HHSI pumps would overpressurize the RCS.

Alternate Testing

These valves will be required to be exercised (full stroke) each refueling outage by injecting HHSI flow into the open and vented RCS.

RR-36

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These check valves cannot be exercised at power (full or partial stroke) since neither the HHSI, LHSI, nor RHR pumps can overcome RCS pressure. The valve cannot be exercised (full stroke) unless LOCA conditions are simulated (pumping into RCS with RCS at zero or very low pressure) to get full pump flows.

Alternate Testing

These check valves will be required to be exercised (partial stroke) each cold shutdown not to exceed once every three (3) months using RHR flow, and exercised (full stroke) each refueling outage using HHSI and LHSI pump flows.

RR-37

Test Requirement

Exercise check valves for operability at least once every three (3) months.

Basis for Relief

These check valves cannot be exercised (full or partial stroke) at power since the SIS Accumulator pressure is lower than the RCS pressure, cannot be exercised (full or partial stroke) during cold shutdown without the possibility of overpressurizing the RCS, and cannot be exercised (full stroke) during a refueling outage as the high flow rate of a full discharge with the SIS Accumulators at normal pressure may cause internal damage to the core.

Alternate Testing

These check valves will be required to be partial stroke exercised every refueling outage by draining each SIS Accumulator into the open RCS with the SIS Accumulator at a reduced pressure.

Pump and Valve
Inservice Test Plan

Rev. 0

4.0 DRAWINGS

F00016

F00024

F00063

F20000

F20001

F05001

F05003

F05004

F05005

F05006

F05007

F05009

F05013

F05014

F05015

F05016

F05017

F05018

F05019

F05020

F05021

F05022

F05028

F05030

Pump and Valve
Inservice Test Plan

Rev. 0

4.0 DRAWINGS (CONT.)

F05033

F05034

F05037

F05038

F05039

F05040

F05041

F05042

F05044

F05046

F05047

F05057

V00017

V00018

V00019

V00021

V10001

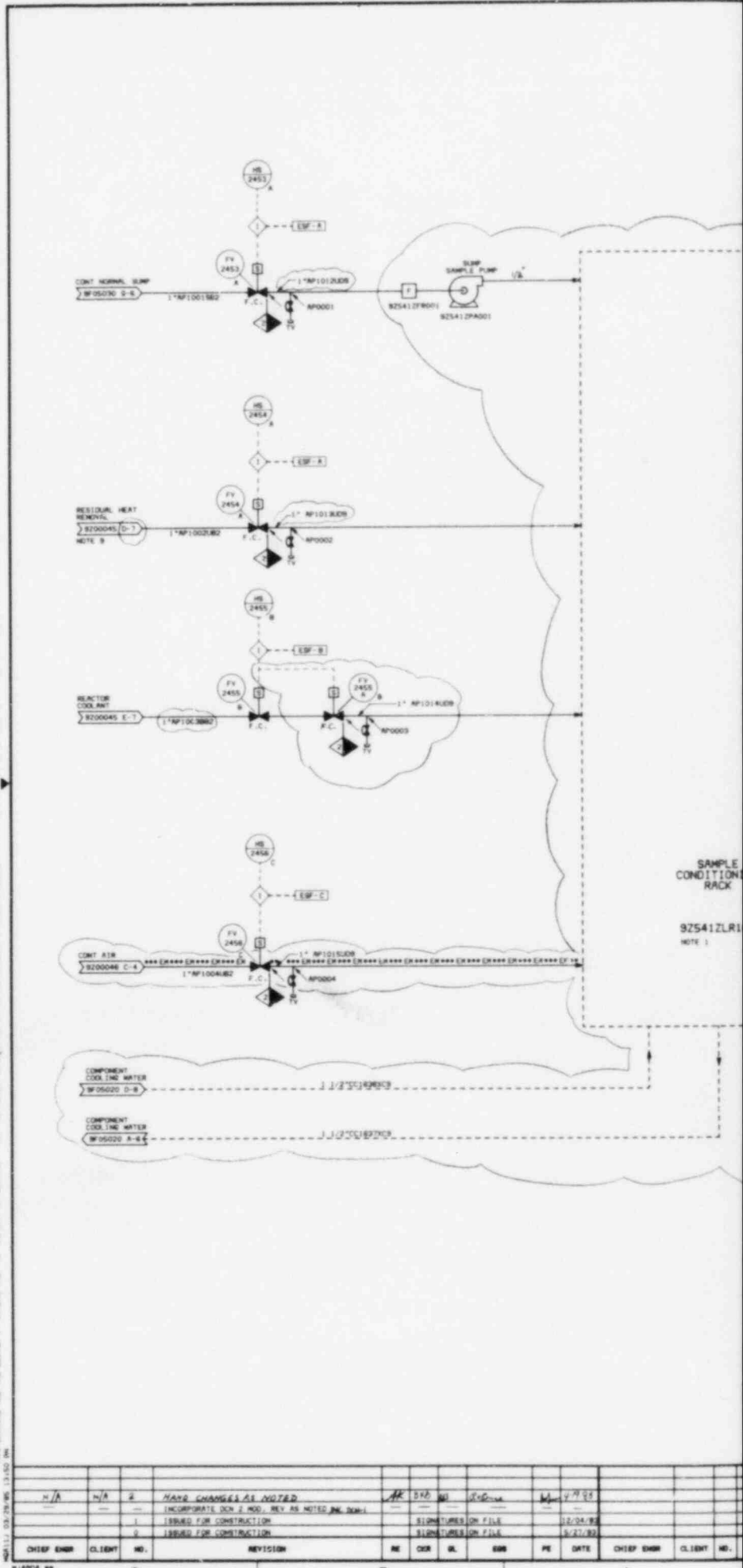
V10002

Z00045

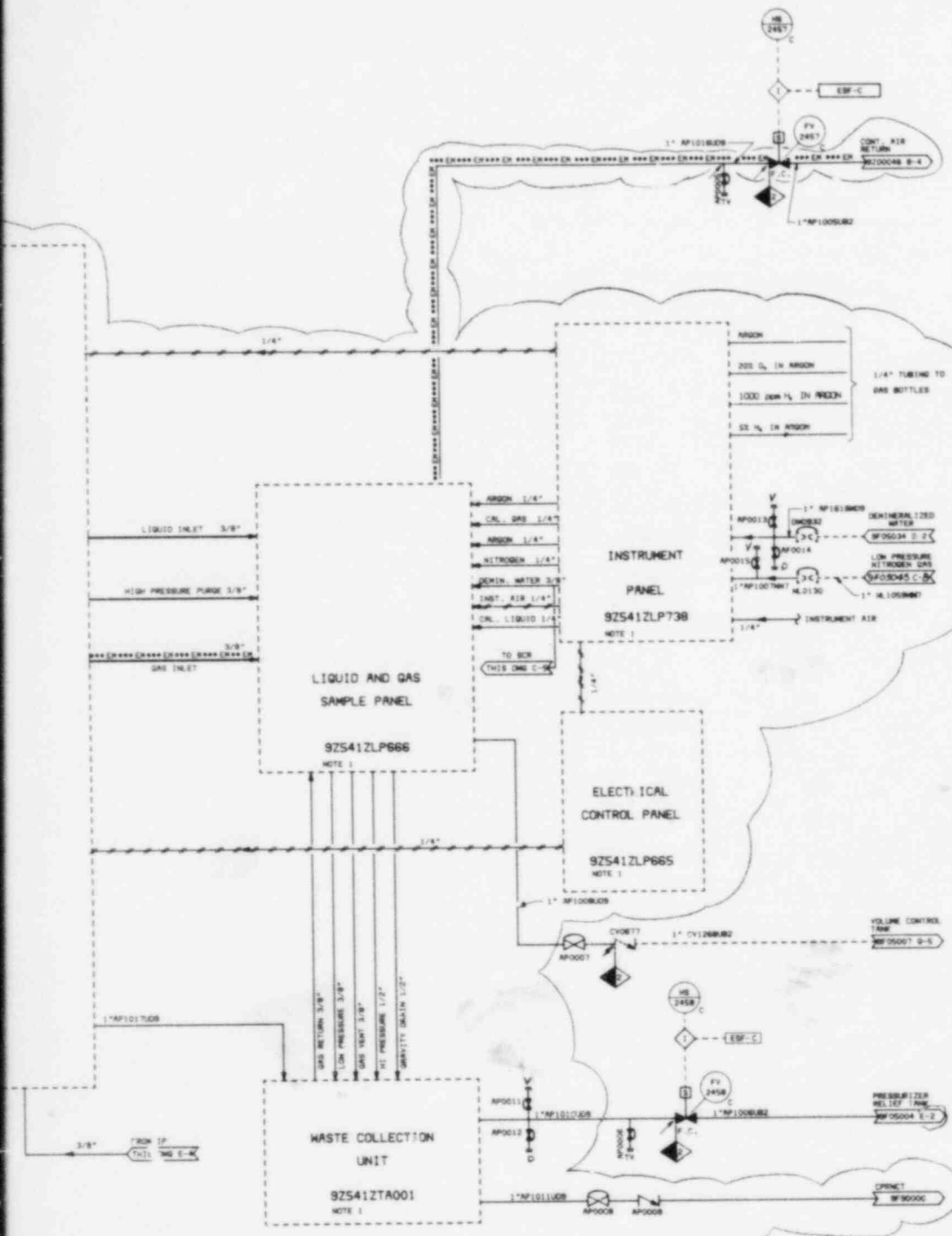
Z00046

Z47501

THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BECTEL. THEY ARE HEREBY LOANED AND ON THE BORROWER'S EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT IN THE LIMITED WAY AND ANY FURTHER USE PERMITTED BY ANY WRITTEN COMMENT GIVEN BY THE LENDER TO THE BORROWER.



NO.	DATE	BY	CHKD	APPD	REVISION	RE	OK	BL	GR	FE	DATE	CHIEF ENGR	CLIENT NO.
1	12/24/88	AR	DA	AR	MADE CHANGES AS NOTED						12/24/88		
2	12/24/88				INCORPORATE SCH. 2 MOD. REV. AS NOTED PER SCH. 1						12/24/88		
3	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		
4	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		
5	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		
6	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		
7	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		
8	12/24/88				ISSUED FOR CONSTRUCTION						12/24/88		



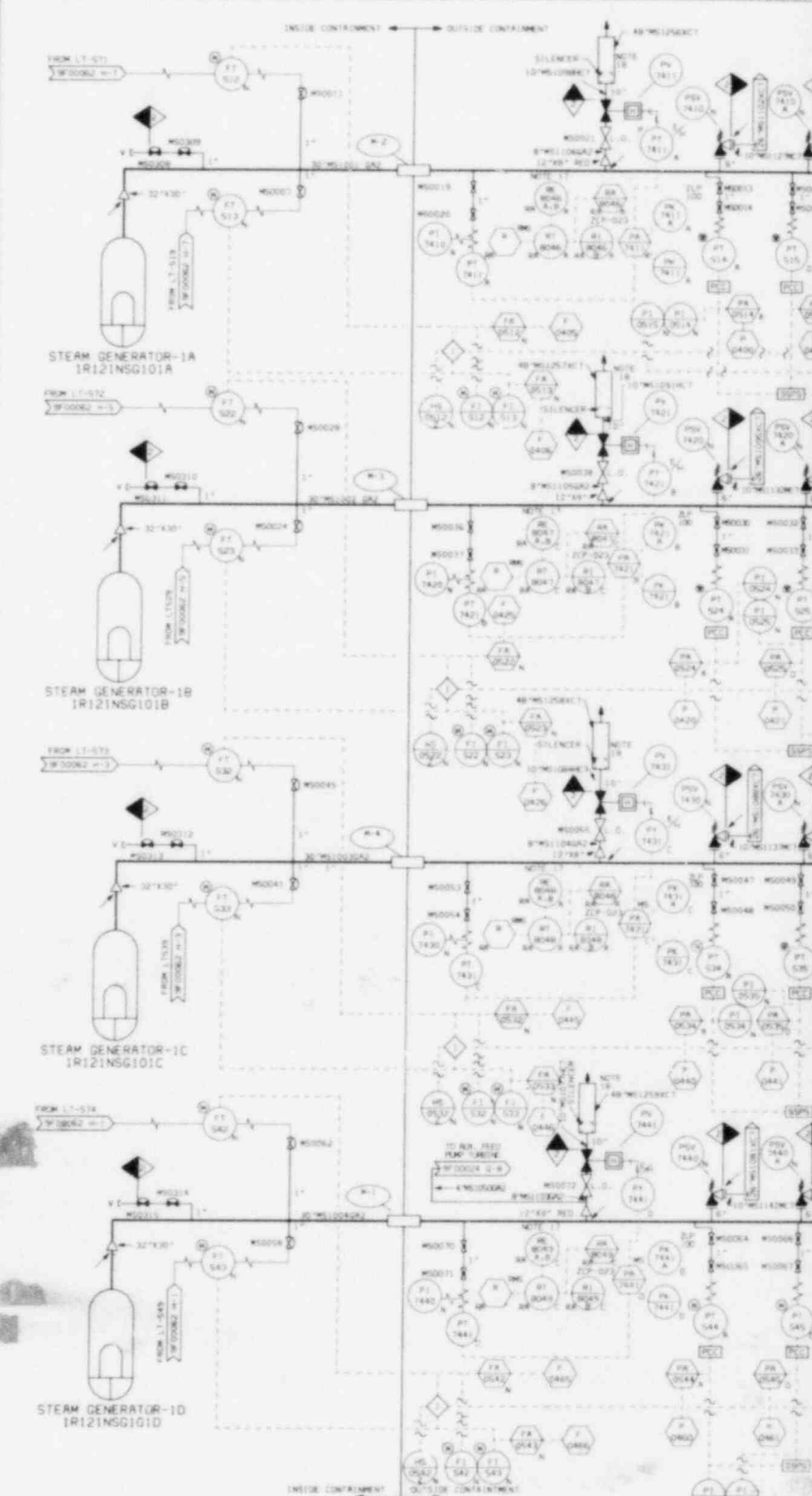
TR APERTURE CARD
 Also Available for Aperture Card

- NOTES:
1. REFER TO NEW DRAWING NUMBERS 8800-001, 8800-002, 8800-003, 8800-004, 8800-005, 8800-006, 8800-007, 8800-008, 8800-009, 8800-010, 8800-011, 8800-012, 8800-013, 8800-014, 8800-015, 8800-016, 8800-017, 8800-018, 8800-019, 8800-020, 8800-021, 8800-022, 8800-023, 8800-024, 8800-025, 8800-026, 8800-027, 8800-028, 8800-029, 8800-030, 8800-031, 8800-032, 8800-033, 8800-034, 8800-035, 8800-036, 8800-037, 8800-038, 8800-039, 8800-040, 8800-041, 8800-042, 8800-043, 8800-044, 8800-045, 8800-046, 8800-047, 8800-048, 8800-049, 8800-050, 8800-051, 8800-052, 8800-053, 8800-054, 8800-055, 8800-056, 8800-057, 8800-058, 8800-059, 8800-060, 8800-061, 8800-062, 8800-063, 8800-064, 8800-065, 8800-066, 8800-067, 8800-068, 8800-069, 8800-070, 8800-071, 8800-072, 8800-073, 8800-074, 8800-075, 8800-076, 8800-077, 8800-078, 8800-079, 8800-080, 8800-081, 8800-082, 8800-083, 8800-084, 8800-085, 8800-086, 8800-087, 8800-088, 8800-089, 8800-090, 8800-091, 8800-092, 8800-093, 8800-094, 8800-095, 8800-096, 8800-097, 8800-098, 8800-099, 8800-100.
 2. FOR INSTRUMENT AND PIPING SYMBOLS SEE 340-5 8800-00001 AND 8800-00002.
 3. ALL INSTRUMENTS ON THIS PAID HAVE SYSTEM DESIGNATION AP.
 4. ALL INSTRUMENTS ON THIS PAID HAVE SEPARATION GROUP H UNLESS NOTED.
 5. ALL INSTRUMENT TAG NUMBERS ON THIS PAID ARE PREFIXED BY 1 FOR UNIT 1 AND 2 FOR UNIT 2.
 6. ALL SAMPLE LINES ON THIS PAID ARE 3/8\" IN. O.D. 1/2\" O.D. IN WALL, 304S GRADE 316 TUBING UNLESS OTHERWISE NOTED.
 7. DELETED.
 8. DELETED.
 9. THE LOCATION OF THE NEW SAMPLE POINT PROVIDES SAMPLING CAPABILITY DURING OPERATION OF THE RESIDUAL HEAT REMOVAL SYSTEM OF LOW HEAD SAFETY INJECTION SYSTEM.
 10. CONTAINMENT ISOLATION VALVES FY-2453 THROUGH FY-2458 ARE THE OUTSIDE CONTAINMENT ISOLATION VALVES FOR THE POST-ACCIDENT SAMPLING SYSTEM. THE CORRESPONDING INSIDE CONTAINMENT ISOLATION VALVES ARE REPRESENTED ON THE RESPECTIVE REFERENCES (PLANNED) PAID 9.

8602050017-01

BECHTEL ENERGY CORPORATION HOUSTON, TEXAS HOUSTON LIGHTING & POWER CO. SOUTH TEXAS PROJECT					PIPING & INSTRUMENT DIAGRAM POST ACCIDENT SAMPLING SYSTEM			
REVISION	NO.	DATE	BY	CHKD.	SCALE	JOB NO.	DRAWING NO.	REV.
						14928	52549247501	2

TABLE 2															
REV	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K	7410L	7410M	7410N
BY	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K	7410L	7410M	7410N
BY	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K	7410L	7410M	7410N
BY	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K	7410L	7410M	7410N



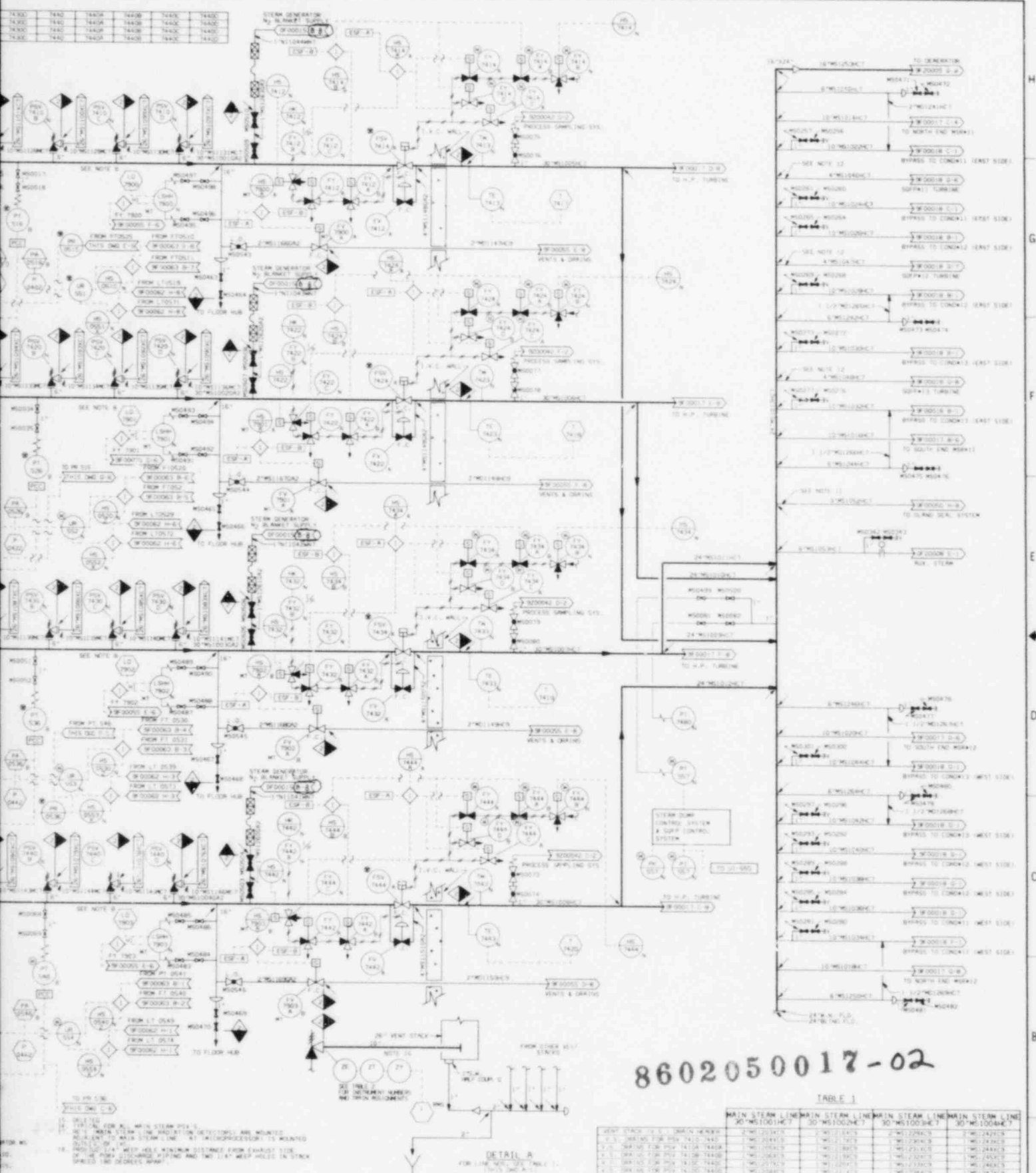
NOTES:

1. DELETED.
2. DELETED.
3. DELETED.
4. DELETED.
5. DELETED.
6. ALL INSTRUMENTS SHOWN ON THIS DIAGRAM ARE PREFIXED BY THE UNIT NO. 1.
7. UNLESS OTHERWISE NOTED, SEE GENERAL NOTE 6 ON P-00000.
8. MAIN STEAM PIPING SHALL BE PIPED TO A COMMON DRAIN HEADER, AND THE DRAIN SHALL BE PIPED TO A P-00000 DRAIN. SEE DETAIL 11 AND TABLE 1 FOR DRAIN LINE NUMBERS.
9. MAIN STEAM PIPING SHALL BE PIPED TO A COMMON DRAIN HEADER, AND THE DRAIN SHALL BE PIPED TO A P-00000 DRAIN. SEE DETAIL 11 AND TABLE 1 FOR DRAIN LINE NUMBERS.
10. MAIN STEAM PIPING SHALL BE PIPED TO A COMMON DRAIN HEADER, AND THE DRAIN SHALL BE PIPED TO A P-00000 DRAIN. SEE DETAIL 11 AND TABLE 1 FOR DRAIN LINE NUMBERS.
11. DRAIN AND STEAM SUPPLY LINE TO BE TAKEN FROM TOP OF MAIN STEAM HEADER. SEE DETAIL 11.
12. MAIN STEAM SUPPLY LINE TO BE TAKEN FROM TOP OF MAIN STEAM HEADER. SEE DETAIL 11.
13. ALL INSTRUMENTS ON THIS DIAGRAM HAVE SYSTEM DESIGN IDENTIFICATION NUMBERS.
14. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P-00000 DRAIN. SEE DETAIL 11 AND TABLE 1 FOR DRAIN LINE NUMBERS.
15. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P-00000 DRAIN. SEE DETAIL 11 AND TABLE 1 FOR DRAIN LINE NUMBERS.

NO.	DATE	BY	CHKD	APPD	REVISION	REASON	DATE	BY	CHKD	APPD	REVISION	REASON
1	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
2	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
3	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
4	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
5	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
6	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
7	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
8	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
9	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
10	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
11	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
12	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
13	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
14	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K
15	7410	7410A	7410B	7410C	7410D	7410E	7410F	7410G	7410H	7410I	7410J	7410K

THIS DRAWING AND THE DESIGN IT COVERS ARE THE PROPERTY OF THE COMPANY. THEY ARE NOT TO BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT IN THE LIMITED WAY AND FOR THE LIMITED PURPOSES SPECIFIED BY THE COMPANY TO THE BORROWER.

PRIMA
CARD
Also Available On
Aperture Card



8602050017-02

TABLE 1

MAIN STEAM LINE											
30" MS1001467		30" MS1001467		30" MS1001467		30" MS1001467		30" MS1001467			
UNIT	STEAM	TO	FROM	UNIT	STEAM	TO	FROM	UNIT	STEAM		
1	30" MS1001467	TO	14.24.744.0	2	30" MS1001467	TO	14.24.744.0	3	30" MS1001467	TO	14.24.744.0
4	30" MS1001467	TO	14.24.744.0	5	30" MS1001467	TO	14.24.744.0	6	30" MS1001467	TO	14.24.744.0
7	30" MS1001467	TO	14.24.744.0	8	30" MS1001467	TO	14.24.744.0	9	30" MS1001467	TO	14.24.744.0
10	30" MS1001467	TO	14.24.744.0	11	30" MS1001467	TO	14.24.744.0	12	30" MS1001467	TO	14.24.744.0
13	30" MS1001467	TO	14.24.744.0	14	30" MS1001467	TO	14.24.744.0	15	30" MS1001467	TO	14.24.744.0
16	30" MS1001467	TO	14.24.744.0	17	30" MS1001467	TO	14.24.744.0	18	30" MS1001467	TO	14.24.744.0
19	30" MS1001467	TO	14.24.744.0	20	30" MS1001467	TO	14.24.744.0	21	30" MS1001467	TO	14.24.744.0
22	30" MS1001467	TO	14.24.744.0	23	30" MS1001467	TO	14.24.744.0	24	30" MS1001467	TO	14.24.744.0
25	30" MS1001467	TO	14.24.744.0	26	30" MS1001467	TO	14.24.744.0	27	30" MS1001467	TO	14.24.744.0
28	30" MS1001467	TO	14.24.744.0	29	30" MS1001467	TO	14.24.744.0	30	30" MS1001467	TO	14.24.744.0

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

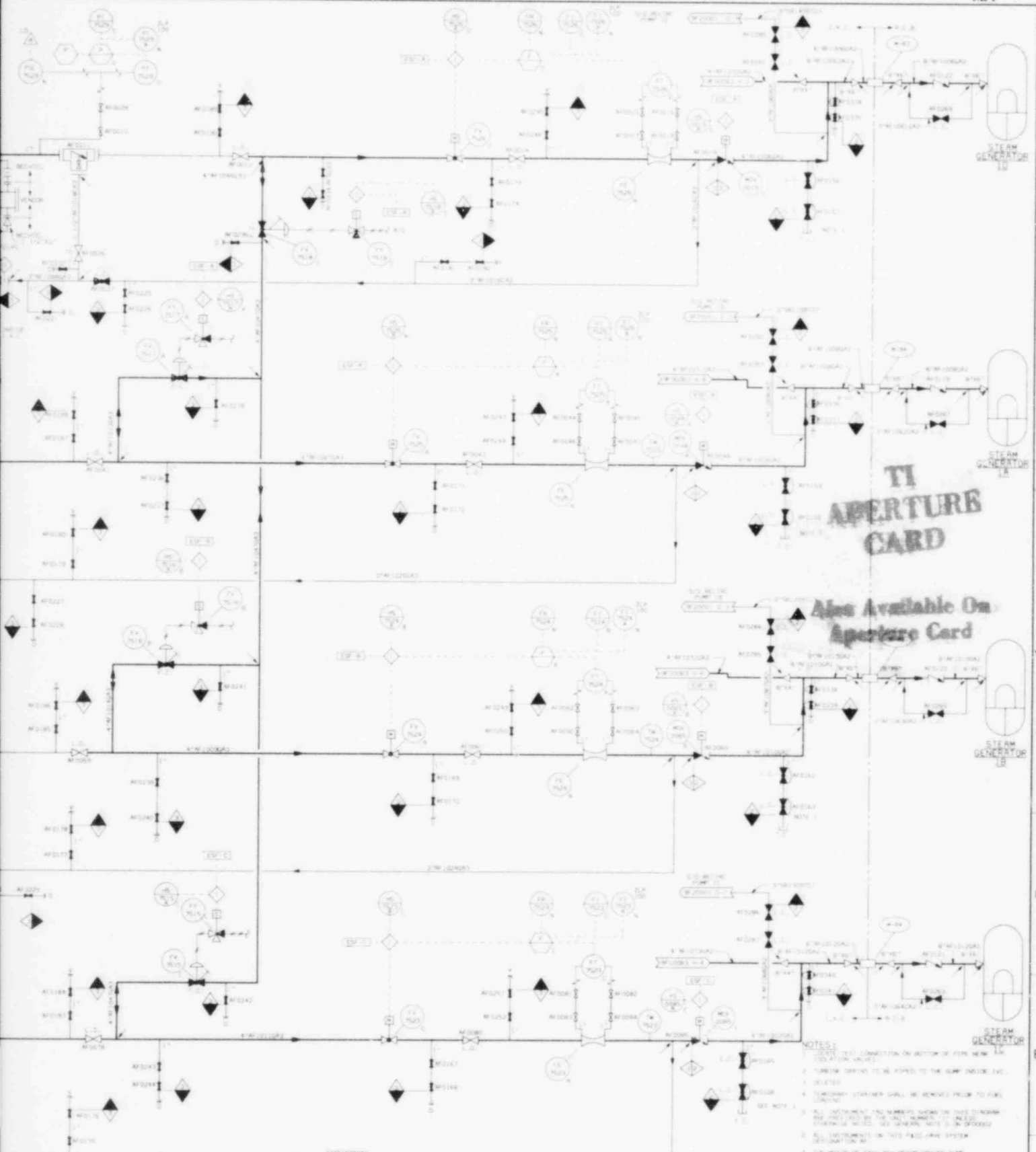
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM
MAIN STEAM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	5310W00016	6

REVISION	BY	CHK	DATE
1

[illegible][illegible]



TI
APERTURE
CARD

Also Available On
Aperture Card

- NOTES:**
1. SEE TEST CONNECTION ON BOTTOM OF PIPE NEW 3.0
 2. TURNING SPRING TO BE ADDED TO THE SHIP (MOTOR) END
 3. DELETED
 4. TEMPORARY STARTER SHALL BE REMOVED PRIOR TO PUMP COMMISSIONING
 5. ALL INSTRUMENTING TAG NUMBERS SHOWN ON THIS DRAWING ARE INDICATED BY THE FIRST NUMBER (1) UNLESS OTHERWISE NOTED. SEE GENERAL NOTE 3 ON SHEET 000000
 6. ALL INSTRUMENTS ON THIS P&ID ARE SHOWN
 7. THE MOTOR OF EACH NEW MOTOR-DRIVEN PUMP CONTAINS A TEMPERATURE ELEMENT
 8. ALL INSTRUMENTS AND PIPING SHALL BE SHOWN ON THIS P&ID FOR ANY LOCATION OF THIS P&ID (UNIT 2) USE UNIT 1 LOCATION NUMBER FOR PIPING AND INSTRUMENTS EQUIPMENT ETC. REFER TO UNIT 1 FOR THE NUMBER OF PIPING

REFERENCES:

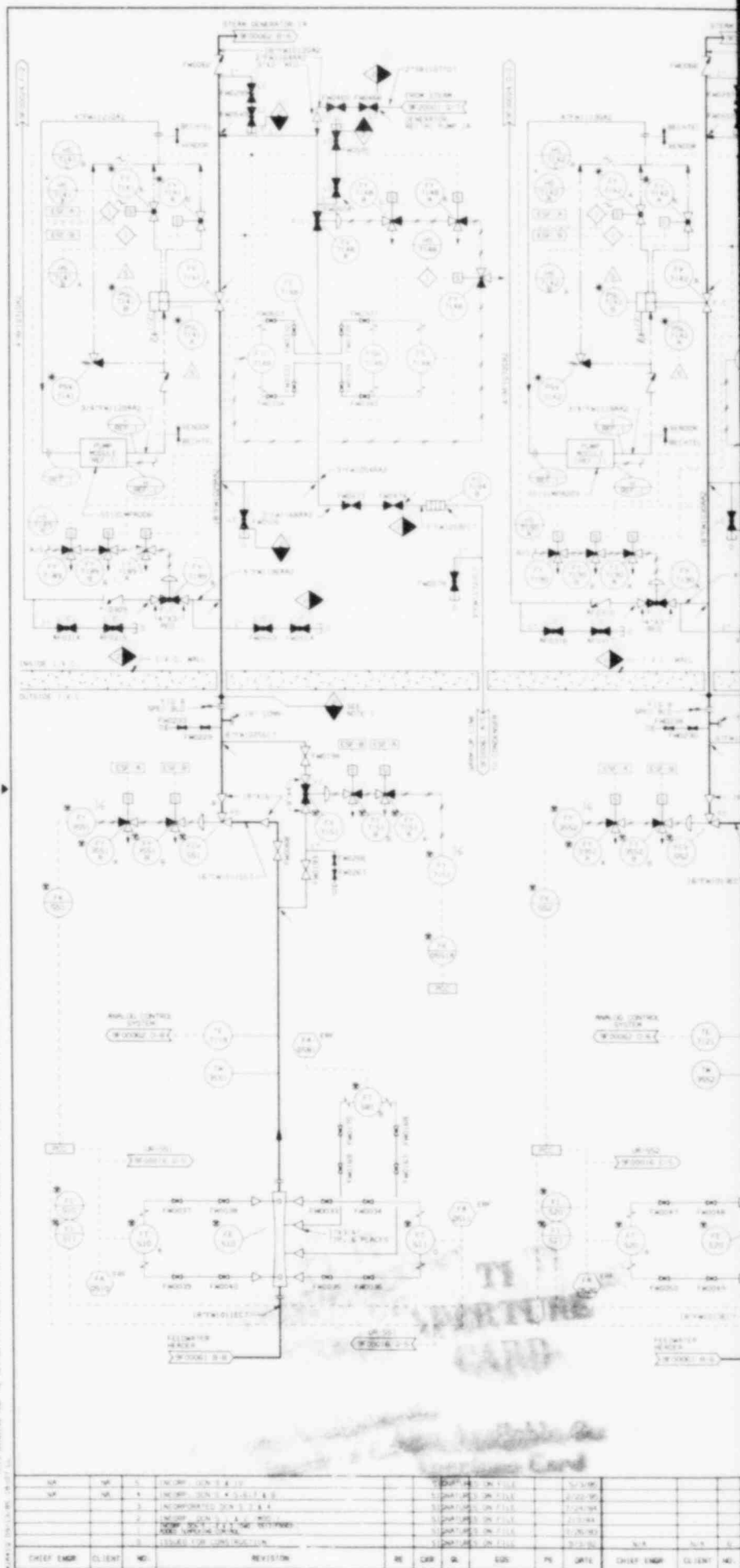
1. STANDARD MILL WHITE (MILL) NOTE SHEET & CHANGES
2. TUBING DRAWING OUTLINE (MILL) NOTE SHEET & CHANGES
3. FOR PIPING & INSTRUMENT TAGS SEE DRAWING 000000 & 000001

4. DELETED
5. BOTTOM OF THE PIPE SHALL BE ABOVE 5.0' 0"

THIS DRAWING SUPERCEDES BAR DRAWING 55142F0024-D & CHANGES THE UNIT DESIGNATOR OF DRAWING 55141F0024.

<p>BECHTEL ENERGY CORPORATION HOUSTON, TEXAS</p>				<p>PIPING & INSTRUMENTATION DIAGRAM RADIALLY FEEDWATER</p>			
<p>HOUSTON LIGHTING & POWER CO. SOUTH TEXAS PROJECT</p>				<p>SCALE NONE</p>	<p>JOB NO. 14928</p>	<p>DRAWING NO. 55143F00024</p>	<p>REV. 6</p>

8602050017-03

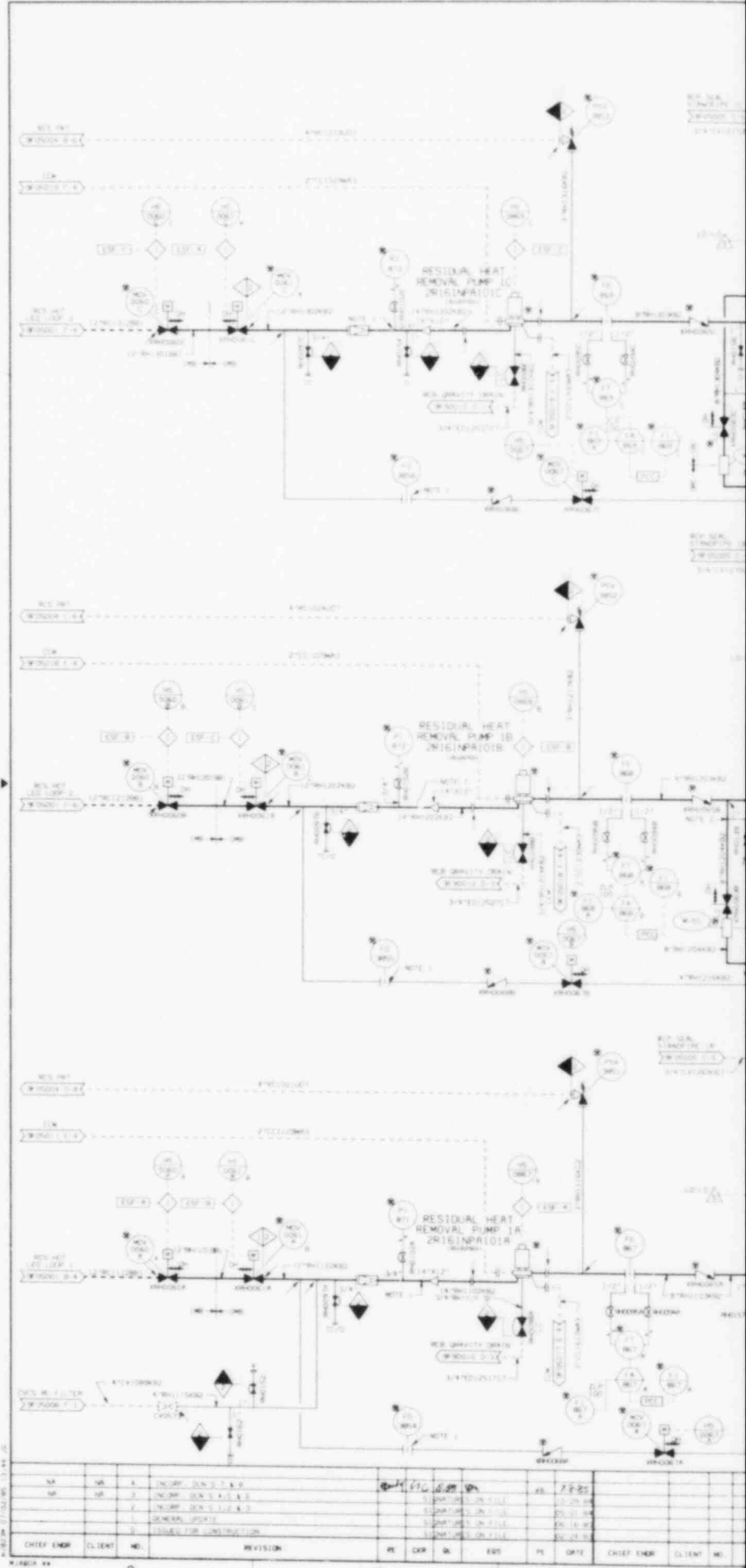
[illegible]



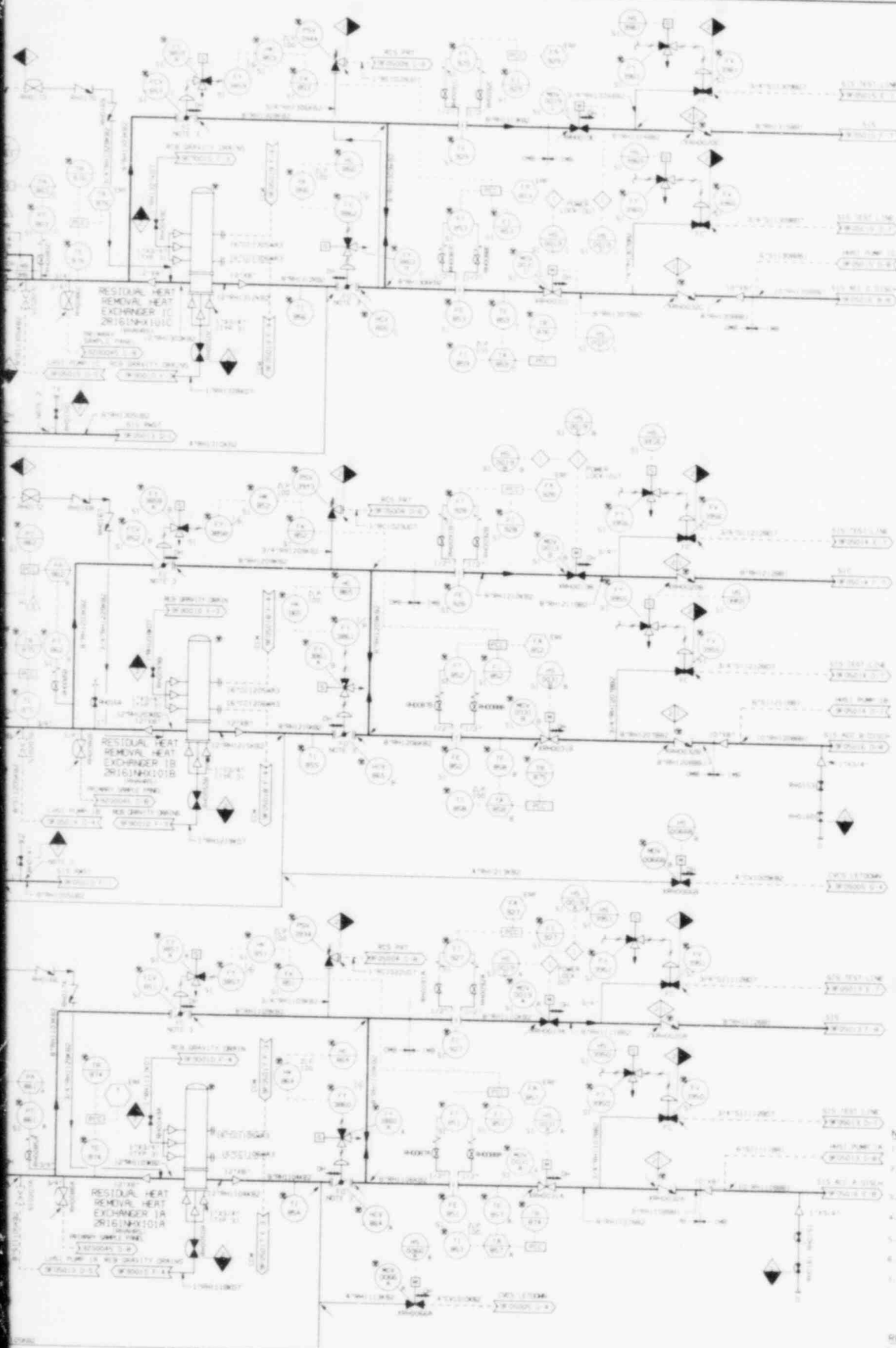
SCALE	SHEET NO.	DRAWING NO.	REV.
	14928	SHEET 0001	6

2 8502050011 -04

THIS DRAWING AND THE DESIGN IT COVERS ARE THE PROPERTY OF BENTLEY. THEY ARE NOT TO BE REPRODUCED, COPIED, LOANED, EXCHANGED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF BENTLEY. ANY VIOLATION OF THESE TERMS WILL BE PROSECUTED TO THE FULL EXTENT OF THE LAW.



NO.	DATE	BY	CHKD.	REVISION	RE	EXP	DL	END	PL	DATE	CHKD.	CLIENT	NO.
1	10/1/88	NA	NA	1. INCORP. DESIGN 1A & B									
2	10/1/88	NA	NA	2. INCORP. DESIGN 1B & C									
3	10/1/88	NA	NA	3. GENERAL UPDATE									
4	10/1/88	NA	NA	4. DESIGN FOR CONSTRUCTION									
5	10/1/88	NA	NA	5. DESIGN FOR CONSTRUCTION									



NOTES:

1. SEE A REVISION SHEET FOR CHANGES TO THIS DRAWING.
2. LOCATE TEST CONNECTION AS CLOSE AS POSSIBLE TO VALVE OR PUMP. TEST CONNECTION ATTACHED TO OUTLET OF PUMP OR VALVE. SEE A REVISION SHEET FOR CHANGES.
3. INSTRUMENTS ON THIS DRAWING ARE IDENTIFIED BY TAG NO. AND SYMBOL. SEE A REVISION SHEET FOR CHANGES.
4. LOCATE INSTRUMENTS AS CLOSE AS POSSIBLE TO THE INSTRUMENT CONNECTION.
5. ALL INSTRUMENTS ON THIS DRAWING ARE IDENTIFIED BY TAG NO. AND SYMBOL. SEE A REVISION SHEET FOR CHANGES.
6. ALL INSTRUMENTS ON THIS DRAWING ARE IDENTIFIED BY TAG NO. AND SYMBOL. SEE A REVISION SHEET FOR CHANGES.
7. UNLESS OTHERWISE NOTED, ALL INSTRUMENTS ON THIS DRAWING ARE IDENTIFIED BY TAG NO. AND SYMBOL. SEE A REVISION SHEET FOR CHANGES.

REFERENCES:

1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWING NO. 160000-1-1-1.
2. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWING NO. 160000-1-1-1.



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

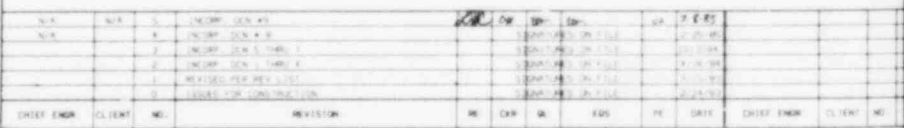
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

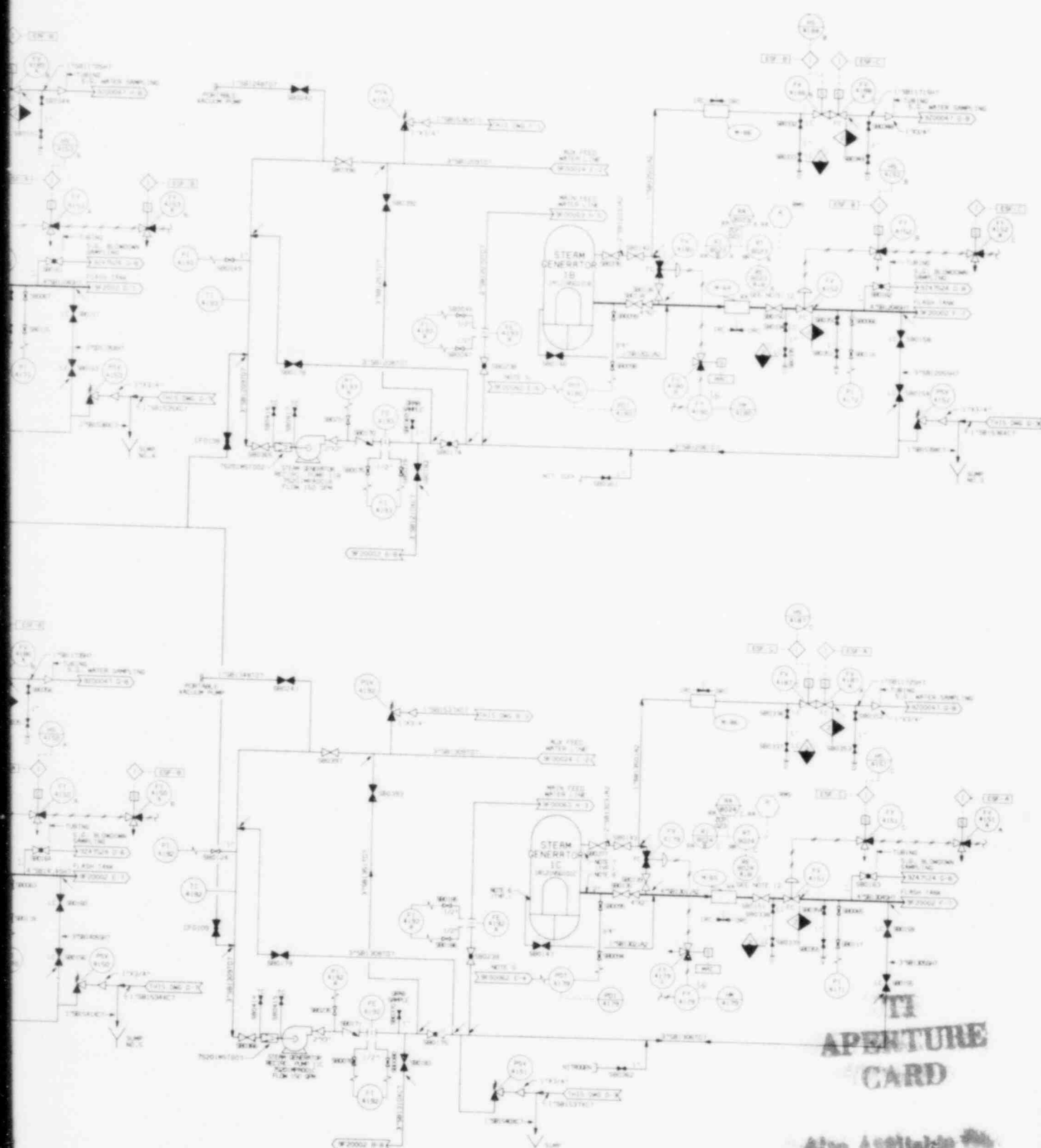
PIPING AND INSTRUMENTATION DIAGRAM
RESIDUAL HEAT REMOVAL SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
	14920	SR160P20000	4

REVISION	BY	CHK	DR	DATE
5				
4				
3				
2				
1				

8602050017-05





NOTES:

1. FOR OPERATING AND MAINTENANCE INFORMATION, SEE THE INSTRUMENTATION AND CONTROL SYSTEMS MANUAL.
2. THIS PIPING AND INSTRUMENTATION DIAGRAM IS A SUMMARY OF THE DESIGN AND IS NOT A CONSTRUCTION DOCUMENT.
3. ALL INSTRUMENTATION SHALL BE AS SHOWN IN THIS DOCUMENT AND SYSTEM DESCRIPTION.
4. ALL INSTRUMENTATION SHALL BE AS SHOWN IN THIS DOCUMENT AND SYSTEM DESCRIPTION.
5. THIS DOCUMENT IS THE PROPERTY OF BECHTEL ENERGY CORPORATION AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.

TI
APERTURE
CARD

Also Available in
Aperture Card

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM
STEAM GENERATOR BLOWDOWN SYSTEM

REVISION	BY	CHK	DL	ESD	PE	DATE
5						
4						
3						
2						
1						


SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	55209F20001	S

602050017-06

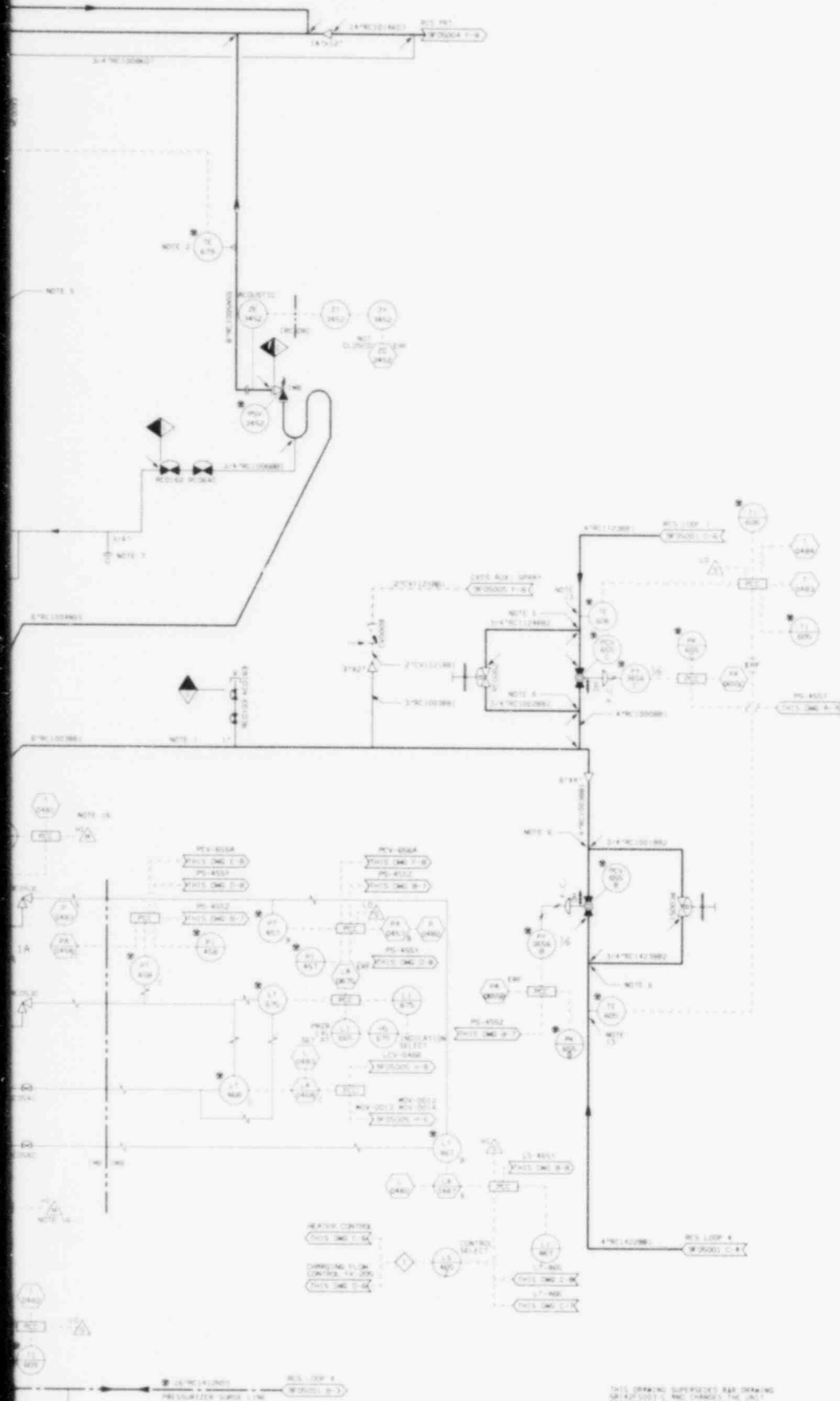
© 2000 Blackwell Science Ltd

Also Available On
Aperture Card
Number 1-190

© 2005 Blackwell Publishing Ltd, *Journal of Internal Medicine* 258: 145–152

							 BECHTEL ENERGY CORPORATION HOUSTON, TEXAS	PIPING AND INSTRUMENTATION DIAGRAM RES. PRIMARY COOLANT LOOP			
								HOUSTON LIGHTING & POWER CO. SOUTH TEXAS PROJECT	SCALE NONE	JOB NO. 14828	DRAWING NO. SR149F05001
REVISION	RE	EXP	GL	EQS	PE	DATE					

8602²050017-07



PI APERTURE CARD

Also Available for Aperture Card

NOTES:

1. SLOPE SPRAY PIPE DOWNWARD TO PROVIDE WATER SEAL BETWEEN PRESSURIZER AND SPRAY VALVE. SPRAY VALVE SHOULD BE AT LEAST 10 FEET BELOW TOP OF PRESSURIZER.
2. STAY ON TEMP. MOUNTED ATD'S LOCATED AT BOTTOM OF P. PIPE.
3. SLOPE PIPE DOWNWARD TO PROVIDE WATER SEAL BETWEEN PRESSURIZER AND MOTOR OPERATED RELIEF VALVES.
4. LOCATE APPROPRIATELY MIDWAY BETWEEN LOOP AND PRESSURIZER.
5. DRAIN LINES TO BE SLOPED DOWN FROM LOOP SEALS TO CONNECT WITH P.A.T. HEADER LINE.
6. PROVIDE 2" DIA. 20' FLOW RESTRICTOR AND ONE WHOSOLE TO DRAIN FROM REL. TO SEAL AT RESTRICTOR.
7. TYPON HOSE TO BE INSTALLED AT THIS POINT TO HEAT PRESSURIZER DURING DRAINING & FILLING.
8. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS PAID. FOR APPLICATION OF THIS PAID TO UNIT 2, USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING AND INSTRUMENTS EQUIPMENT. ETC. REFER TO DRAWING 501000000 AND 501000000 FOR IDENTIFICATION NUMBER OF ALL S.
9. DIGITAL PRESSURE INDICATOR TO BE CONNECTED TO THIS LINE DOWN STREAM OF THE SW. HEAT EXCHANGER.
10. HOSE TO BE CONNECTED DURING RCS VACUUM DEPRESSURING OPERATIONS.
11. ALL INSTRUMENTS SHOWN ON THIS PAID HAVE SYSTEM DESIGNATION W.C.
12. ALL INSTRUMENTS SHOWN ON THIS PAID HAVE SEPARATION GROUP "W" (PRESS. GROUPING) NOTED.
13. LOCATE WETS IN WATER SEAL AND AS CLOSE AS POSSIBLE TO THE CONTROL VALVE BUT UPSTREAM OF BYPASS LINE CONNECTION.
14. REL. COIL COMPRESSURE NOTIFICATION ACTUATION SWITCH (FROM BLOCK 1).
15. FOR PRESSURIZER PRESSURE OR LEVEL DERIVED ANNUNCIATION AND COMPUTER INPUTS SEE WESTINGHOUSE PROCESS CONTROL & DATA LOGGING UNIT - P. 1011118 AND FUNCTIONAL DIAGRAMS DMS. STANDED DMS. 8 AND 12.
16. ANNUNCIATORS OF PRESSURIZER TEMPERATURE INSTRUMENT CHANNELS 801 AND 802 ARE COMBINED IN A SINGLE WINDOW.
17. A 1/2" DIA. 20' FLOW RESTRICTOR IS PROVIDED BY "B" TO ALLOW FOR A 1/2" DIA. AREA BETWEEN 801 AND 802.

REFERENCES:

1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWINGS 500000 & 500000.
2. WESTINGHOUSE DMS. NO. 1201214 SUB 1-1011 2 OF 3.

THIS DRAWING SUPERSEDES BAR DRAWING 501000000 AND CHANGES THE UNIT DESIGNATION OF DRAWING 501000000.

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

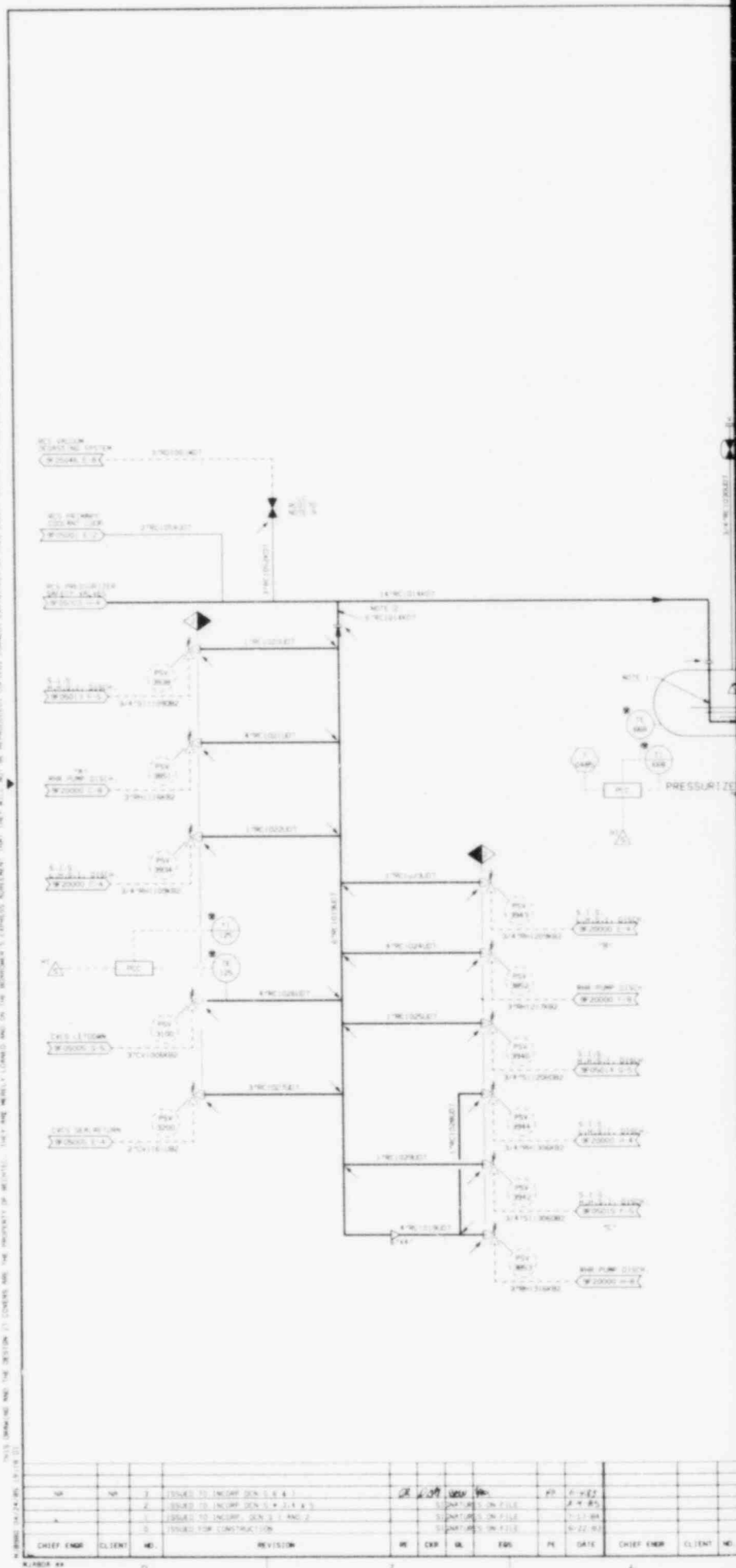
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

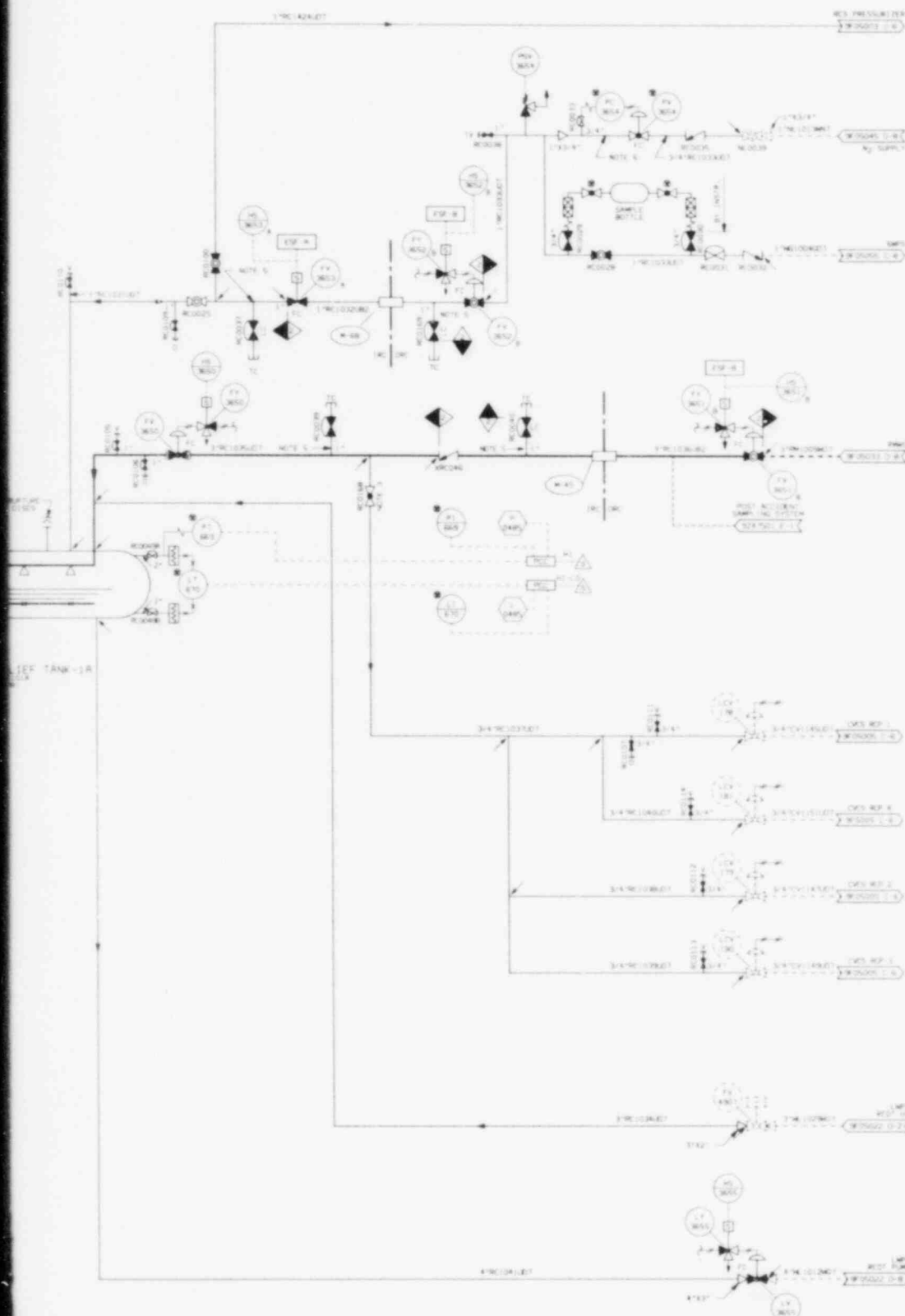
PIPING AND INSTRUMENTATION DIAGRAM
RCS PRESSURIZER

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR149F05003	3

REVISION	BY	CHK	APP	DATE
5				
4				
3				

B602050017-08

[illegible]



THE APERTURE CARD

Also Available On
Apostrophe Card

6074

- [illegible]

1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 26

1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWING OF 00001 & OF 00002.
2. WESTINGHOUSE DRAWING NO. 120718 SUB 7
Set 2 of 3

THIS DRAWING SUPPOSEDLY WAS DRAWN ON 4/25/2004 AND CHANGED THE DATE OF SIGNATURE OF DRAWING 504-175000-1



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

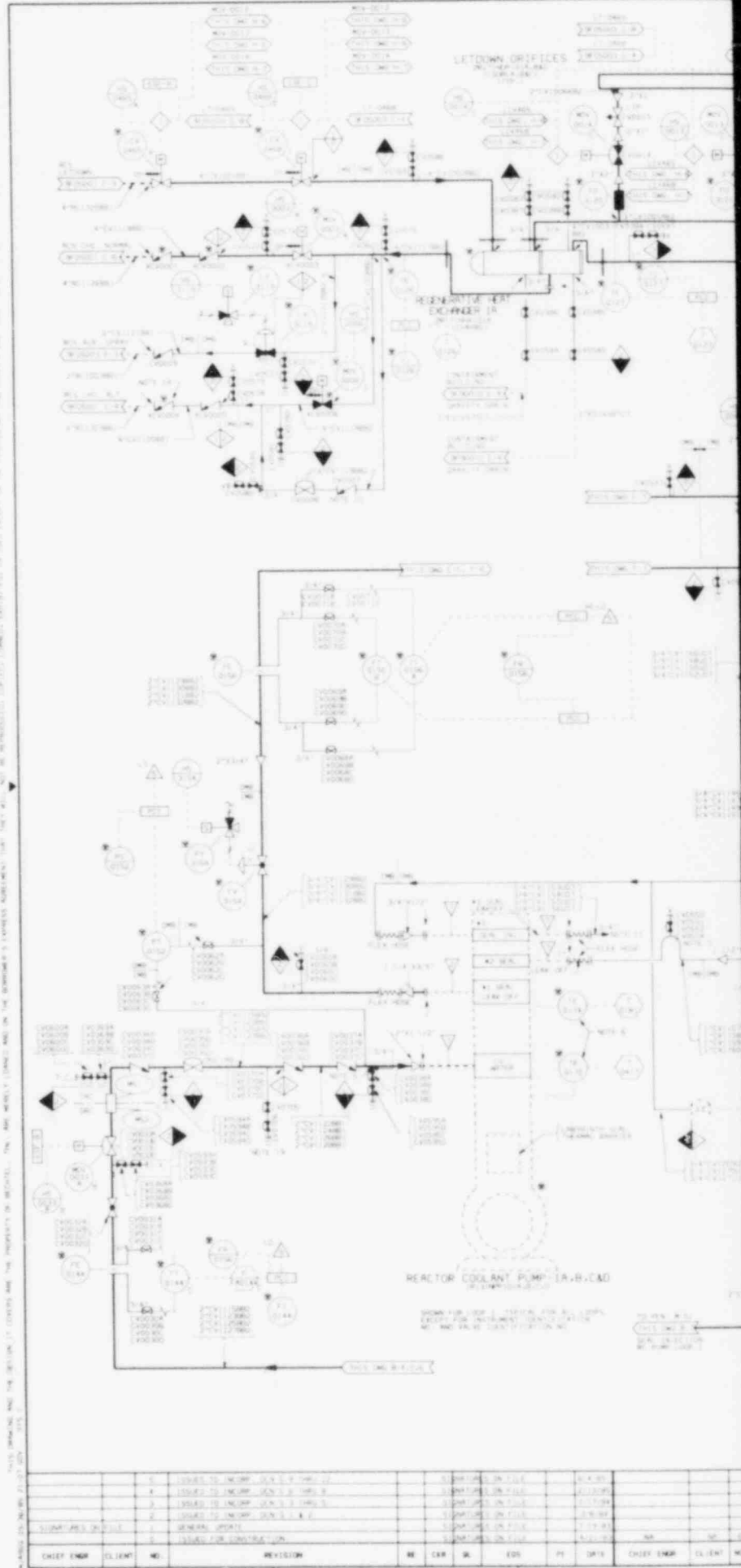
PIPING AND INSTRUMENTATION DIAGRAM
RCS PRESSURIZER RELIEF TANK

SCALE	JOB NO.	DRAWING NO.	REV
	14928	SR149F05004	3

REVISION	BY	CHKD	QA	ESG	PE	DATE
----------	----	------	----	-----	----	------

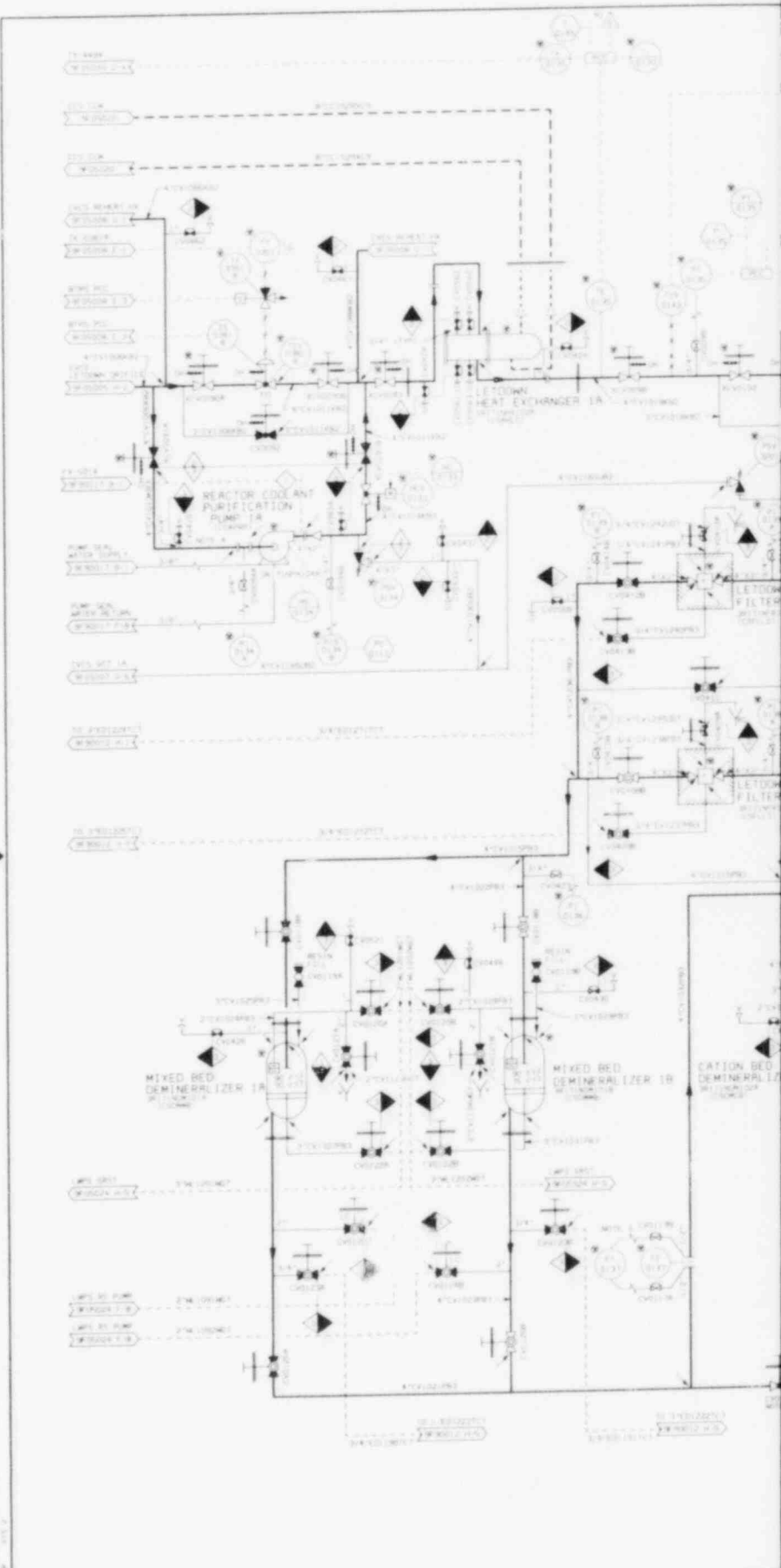
8602050017-09

THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BENTON, FRANK & WARELY, INC. AND WILL BE LOANED TO THE CLIENT. IT IS NOT TO BE REPRODUCED, COPIED, LOANED, RENTED, OR IN ANY MANNER USED WITHOUT THE WRITTEN CONSENT OF BENTON, FRANK & WARELY, INC.

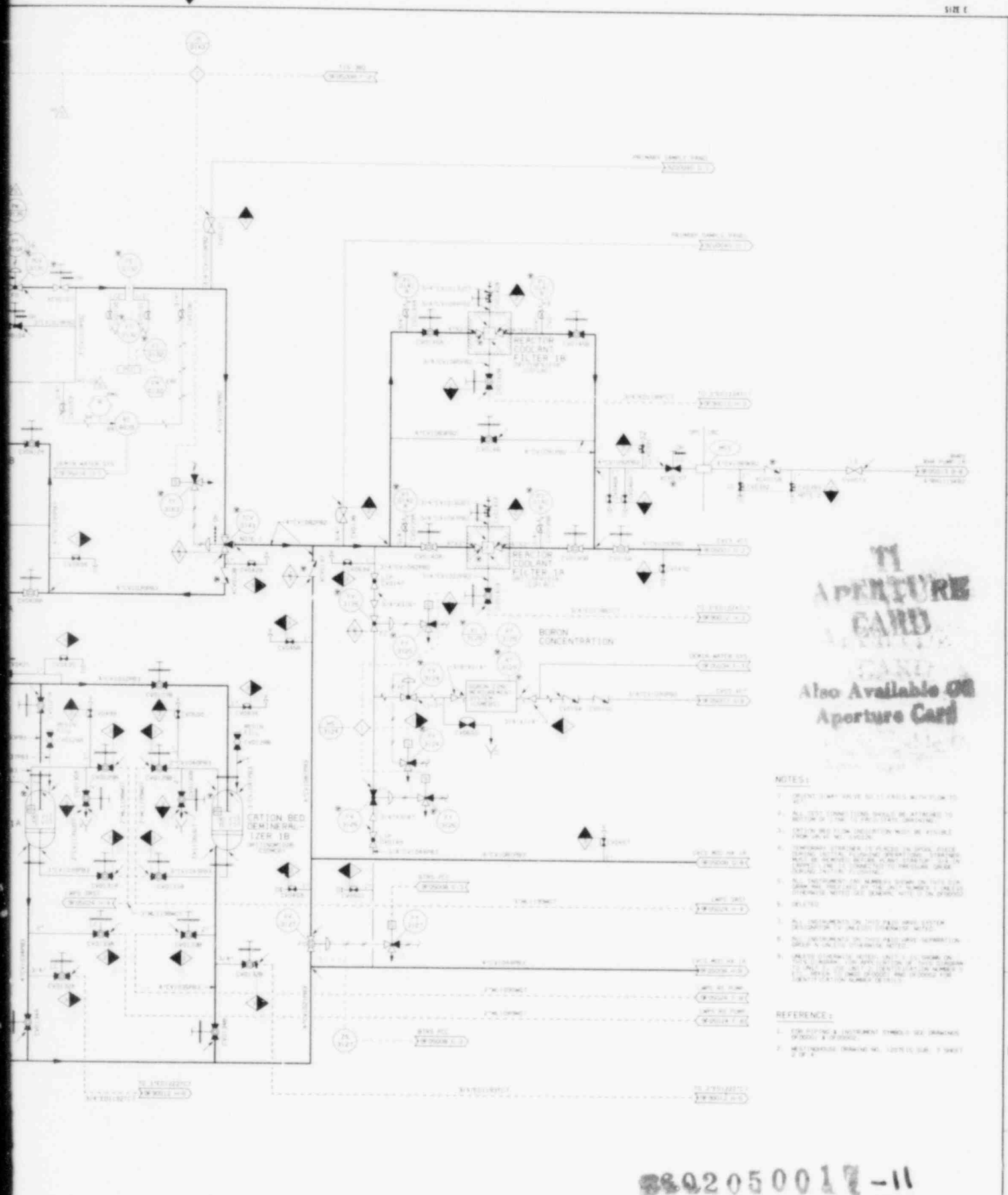


REVISION	NO.	DATE	BY	CHKD	APP'D	REMARKS
1	1	10/1/58	J. H. B.			ISSUED FOR CONSTRUCTION
2	2	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
3	3	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
4	4	10/1/58	J. H. B.			LEADEN DRIFT TANK
5	5	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
6	6	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
7	7	10/1/58	J. H. B.			LEADEN DRIFT TANK
8	8	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
9	9	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
10	10	10/1/58	J. H. B.			LEADEN DRIFT TANK
11	11	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
12	12	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
13	13	10/1/58	J. H. B.			LEADEN DRIFT TANK
14	14	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
15	15	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
16	16	10/1/58	J. H. B.			LEADEN DRIFT TANK
17	17	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
18	18	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
19	19	10/1/58	J. H. B.			LEADEN DRIFT TANK
20	20	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
21	21	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
22	22	10/1/58	J. H. B.			LEADEN DRIFT TANK
23	23	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
24	24	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
25	25	10/1/58	J. H. B.			LEADEN DRIFT TANK
26	26	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
27	27	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
28	28	10/1/58	J. H. B.			LEADEN DRIFT TANK
29	29	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
30	30	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
31	31	10/1/58	J. H. B.			LEADEN DRIFT TANK
32	32	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
33	33	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
34	34	10/1/58	J. H. B.			LEADEN DRIFT TANK
35	35	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
36	36	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
37	37	10/1/58	J. H. B.			LEADEN DRIFT TANK
38	38	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
39	39	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
40	40	10/1/58	J. H. B.			LEADEN DRIFT TANK
41	41	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
42	42	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
43	43	10/1/58	J. H. B.			LEADEN DRIFT TANK
44	44	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
45	45	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
46	46	10/1/58	J. H. B.			LEADEN DRIFT TANK
47	47	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
48	48	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
49	49	10/1/58	J. H. B.			LEADEN DRIFT TANK
50	50	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
51	51	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
52	52	10/1/58	J. H. B.			LEADEN DRIFT TANK
53	53	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
54	54	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
55	55	10/1/58	J. H. B.			LEADEN DRIFT TANK
56	56	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
57	57	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
58	58	10/1/58	J. H. B.			LEADEN DRIFT TANK
59	59	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
60	60	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
61	61	10/1/58	J. H. B.			LEADEN DRIFT TANK
62	62	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
63	63	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
64	64	10/1/58	J. H. B.			LEADEN DRIFT TANK
65	65	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
66	66	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
67	67	10/1/58	J. H. B.			LEADEN DRIFT TANK
68	68	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
69	69	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
70	70	10/1/58	J. H. B.			LEADEN DRIFT TANK
71	71	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
72	72	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
73	73	10/1/58	J. H. B.			LEADEN DRIFT TANK
74	74	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
75	75	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
76	76	10/1/58	J. H. B.			LEADEN DRIFT TANK
77	77	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
78	78	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
79	79	10/1/58	J. H. B.			LEADEN DRIFT TANK
80	80	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
81	81	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
82	82	10/1/58	J. H. B.			LEADEN DRIFT TANK
83	83	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
84	84	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
85	85	10/1/58	J. H. B.			LEADEN DRIFT TANK
86	86	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
87	87	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
88	88	10/1/58	J. H. B.			LEADEN DRIFT TANK
89	89	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
90	90	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
91	91	10/1/58	J. H. B.			LEADEN DRIFT TANK
92	92	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
93	93	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
94	94	10/1/58	J. H. B.			LEADEN DRIFT TANK
95	95	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
96	96	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
97	97	10/1/58	J. H. B.			LEADEN DRIFT TANK
98	98	10/1/58	J. H. B.			REACTOR COOLANT PUMP - IN-B-CAD
99	99	10/1/58	J. H. B.			REACTOR HEAT EXCHANGER
100	100	10/1/58	J. H. B.			LEADEN DRIFT TANK

THIS DRAWING AND THE DESIGN IT CONTAINS ARE THE PROPERTY OF BENTLEY, THEY ARE HEREBY LOANED AND ON THE UNDERTANDING OF EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, REPRODUCED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF BENTLEY. ANY VIOLATION OF THIS AGREEMENT WILL BE CONSIDERED A BREACH OF CONTRACT AND WILL BE SUBJECT TO LEGAL ACTION.



NO.	REV.	DESCRIPTION	DATE	BY	CHKD.	APP'D.	STATUS
1	1	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
2	2	GENERAL UPDATE	11/11/80	J. L. BENTLEY			ISSUED
3	3	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
4	4	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
5	5	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
6	6	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
7	7	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
8	8	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
9	9	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED
10	10	ISSUED FOR CONSTRUCTION	11/11/80	J. L. BENTLEY			ISSUED



TI APERTURE CARD
Also Available on Aperture Card

- NOTES:**
1. INSTRUMENTS ARE TO BE PROVIDED BY THE USER.
 2. ALL TEST CONNECTIONS SHOULD BE ATTACHED TO BOTTOM OF LINE TO PREVENT DRAINING.
 3. CATION BED DEMINERALIZER 12ER 1B IS TO BE PROVIDED BY THE USER.
 4. DEMINERALIZED WATER IS TO BE PROVIDED BY THE USER.
 5. REACTION COOLANT IS TO BE PROVIDED BY THE USER.
 6. BORON CONCENTRATION IS TO BE PROVIDED BY THE USER.
 7. ALL INSTRUMENTS ON THIS PIPING SYSTEM ARE TO BE PROVIDED BY THE USER.
 8. ALL INSTRUMENTS ON THIS PIPING SYSTEM ARE TO BE PROVIDED BY THE USER.
 9. ALL INSTRUMENTS ON THIS PIPING SYSTEM ARE TO BE PROVIDED BY THE USER.

- REFERENCE:**
1. PIPING & INSTRUMENT SYMBOLS SEE DRAWINGS 100000 & 100001.
 2. INSTRUMENT DRAWING NO. 100000 & 100001.

8802050017-11

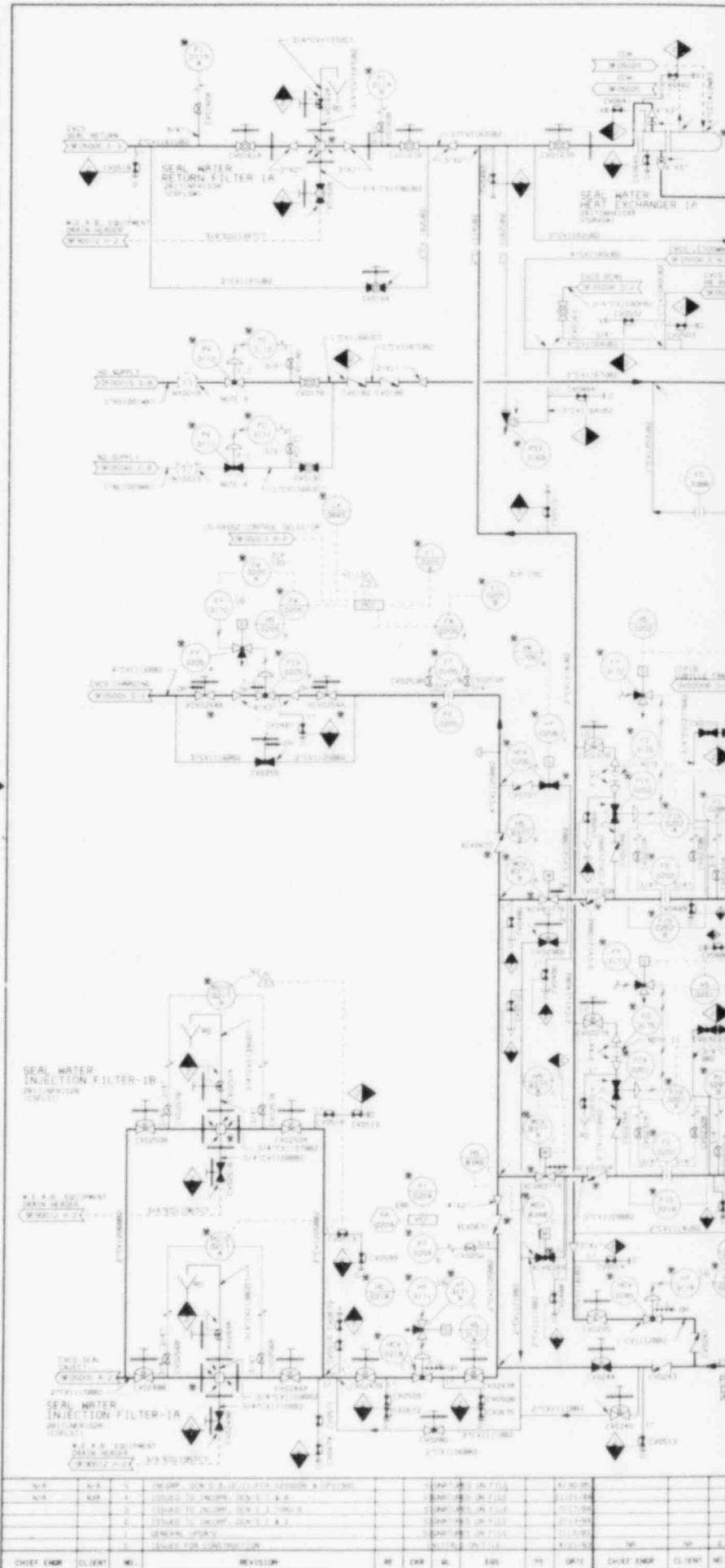
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
CHEMICAL AND VOLUME CONTROL SYSTEM

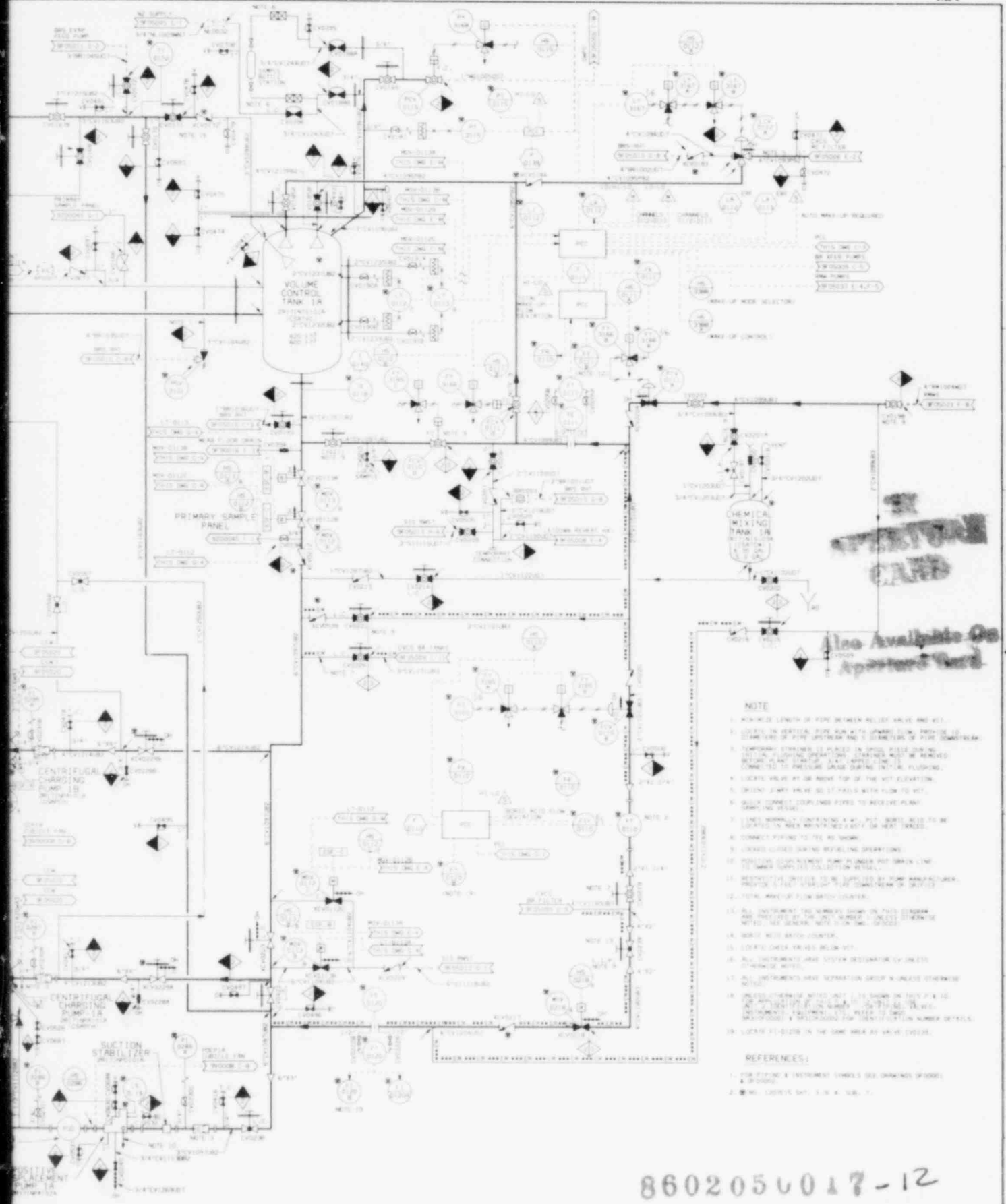
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR17905006	3

REVISION	BY	CHK	REV	DATE
5				
4				
3				
2				
1				

THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BECHTEL. THEY ARE HEREBY LOANED TO YOU BY THE BUREAU OF RESEARCH AND ARE NOT TO BE REPRODUCED, COPIED, LOANED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF BECHTEL. THE BUREAU OF RESEARCH AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BECHTEL. THEY ARE HEREBY LOANED TO YOU BY THE BUREAU OF RESEARCH AND ARE NOT TO BE REPRODUCED, COPIED, LOANED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF BECHTEL.



NO.	CHIEF ENGR.	CLIENT	NO.	REVISION	NO.	CHIEF ENGR.	CLIENT	NO.
1			1	1	1			1
2			2	2	2			2
3			3	3	3			3
4			4	4	4			4
5			5	5	5			5
6			6	6	6			6
7			7	7	7			7
8			8	8	8			8
9			9	9	9			9
10			10	10	10			10



NOTE

1. MINIMUM LENGTH OF PIPE BETWEEN RELIEF VALVE AND VIT.
2. LOCATE IN VERTICAL PIPE RUN WITH UPWARD FLOW, PROVIDE 10' CLEARANCE OF PIPE UPSTREAM AND 5' DOWNSTREAM OF PIPE DOWNSTREAM.
3. THERMOWELL THERMISTOR IS PLACED IN SPILL FLOW LINE, BEFORE ANY STARTUP, SHUT DOWN, OR MAINTENANCE WORK BEING PERFORMED TO PREVENT FLAME DURING THE FLUSHING.
4. LOCATE VALVE AT OR ABOVE TOP OF THE VIT ELEVATION.
5. DRIVEN 2" VIT VALVE, 80' ST. PADS WITH FLOW TO VIT.
6. VALVE CORRECT COUPLING PIPES TO AVOID PLANT DRAINING VIT.
7. LINES NORMALLY CONTAINING A VIT, BUT NOT BEING USED TO BE LOCATED IN AREA MAINTAINED AS VIT OR HEAT TRACES.
8. CORRECT PIPING TO THE AS SHOWN.
9. LINES CLOSED DURING REFILLING OPERATIONS.
10. POSITION DISCONNECT PUMP PLUNDER PIPING LINE TO MAIN SUPPLY COLLECTION VIT.
11. INSTRUMENTS (EXCEPT VIT) ARE SUPPLIED BY THE MANUFACTURER, PROVIDED A VIT - THERMOWELL THERMISTOR IS SHOWN.
12. TOTAL MAKE-UP FLOW BATCH COUNTER.
13. ALL INSTRUMENTS AND THERMOWELL THERMISTORS IN THIS SYSTEM ARE PROVIDED BY THE VIT, NORMALLY, THERMOWELL THERMISTOR IS NOT, SEE GENERAL NOTE 10 ON SHEET 1.
14. MAKE VIT BATCH COUNTER.
15. LOCATE CHECK VALVES BELOW VIT.
16. ALL INSTRUMENTS HAVE SYSTEM DESIGNATION (VIT) UNLESS OTHERWISE NOTED.
17. ALL INSTRUMENTS HAVE SEPARATION GROUP (VIT) UNLESS OTHERWISE NOTED.
18. INSTRUMENTS NOTED UNIT (VIT) SHOWN ON THIS P&ID ARE SUPPLIED BY THE VIT, NORMALLY, THERMOWELL THERMISTOR IS NOT, SEE GENERAL NOTE 10 ON SHEET 1.
19. LOCATE VIT-BATCH IN THE SAME AREA AS VIT-BATCH.

REFERENCES:

1. FOR STOPPING & INSTRUMENT SYMBOLS SEE DRAWING 0100001 & 0100002.
2. VIT - LOCATED VIT, 1/2" X 1/2" X 1/2" VIT.

8602050017-12

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

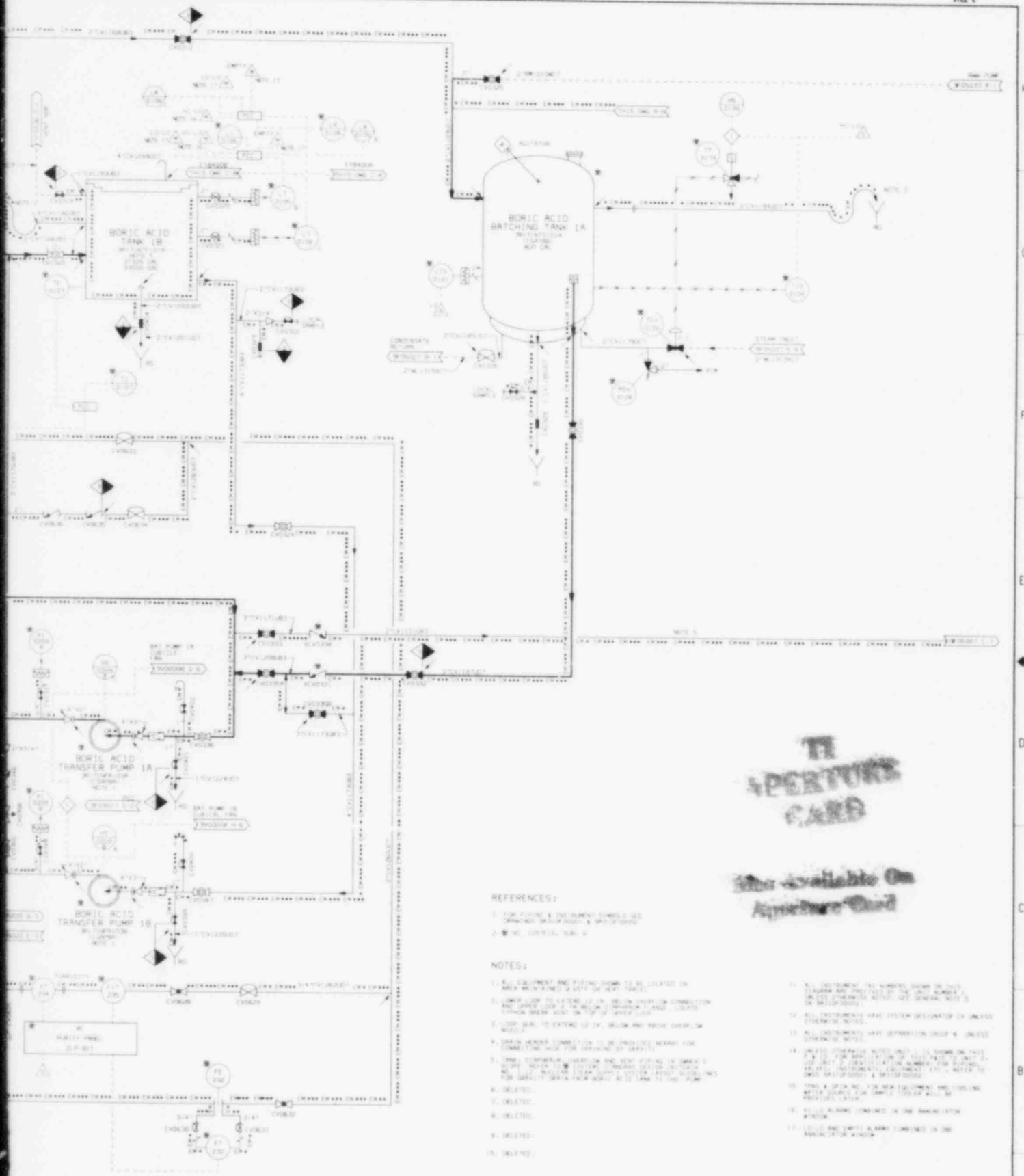
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
CHEMICAL AND VOLUME CONTROL SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
AS SHOWN	14926	SR 1798/05007	6

REVISION	BY	CHK	DATE
1

SIZE C



**PI
APERTURE
CARD**

**Not Available On
Aperture Card**

REFERENCES:

1. PIPING & INSTRUMENT SYMBOLS, 2ND EDITION, 1965, 1966
2. IEC, SYMBOLS, 1965

NOTES:

1. ALL EQUIPMENT AND PIPING SHALL BE LOCATED ON AREA WITHIN 10' OF 10' HEAT TREAT.
2. LOWER LOOP TO EXTEND 12" IN BELOW HEAT TREAT CONNECTION AND UPPER LOOP TO EXTEND 12" IN BELOW HEAT TREAT CONNECTION. UPPER BREAK VENT ON TOP OF UPPER LOOP.
3. TOP BEAR TO EXTEND 12" IN BELOW AND ABOVE OVERFLOW WHEEL.
4. DRAIN WHEEL CONNECTION TO BE PROVIDED BEARING FOR CONNECTION WHEEL FOR DRAINING BY GRAVITY.
5. TANK, OVERFLOW, OVERFLOW AND VENT PIPING TO DRAIN TO DRAIN WHEEL TO BE PROVIDED BEARING FOR CONNECTION WHEEL FOR DRAINING BY GRAVITY.
6. DELETED.
7. DELETED.
8. DELETED.
9. DELETED.
10. DELETED.

11. ALL INSTRUMENT TAG NUMBERS SHOWN ON THIS DRAWING ARE PRELIMINARY. THE FINAL TAG NUMBERS WILL BE DETERMINED BY THE INSTRUMENT TAG NUMBERS.
12. ALL INSTRUMENTS HAVE SYSTEM DESCRIPTION OR UNLESS OTHERWISE NOTED.
13. ALL INSTRUMENTS HAVE SEPARATION DROOP & UNLESS OTHERWISE NOTED.
14. UNLESS OTHERWISE NOTED, ALL INSTRUMENTS SHALL BE PROVIDED WITH A 1/2" NPT CONNECTION TO THE INSTRUMENT TAG NUMBERS.
15. TANK & DRAIN NO. 200 NEW EQUIPMENT AND COOLING WATER SOURCE FOR TANKS 100 & 200 WILL BE PROVIDED LATER.
16. ALL ALARMS COMING IN THE ANNUNCIATOR WINDOW.
17. LOUPE AND WHITE ALARMS COMING IN THE ANNUNCIATOR WINDOW.

8602050017-13



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
CHEMICAL AND VOLUME CONTROL SYSTEM

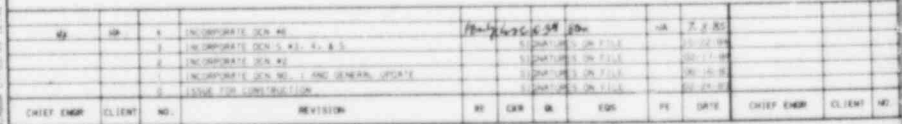
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SP179F05009	6

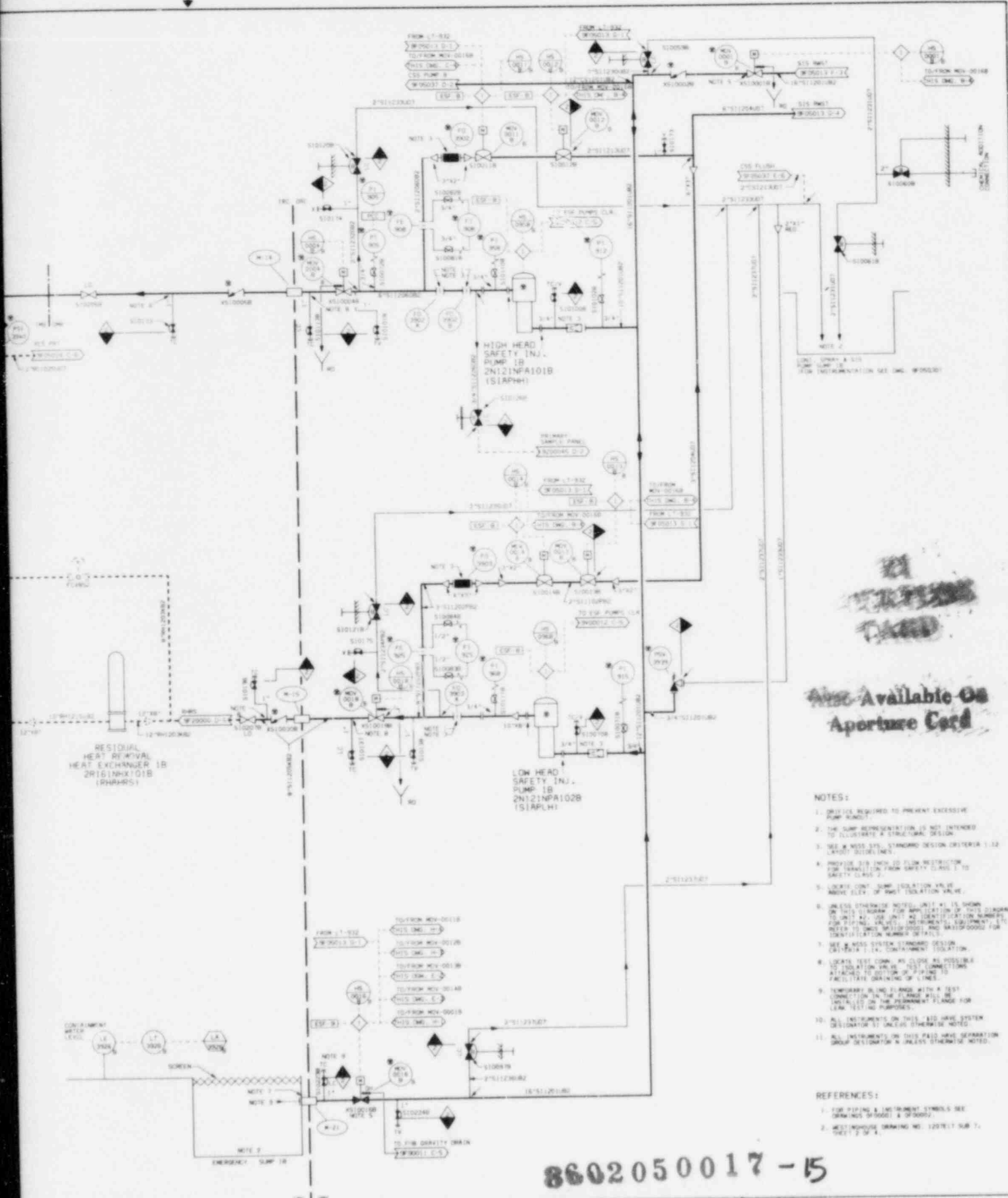
REVISION	BY	CHK	APP	DATE
5				
4				
3				
2				
1				



12

W. J. A. J. B. 94





Also Available On
Aperture Card

- NOTES:**
1. NOTICE REQUIRED TO PREVENT EXCESSIVE PUMP RUNTIME.
 2. THE PUMP REPRESENTATION IS NOT INTENDED TO ILLUSTRATE A STRUCTURAL DESIGN.
 3. SEE W. MOSS SYS. STANDARD DESIGN CRITERIA 1.12 LAYOUT GUIDELINES.
 4. PROVIDE 3/8" INCH OR LARGER RESTRICTOR FOR ISOLATION VALVE FOR SAFETY CLASS 1 TO SAFETY CLASS 2.
 5. LOCATE CONT. SLURRY ISOLATION VALVE ABOVE SLURRY OF PUMP ISOLATION VALVE.
 6. UNLESS OTHERWISE NOTED, UNIT #1 IS SHOWN ON THIS DRAWING. FOR APPLICATION OF THIS DIAGRAM TO UNIT #2, USE UNIT #2 IDENTIFICATION NUMBERS FOR PIPING, INSTRUMENTS, AND INSTRUMENT LTV. REFER TO MOSS 3P1000000 AND 3P1000000 FOR IDENTIFICATION NUMBER DETAILS.
 7. SEE W. MOSS SYSTEM STANDARD DESIGN CRITERIA 1.14, CONTAINMENT ISOLATION.
 8. LOCATE TEST COUPLER AS CLOSE AS POSSIBLE TO ISOLATION VALVE. TEST CONNECTIONS ATTACHED TO BOTTOM OF PIPING TO FACILITATE DRAINING OF LINES.
 9. TEMPORARY BLIND PLUGS WITH A TEST CONNECTION IN THE PLUGS MUST BE INSTALLED ON THE PERMANENT PLANS FOR LEAK TESTING PURPOSES.
 10. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM DESIGNATOR 11 UNLESS OTHERWISE NOTED.
 11. ALL INSTRUMENTS ON THIS P&ID HAVE SEPARATION GROUP DESIGNATOR 11 UNLESS OTHERWISE NOTED.

- REFERENCES:**
1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWINGS 3P00001 & 3P00002.
 2. WESTINGHOUSE DRAWING NO. 120711 SUB 7, SHEET 2 OF 4.

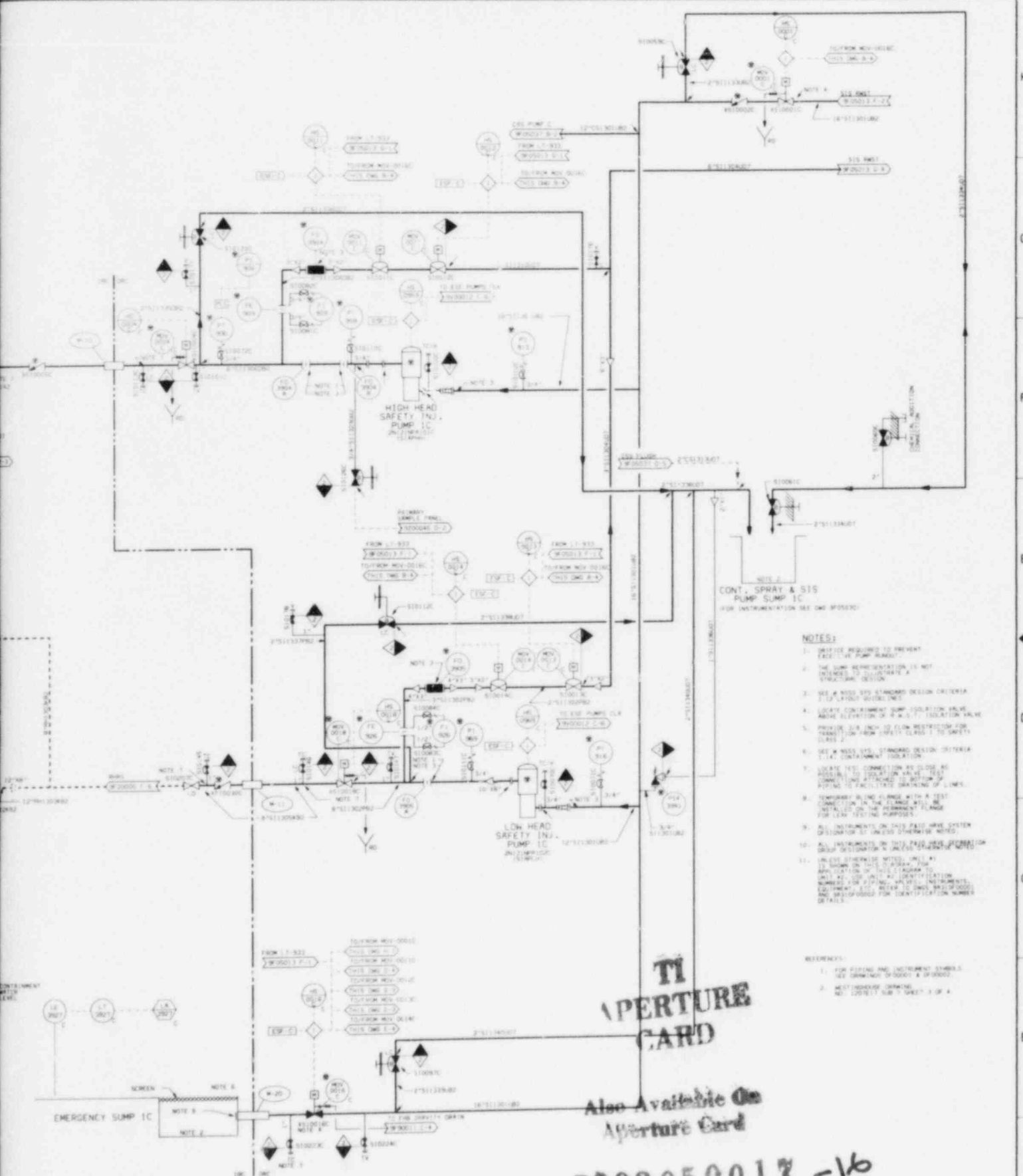
8602050017-15

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM SAFETY INJECTION SYSTEM			
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	SN129F05014	4

REVISION	BY	CHK	APP	DATE
5				
4				
3				
2				
1				

[illegible]



NOTES:

1. SEE NOTE REQUIRED TO PREVENT EXCESSIVE PUMP RUNTIME.
2. THE PUMP REPRESENTATION IS NOT INTENDED TO INDICATE A SPECIFIC DESIGN.
3. SEE # 2000 VPS STANDARD DESIGN CRITERIA 2.12 LAYOUT GUIDELINES.
4. LOCATE CONTINUOUS PUMP ISOLATION VALVE ABOVE ELEVATION OF 4'-0" (4'-0" ISOLATION VALVE).
5. PROVIDE 2.0 INCH (2.0 INCH) RESTRICTION FOR TRANSFER FROM LOW PRESSURE TO SAFETY CLASS 2.
6. SEE # 2000 VPS STANDARD DESIGN CRITERIA 2.14.1 CONTAINMENT ISOLATION.
7. LOCATE TEST CONNECTION AS CLOSE AS POSSIBLE TO ISOLATION VALVE. TEST CONNECTION ATTACHED TO BOTTOM OF PIPING TO FACILITATE DRAINING OF LINES.
8. TEMPORARY BLIND FLANGE WITH A TEST CONNECTION IN THE FLANGE WILL BE INSTALLED ON THE PERMANENT FLANGE FOR LEAK TESTING PURPOSES.
9. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM OR SIGNALING OR ANALOG OUTPUTS. NOTES.
10. ALL INSTRUMENTS ON THIS P&ID HAVE PROMOTION GROUP DESIGNATION 'N' UNLESS OTHERWISE NOTED.
11. UNLESS OTHERWISE NOTED, ALL 'N' IS BASED ON THIS P&ID. FOR APPLICATION OF THIS P&ID TO OTHER SYSTEMS, ALL 'N' IS BASED ON THE IDENTIFICATION NUMBERS FOR PIPING, ALL 'N' INSTRUMENTS EQUIPMENT, ALL 'N' ALTERNATE SYMBOLS, AND ALL 'N' SYMBOLS FOR IDENTIFICATION NUMBERS.

REFERENCES:

1. FOR PIPING AND INSTRUMENT SYMBOLS, SEE DRAWINGS OF 00001 & 00002.
2. WESTINGHOUSE DRAWING NO. 20001.1 SUB 1 SHEET 3 OF 4.

TI APERTURE CARD

Also Available On Aperture Card

8002050017-16

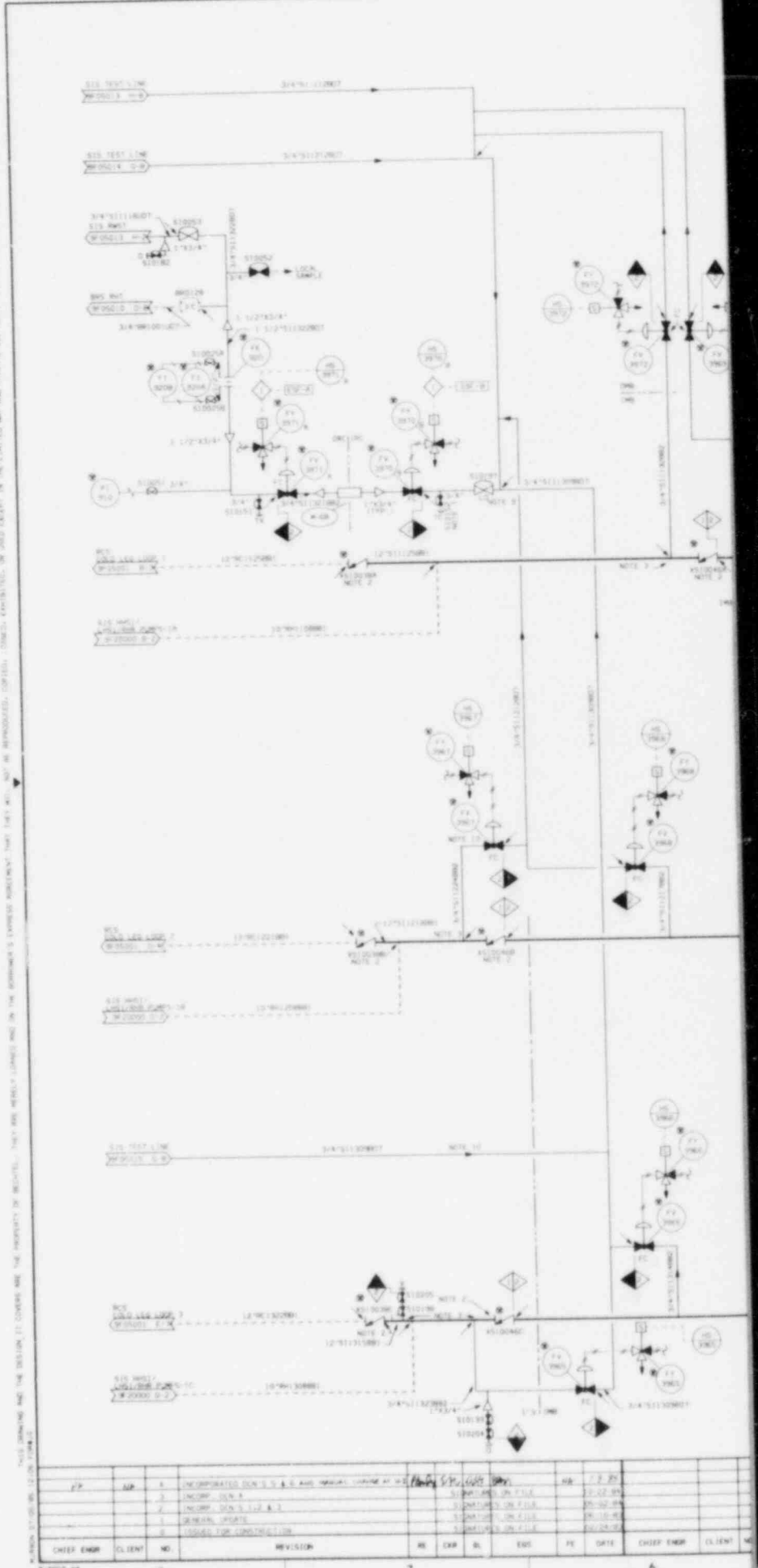
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

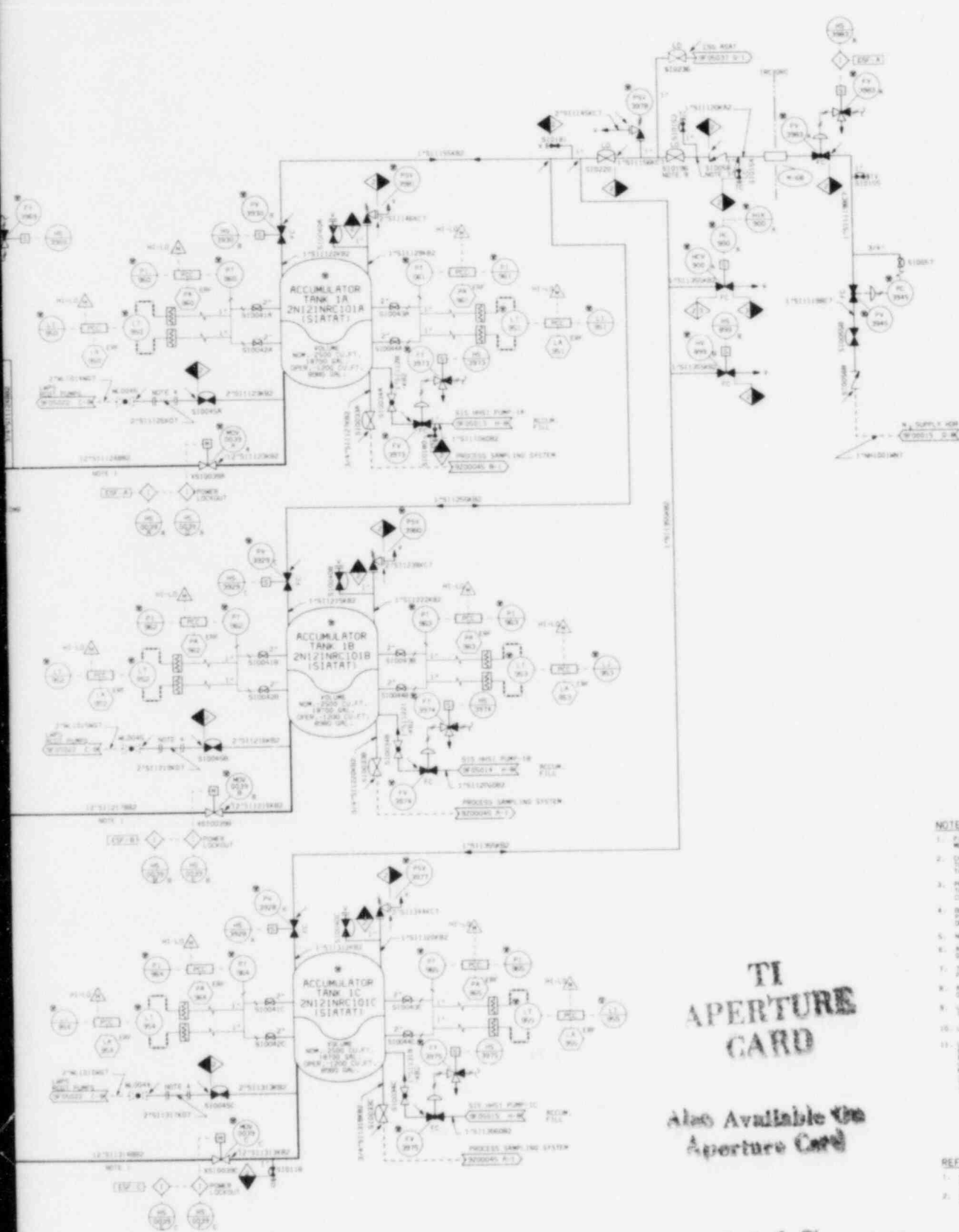
PIPING AND INSTRUMENT DIAGRAM
SAFETY INJECTION SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SN12905015	4

REVISION	RE	CHK	SL	ISS	PR	DATE
5						
4						
3						
2						
1						

THIS DRAWING AND THE DESIGN IT COVERS ARE THE PROPERTY OF BENTLEY SYSTEMS, INC. AND ARE NOT TO BE REPRODUCED, COPIED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF BENTLEY SYSTEMS, INC.





**TI
APERTURE
CARD**

Also Available On
Aperture Card

NOTES:

1. PIPING SCHEDULE 140 MUST BE USED TO MEET SAFETY ANALYSIS FLOW REQUIREMENTS.
2. CHECK VALVES SHOULD BE LOCATED AS CLOSE TO THE REACTION COOLANT PUMP AS POSSIBLE.
3. PROVIDE 1/2" I.D. FLOW RESTRICTOR FOR CONNECTION FROM SAFETY CLASS 1 TO SAFETY CLASS 2.
4. IN TWO PHASES NORMALLY INSTALLED, SPEED UP TO BE INSTALLED DURING ACCUMULATOR DRAINING, ONLY AFTER DEPRESSURIZATION.
5. NOTE DELETED.
6. ALL INSTRUMENTS ON THIS P&ID HAVE SEPARATION GROUP DESIGNATION N UNLESS OTHERWISE NOTED.
7. TEST CONNECTIONS ATTACHED TO BOTTOM OF PIPING TO FACILITATE DRAINING OF LINES.
8. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM DESIGNATION ST UNLESS OTHERWISE NOTED.
9. LOCATE TEST BARREL VALVE AS CLOSE TO TEST CONNECTION AS POSSIBLE.
10. LOCATED OUTSIDE THE WELDED BARRIER.
11. UNLESS OTHERWISE NOTED, UNIT #1 IS SHOWN ON THIS DIAGRAM FOR APPLICATION OF THIS DIAGRAM TO UNIT #2, USE UNIT #2 IDENTIFICATION NUMBERS FOR PIPING AND INSTRUMENTS. EQUIPMENT ETC. REFER TO UNIT #2 IDENTIFICATION AND DEVELOPMENT FOR IDENTIFICATION NUMBER DETAILS.

REFERENCES:

1. FOR PIPING & INSTRUMENT SYMBOLS - STANDARD 04-00001 & 07-00007
2. INSTRUMENTATION DRAWING NO. 1207N, SUB. T-SHEET 4 OF 4.

8602050017 -17

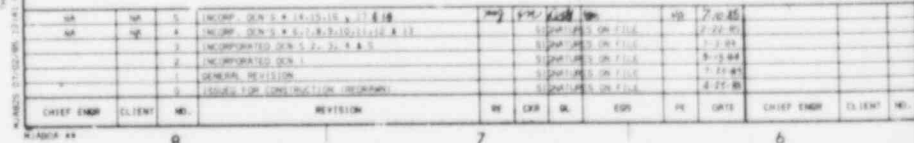
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

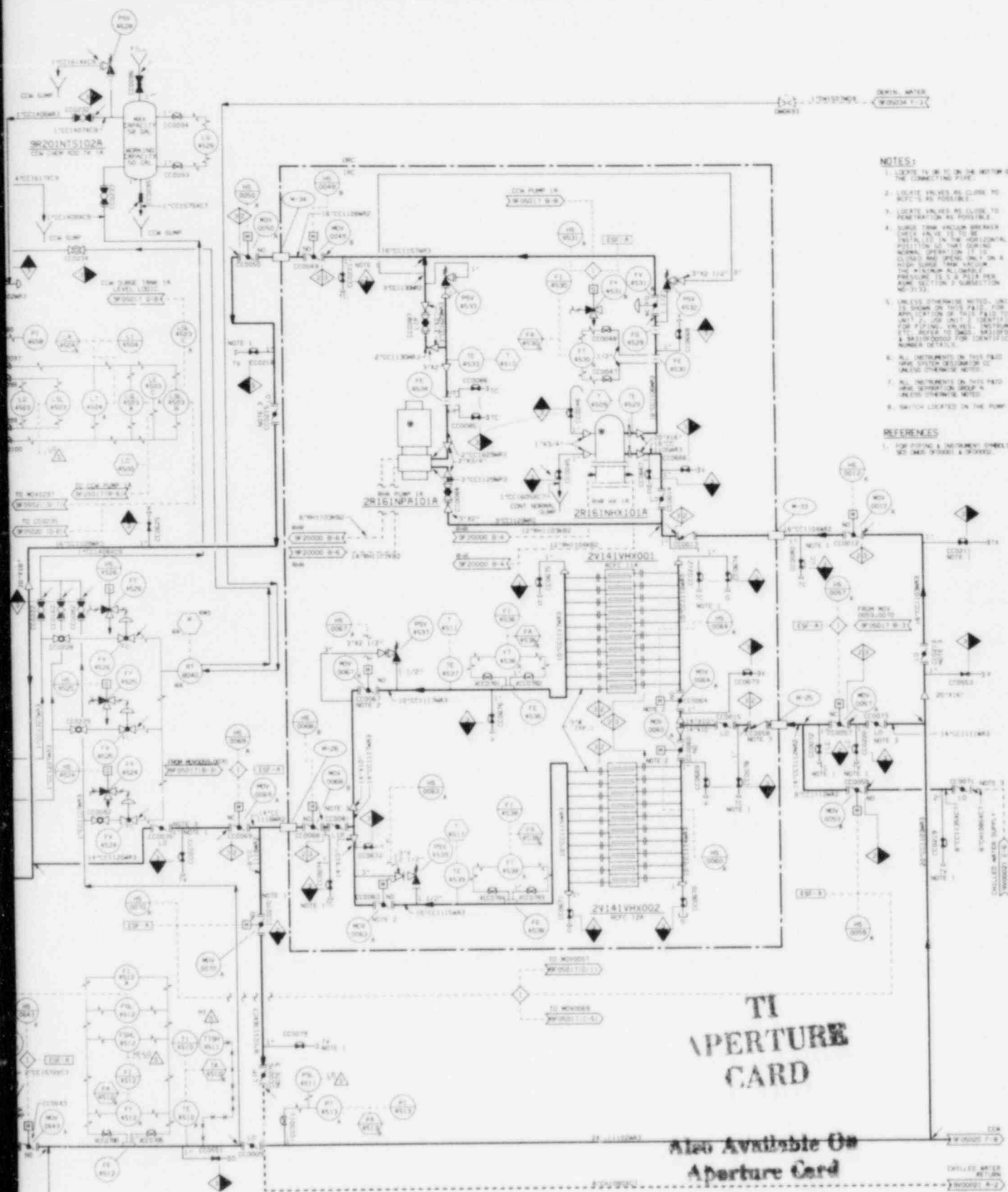
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENT DIAGRAM
SAFETY INJECTION SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SN129F05016	4

REVISION	BY	CHK	DL	EQS	RE	DATE





- NOTES:**
1. LOCATE TV ON TO ON THE BOTTOM OF THE CONNECTING PIPE.
 2. LOCATE VALVES AS CLOSE TO PENETRATION AS POSSIBLE.
 3. LOCATE VALVES AS CLOSE TO PENETRATION AS POSSIBLE.
 4. SURGE TANK VACUUM BREAKER (V.B.) IS TO BE INSTALLED IN THE HORIZONTAL POSITION SO THAT DURING NORMAL OPERATION IT IS CLOSED AND OPENING ONLY ON A VACUUM SURGE FROM VACUUM BREAKER ALLOWING PRESSURE TO BE MAINTAINED ABOVE VACUUM SET POINT.
 5. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS PAGE. FOR APPLICATION OF THIS PAGE TO UNIT 2, USE UNIT 1 IDENTIFICATION NUMBERS FOR PIPING AND INSTRUMENTS. EQUIPMENT IS IDENTIFIED BY TAG NUMBER AND UNIT IDENTIFICATION NUMBER SET 1-2.
 6. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESIGNATION 'C' UNLESS OTHERWISE NOTED.
 7. ALL INSTRUMENTS ON THIS PAGE HAVE CONNECTION GROUP 'M' UNLESS OTHERWISE NOTED.
 8. SWITCH LOCATED IN THE PUMP ROOM.
- REFERENCES**
1. FOR PIPING & INSTRUMENT SYMBOLS SEE SHEETS 200001 & 200002.

**TI
APERTURE
CARD**

Also Available On
Aperture Card

8602050017-18

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
COMPONENT COOLING WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	SR209F05017	5

REVISION	BY	CHK	DL	ESR	PE	DATE
----------	----	-----	----	-----	----	------

5

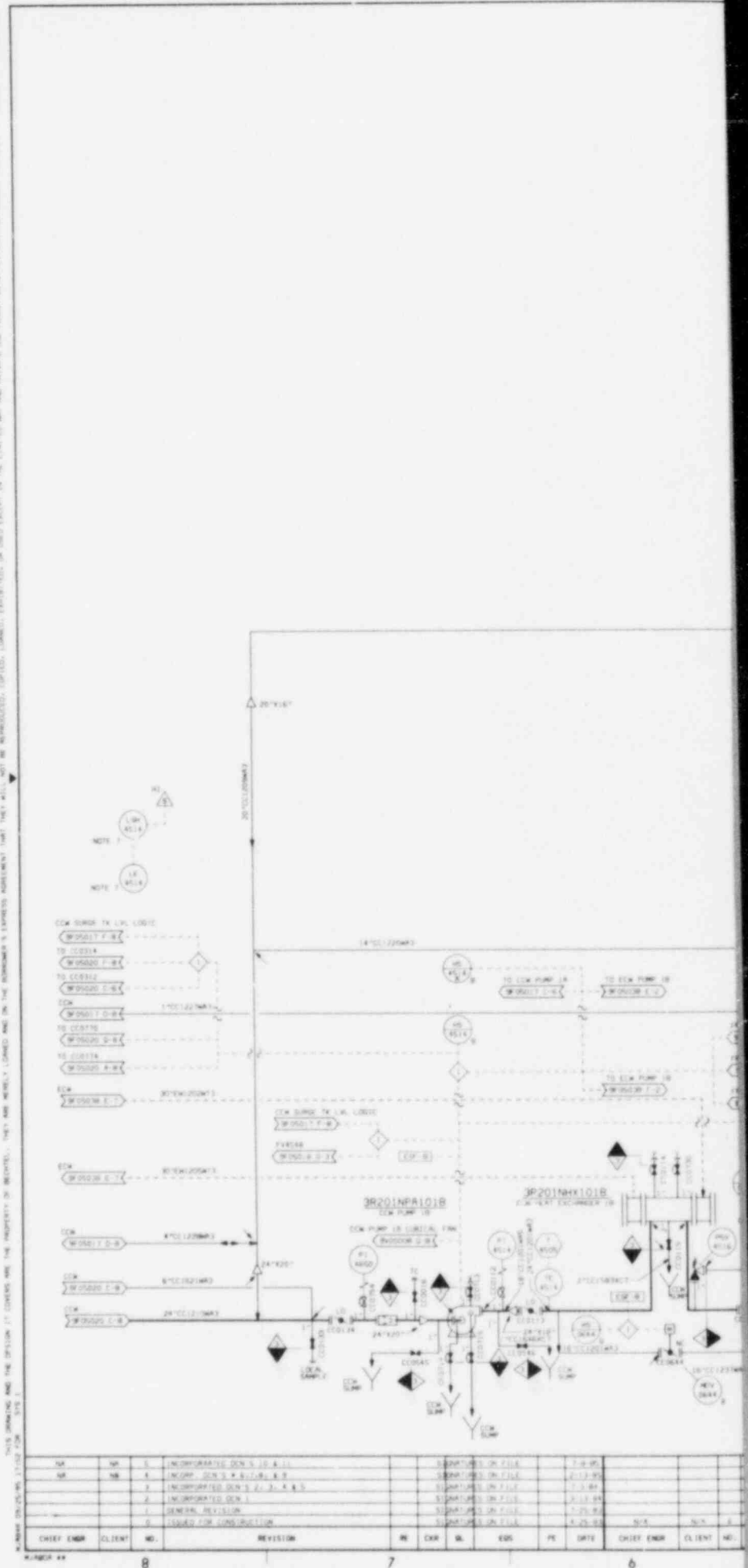
4

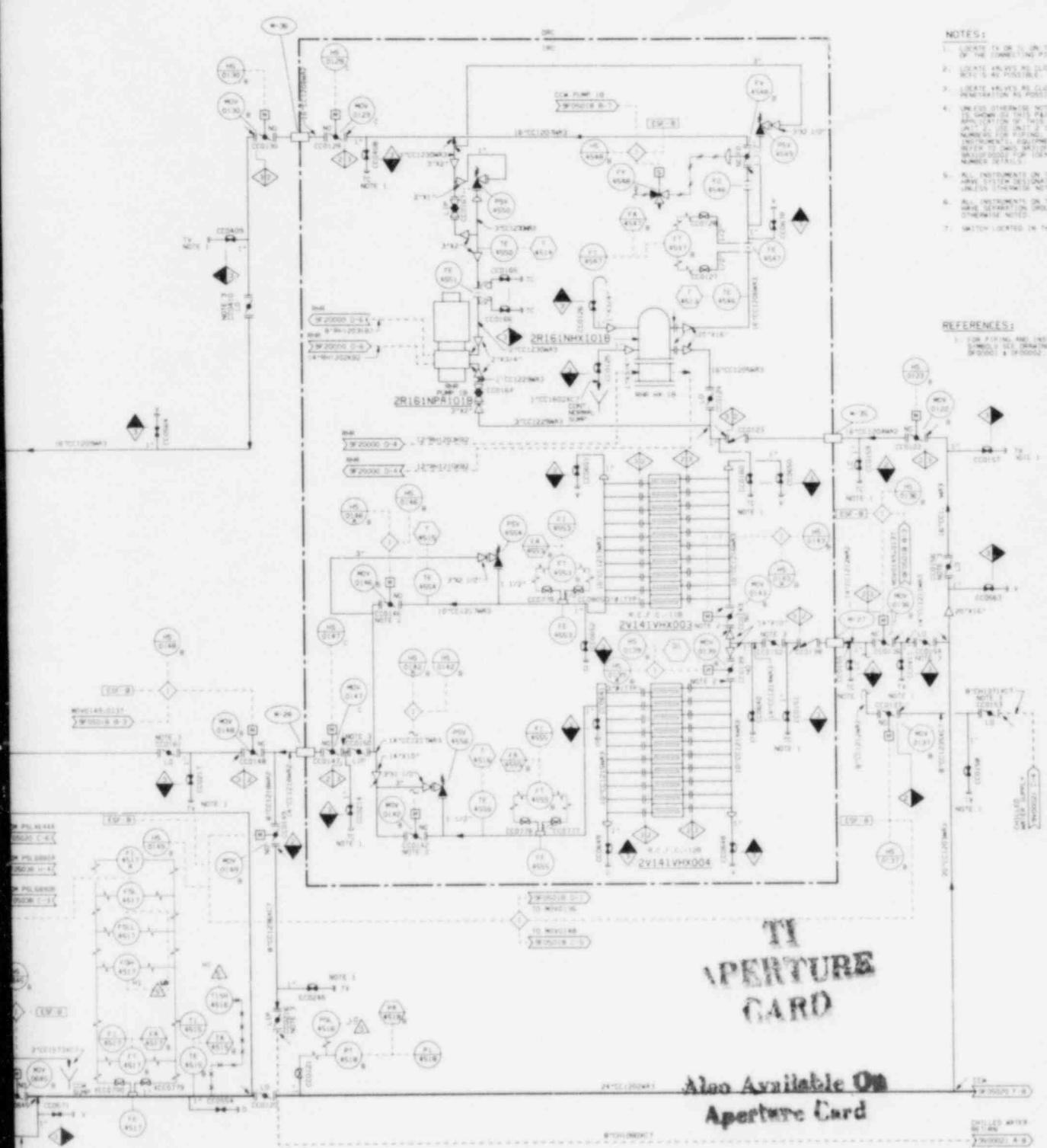
3

2

1

THIS DRAWING AND THE DESIGN IT CONTAINS ARE THE PROPERTY OF BENTLEY. THEY ARE HEREBY LOANED AND ON THE ASSUMPTION & EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT GIVEN BY THE LENDER TO THE BORROWER.





- NOTES:**
1. LOCATE TX OR TO ON THE BOTTOM OF THE CONNECTING PIPE.
 2. LOCATE VALVES AS CLOSE TO NOISE AS POSSIBLE.
 3. LOCATE VALVES AS CLOSE TO PENETRATION AS POSSIBLE.
 4. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P&ID FOR APPLICATION OF THIS P&ID TO UNIT 2. USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC. NEVER TO OMB, S&P, T&S, AND INCLUDES P&ID IDENTIFICATION NUMBERS DETAILS.
 5. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM DESIGNATION, UNLESS OTHERWISE NOTED.
 6. ALL INSTRUMENTS ON THIS P&ID HAVE IDENTIFICATION GROUP, UNLESS OTHERWISE NOTED.
 7. SWITCH LOCATED IN THE PUMP ROOM.

- REFERENCES:**
1. FOR PIPING AND INSTRUMENT SYMBOLS SEE DRAWING SR209F05018 & SR209F05019

**TV
APERTURE
CARD**

Also Available On
Aperture Card

8602050017-19

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

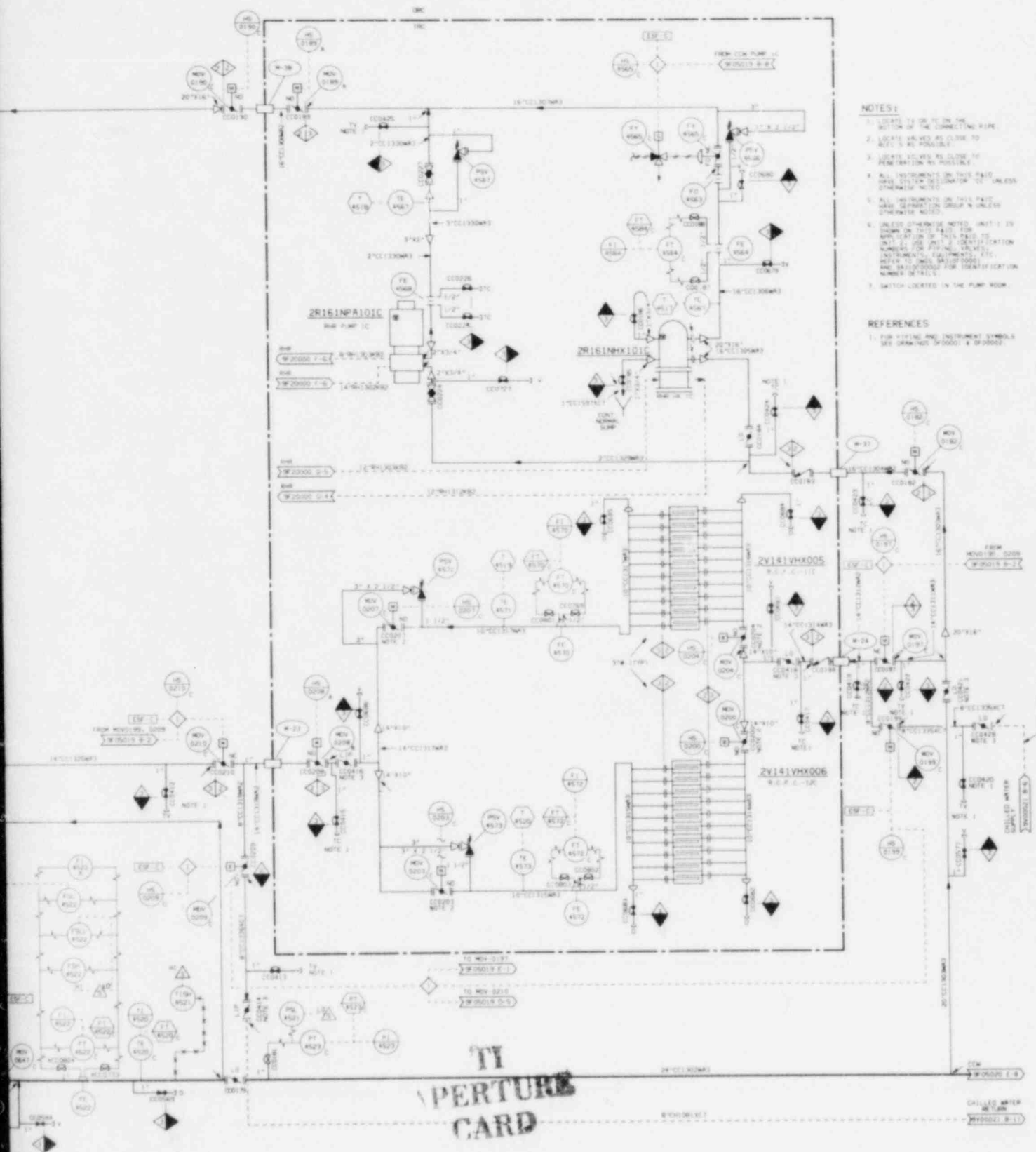
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
COMPONENT COOLING WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR209F05018	6

REVISION	BY	CHK	DL	EQS	PE	DATE
1
2
3
4
5

01-12-2006 09:00 AM



NOTES:

1. LOCATE TO OR TO ON THE BOTTOM OF THE CONNECTING PIPE.
2. LOCATE AS NEAR AS POSSIBLE TO THE VALVE.
3. LOCATE TO OR TO ON THE BOTTOM OF THE CONNECTING PIPE.
4. ALL INSTRUMENTS ON THIS PAID HAVE SYSTEM RELOCATION FOR UNLESS OTHERWISE NOTED.
5. ALL INSTRUMENTS ON THIS PAID HAVE SYSTEM RELOCATION FOR UNLESS OTHERWISE NOTED.
6. UNLESS OTHERWISE NOTED, UNIT 1 TO 4 ON THIS PAID FOR APPLICATION OF THIS PAID TO UNIT 1 TO 4 IDENTIFICATION NUMBER FOR UNIT 1 TO 4. INSTRUMENTS, EQUIPMENTS, ETC. REFER TO SMALL MAPS FOR IDENTIFICATION NUMBER DETAILS.
7. SWITCH LOCATED IN THE PUMP ROOM.

REFERENCES

1. FOR PIPING AND INSTRUMENT SYMBOLS SEE DRAWING 010001 & 010002.

TI
APERTURE
CARD

Also Available On
Aperture Card

8602050017-20



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
COMPONENT COOLING WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	SR209F05019	5

REVISION

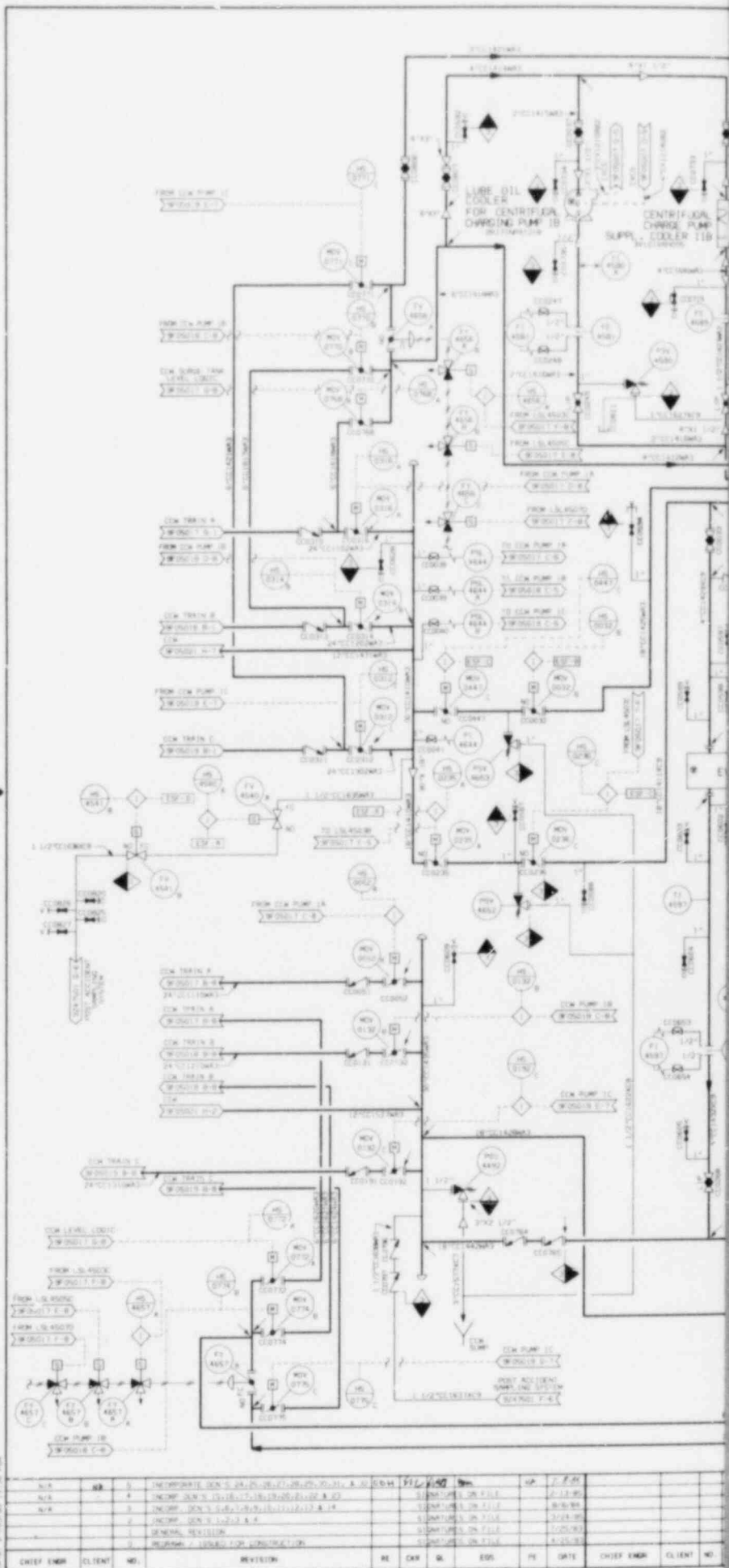
5

4

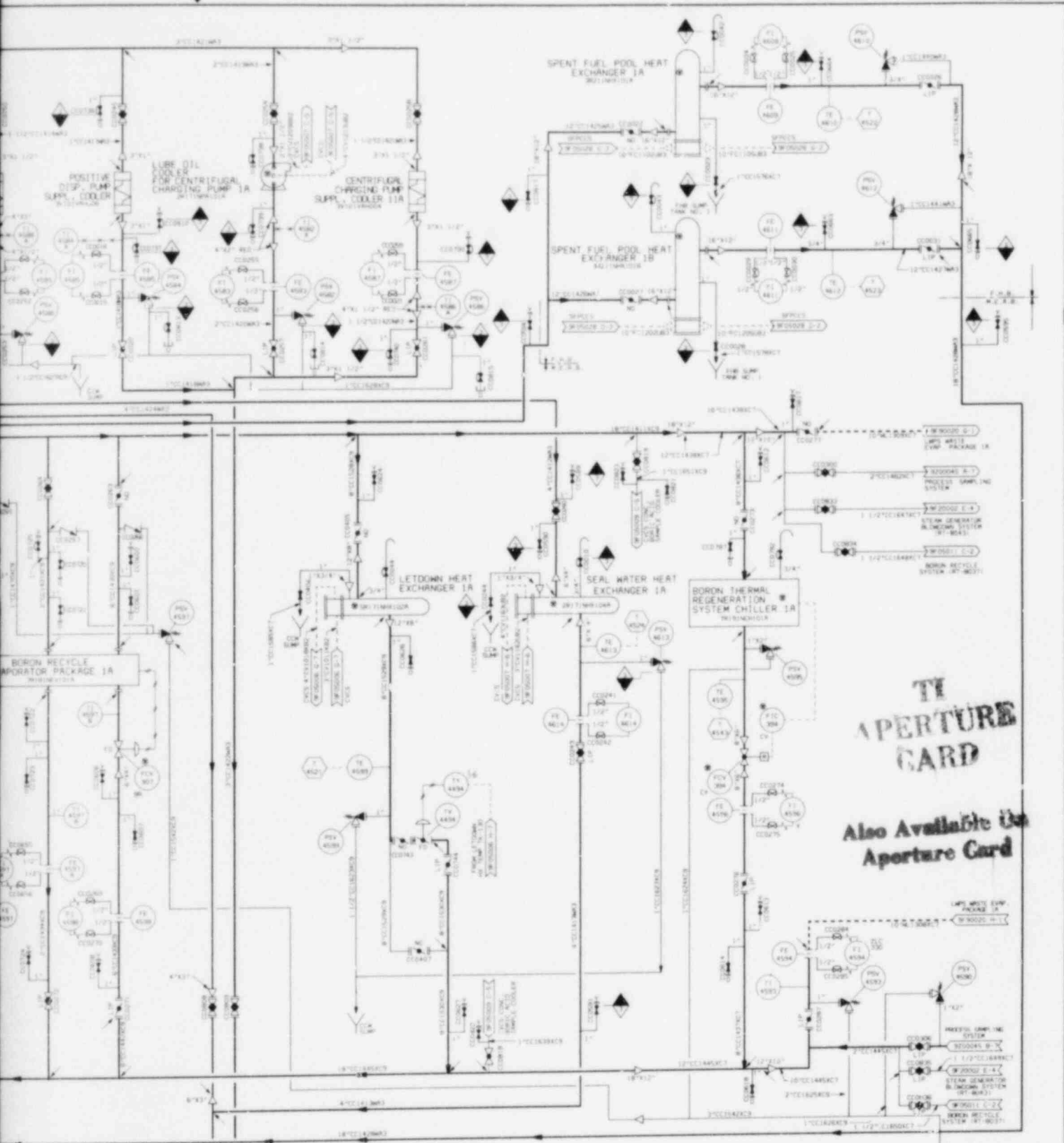
3

2

1



DATE	USER	CLIENT	NO.	REVISION	RE	CHK	GL	EDS	PC	DATE	DATE	USER	CLIENT	NO.
5/1/2008	WJ	1	1	1	1	1	1	1	1	1	1	1	1	1
5/1/2008	WJ	1	2	2	2	2	2	2	2	2	2	2	2	2
5/1/2008	WJ	1	3	3	3	3	3	3	3	3	3	3	3	3
5/1/2008	WJ	1	4	4	4	4	4	4	4	4	4	4	4	4
5/1/2008	WJ	1	5	5	5	5	5	5	5	5	5	5	5	5
5/1/2008	WJ	1	6	6	6	6	6	6	6	6	6	6	6	6
5/1/2008	WJ	1	7	7	7	7	7	7	7	7	7	7	7	7
5/1/2008	WJ	1	8	8	8	8	8	8	8	8	8	8	8	8
5/1/2008	WJ	1	9	9	9	9	9	9	9	9	9	9	9	9
5/1/2008	WJ	1	10	10	10	10	10	10	10	10	10	10	10	10
5/1/2008	WJ	1	11	11	11	11	11	11	11	11	11	11	11	11
5/1/2008	WJ	1	12	12	12	12	12	12	12	12	12	12	12	12
5/1/2008	WJ	1	13	13	13	13	13	13	13	13	13	13	13	13
5/1/2008	WJ	1	14	14	14	14	14	14	14	14	14	14	14	14
5/1/2008	WJ	1	15	15	15	15	15	15	15	15	15	15	15	15
5/1/2008	WJ	1	16	16	16	16	16	16	16	16	16	16	16	16
5/1/2008	WJ	1	17	17	17	17	17	17	17	17	17	17	17	17
5/1/2008	WJ	1	18	18	18	18	18	18	18	18	18	18	18	18
5/1/2008	WJ	1	19	19	19	19	19	19	19	19	19	19	19	19
5/1/2008	WJ	1	20	20	20	20	20	20	20	20	20	20	20	20
5/1/2008	WJ	1	21	21	21	21	21	21	21	21	21	21	21	21
5/1/2008	WJ	1	22	22	22	22	22	22	22	22	22	22	22	22
5/1/2008	WJ	1	23	23	23	23	23	23	23	23	23	23	23	23
5/1/2008	WJ	1	24	24	24	24	24	24	24	24	24	24	24	24
5/1/2008	WJ	1	25	25	25	25	25	25	25	25	25	25	25	25
5/1/2008	WJ	1	26	26	26	26	26	26	26	26	26	26	26	26
5/1/2008	WJ	1	27	27	27	27	27	27	27	27	27	27	27	27
5/1/2008	WJ	1	28	28	28	28	28	28	28	28	28	28	28	28
5/1/2008	WJ	1	29	29	29	29	29	29	29	29	29	29	29	29
5/1/2008	WJ	1	30	30	30	30	30	30	30	30	30	30	30	30
5/1/2008	WJ	1	31	31	31	31	31	31	31	31	31	31	31	31
5/1/2008	WJ	1	32	32	32	32	32	32	32	32	32	32	32	32
5/1/2008	WJ	1	33	33	33	33	33	33	33	33	33	33	33	33
5/1/2008	WJ	1	34	34	34	34	34	34	34	34	34	34	34	34
5/1/2008	WJ	1	35	35	35	35	35	35	35	35	35	35	35	35
5/1/2008	WJ	1												



NOTES:
 1. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN.
 2. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESIGNATION CC UNLESS OTHERWISE NOTED.
 3. ALL INSTRUMENTS ON THIS PAGE HAVE GENERATION GROUP 4 UNLESS OTHERWISE NOTED.

REFERENCES:
 1. FOR PIPING AND INSTRUMENT SYMBOLS SEE DRAWINGS D-00001 & D-00002

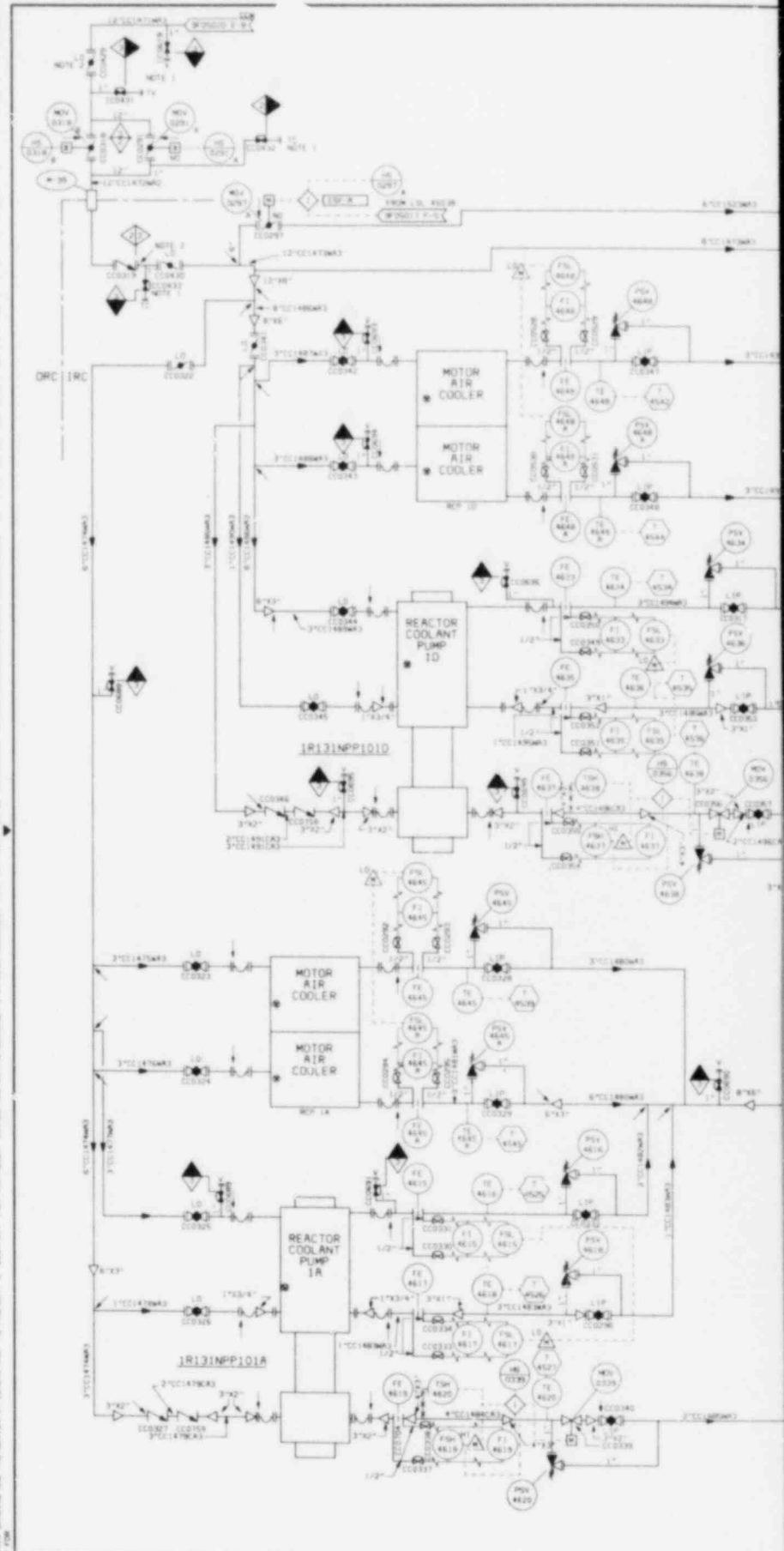
8602050017-21

BECHTEL ENERGY CORPORATION
 HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
 SOUTH TEXAS PROJECT

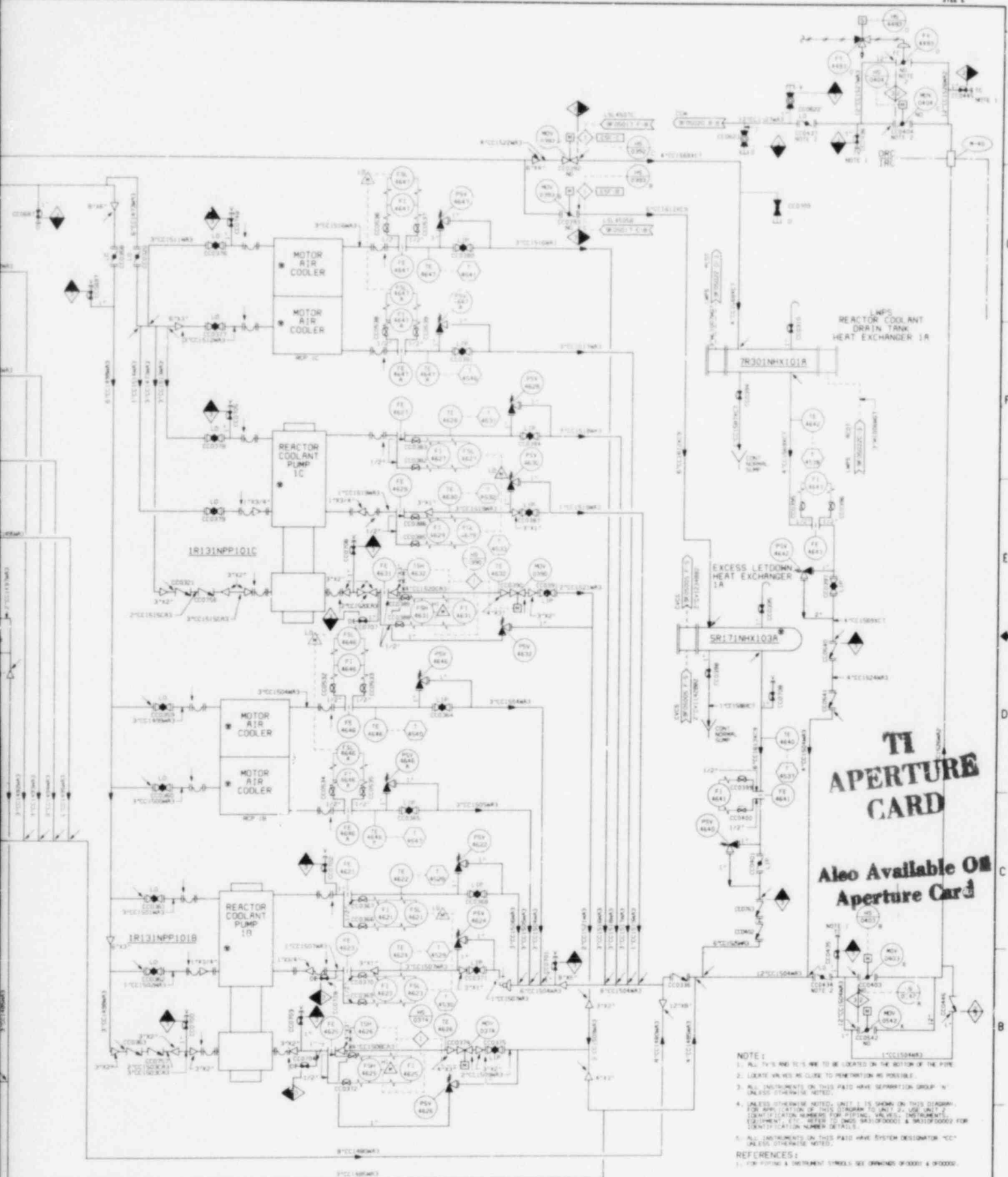
PIPING AND INSTRUMENTATION DIAGRAM COMPONENT COOLING WATER SYSTEM			
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR209F 05020	5

REVISION	BY	CHK	DL	EDR	PE	DATE
5						
4						
3						
2						
1						

THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BECAULT. THEY ARE HEREBY LOANED AND ON THE BORROWER'S EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT ON THE LIMITED WAY AND PURPOSES AUTHORIZED BY THE LENDER TO THE BORROWER.



NO.	REV.	DESCRIPTION	BY	CHK	DATE	NO.	REV.	DESCRIPTION	BY	CHK	DATE
1	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	1	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
2	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	2	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
3	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	3	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
4	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	4	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
5	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	5	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
6	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	6	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
7	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	7	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
8	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	8	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
9	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	9	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87
10	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87	10	1	INCORPORATED DEN 1, 2, 3, 4, 5, 6, 7	WJ	WJ	8-19-87

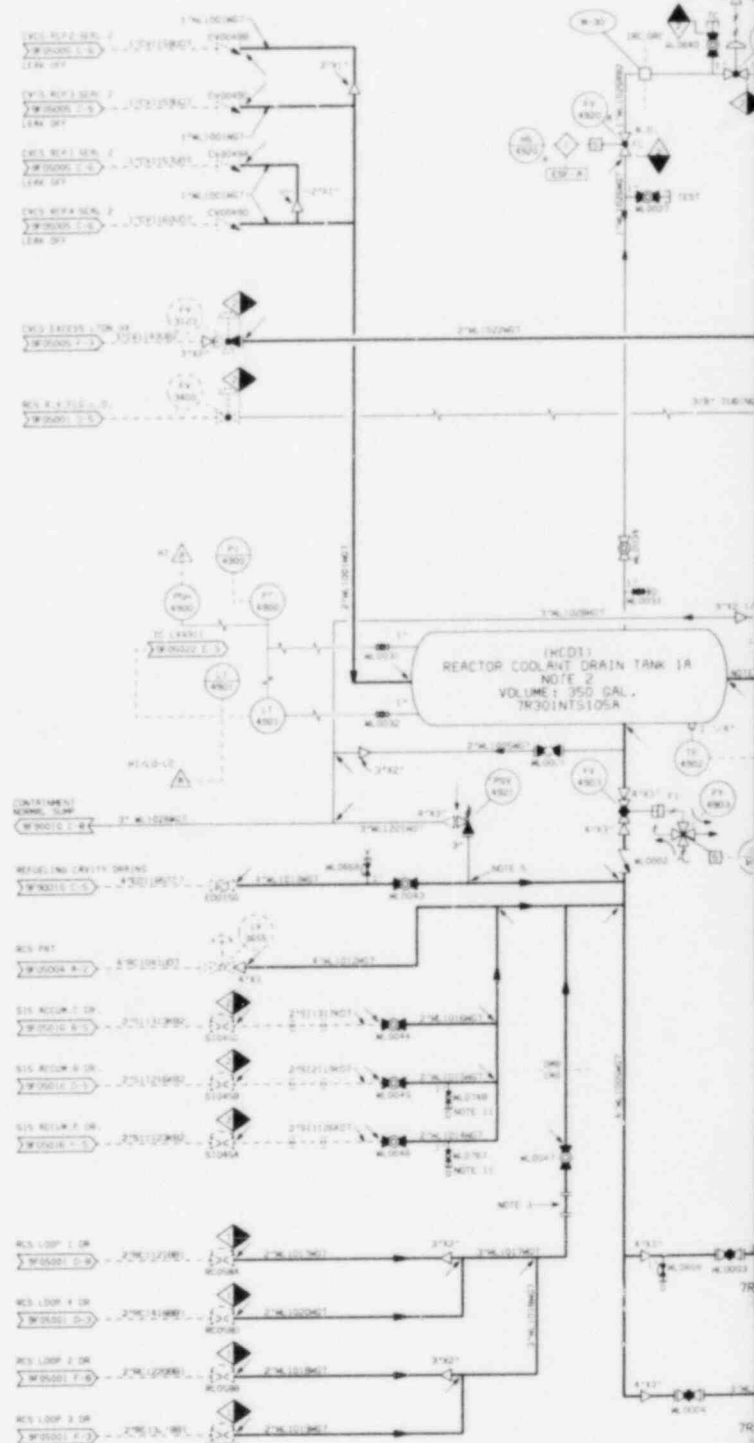


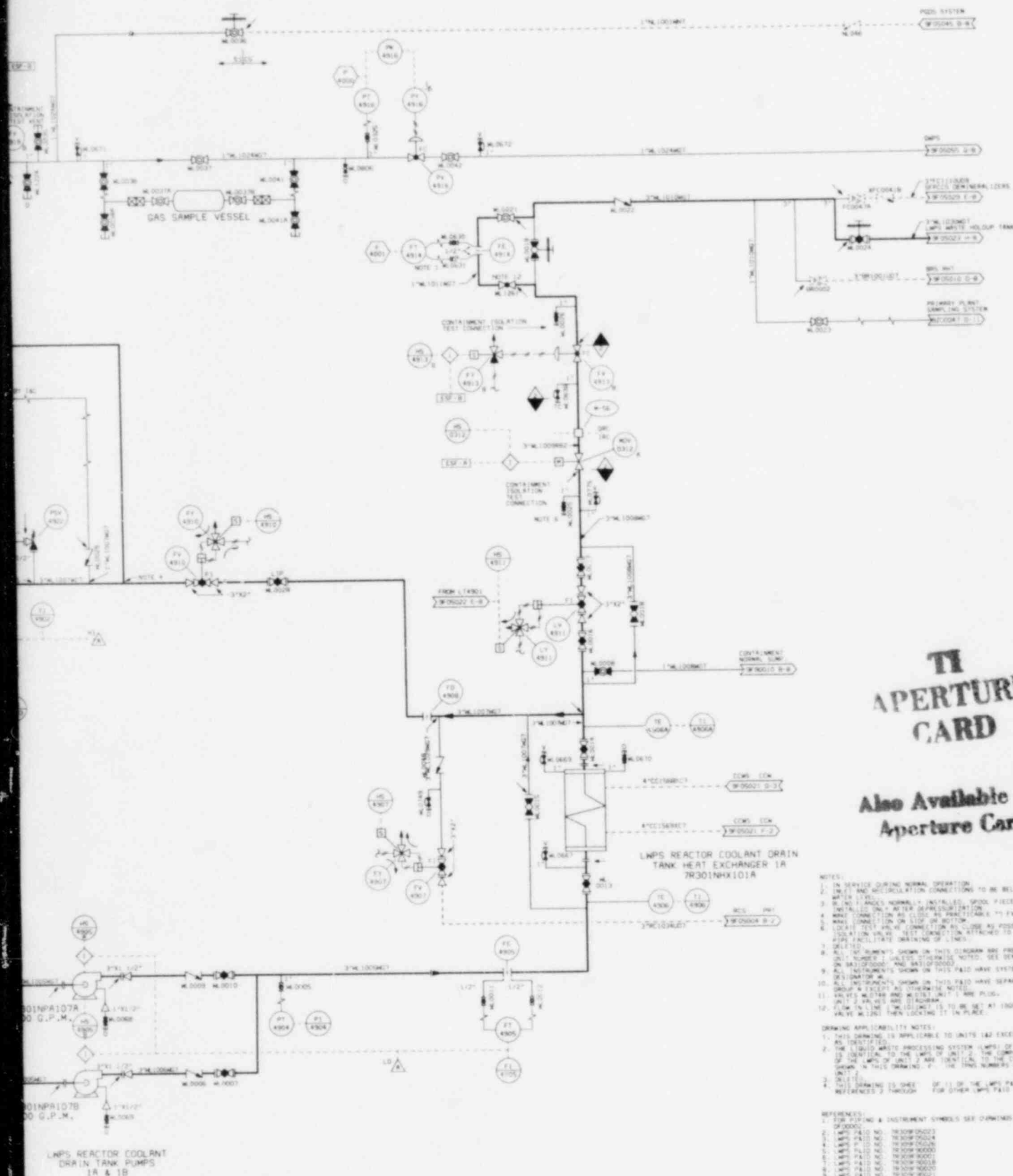
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
COMPONENT COOLING WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
	14928	SR209F05021	4

8602050017-22

[illegible]



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

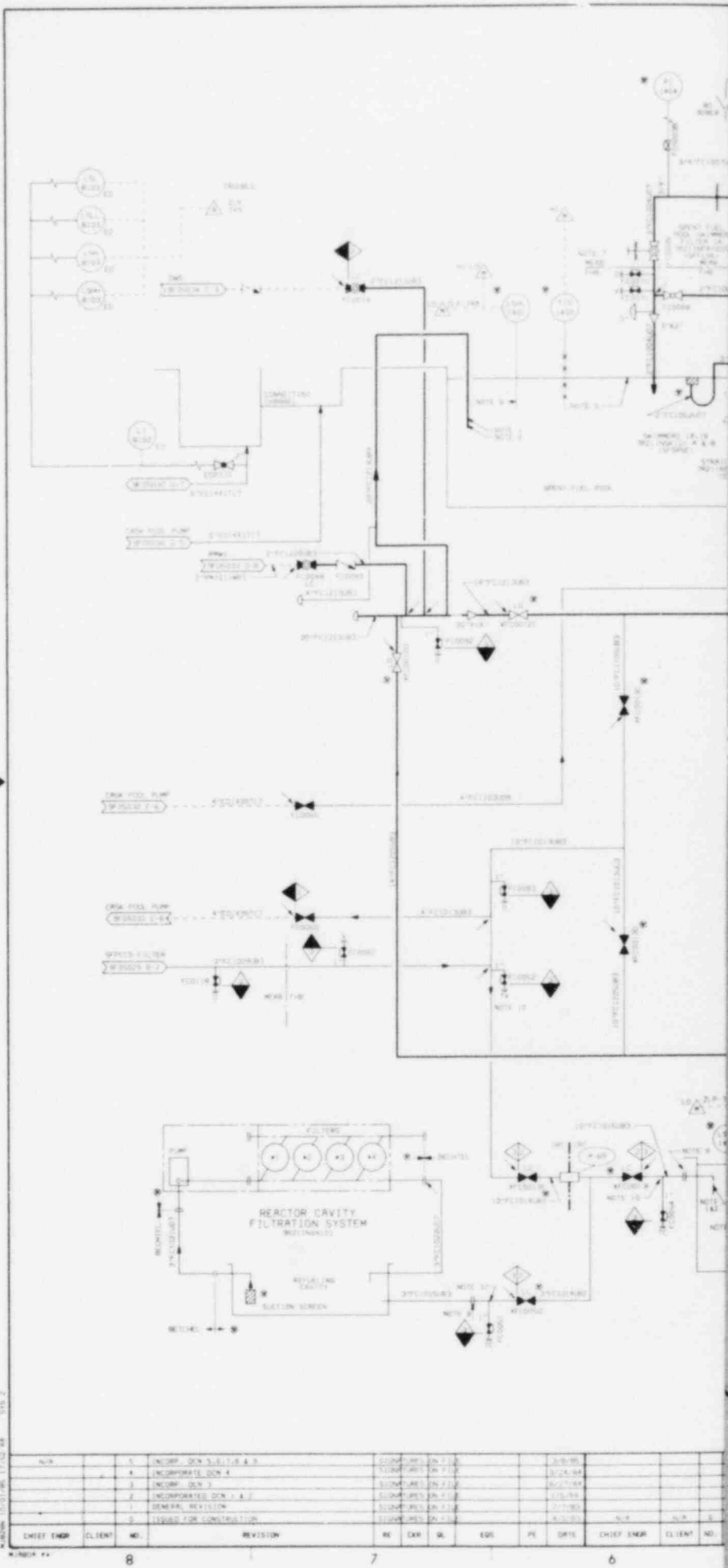
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
LIQUID WASTE PROCESSING SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR308F05022	3

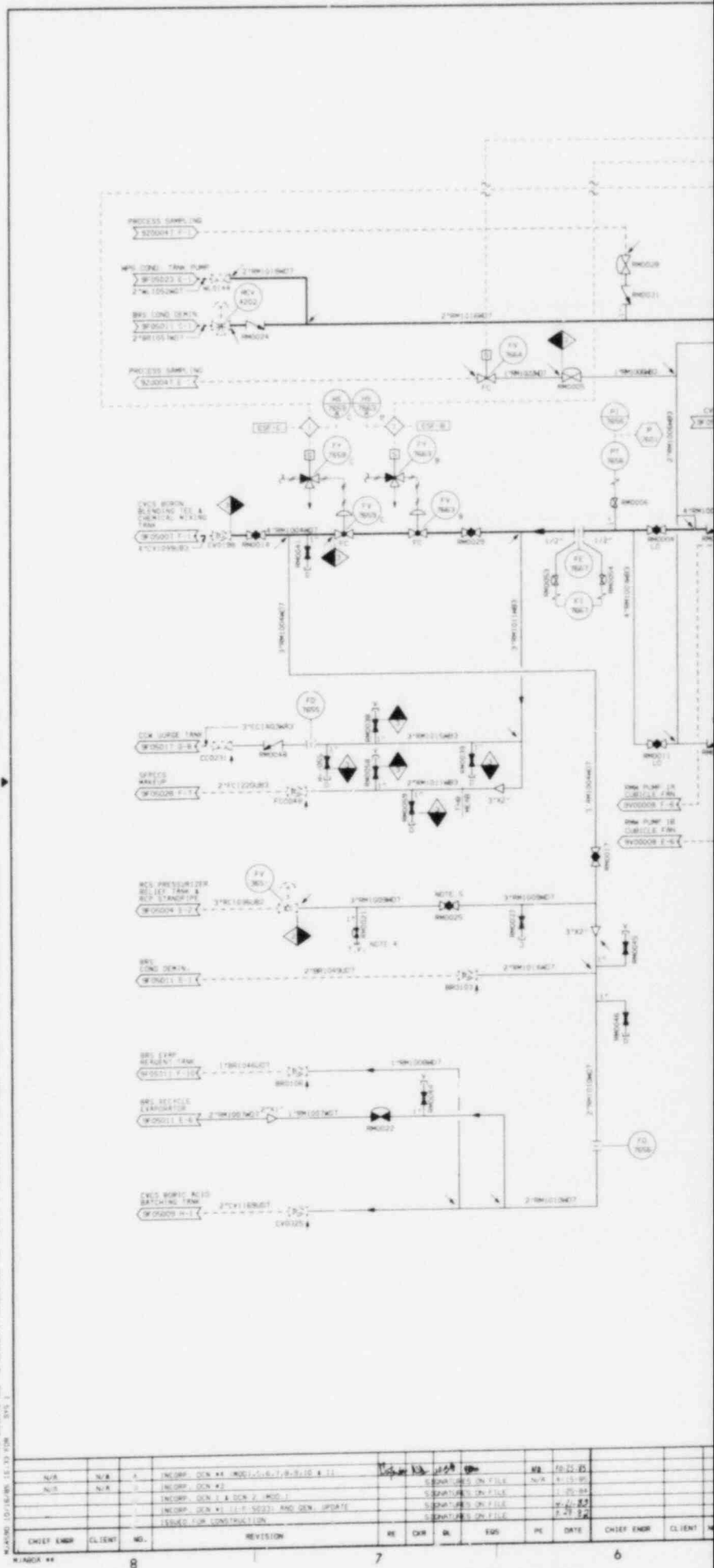
8602050017 - 23

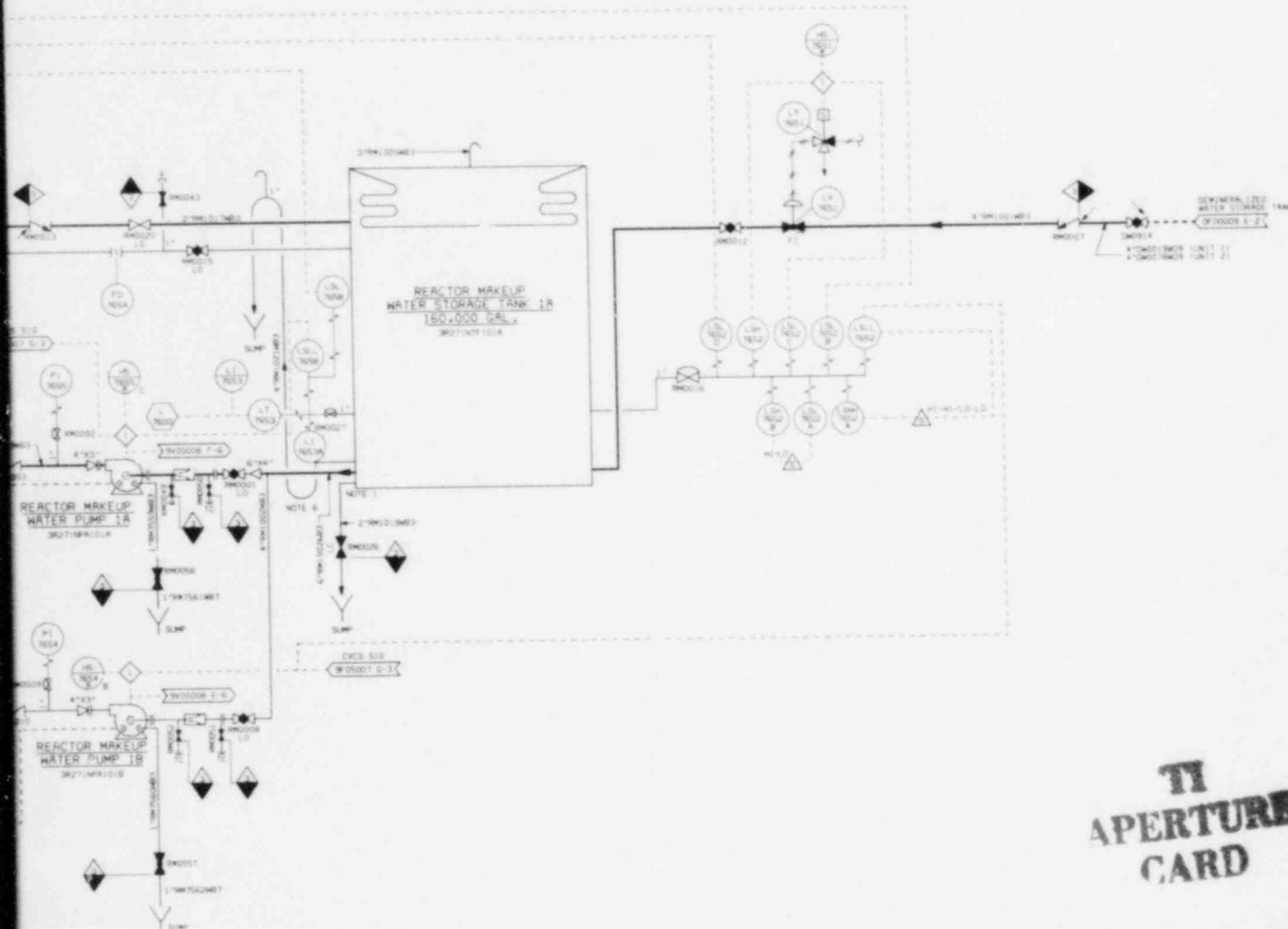
THIS DRAWING AND THE SECTION IT CONTAINS ARE THE PROPERTY OF BECHTEL. THEY ARE NOT TO BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT IN THE LIMITED WAY AND FOR THE LIMITED PURPOSES SPECIFIED BY THE OWNER IN THE AGREEMENT. ANY VIOLATION OF THIS AGREEMENT WILL BE CONSIDERED A BREACH OF CONTRACT AND WILL BE SUBJECT TO THE FOLLOWING PENALTIES: A FINE OF \$10,000 PER DAY OF VIOLATION, AND THE OBLIGATION TO REPAIR OR REPLACE THE VIOLATED EQUIPMENT AT THE VIOLATOR'S EXPENSE. THIS DRAWING IS NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN CONSENT OF BECHTEL.



NO.	REVISION	DATE	BY	CHKD	APP'D	REV	NO.	REVISION	DATE	BY	CHKD	APP'D	REV	NO.
1	INCORP. DES. 3, 4, 5 & 6	11/11/88	W. J. H.				1	INCORP. DES. 3, 4, 5 & 6	11/11/88	W. J. H.				1
2	INCORP. DES. 3	11/11/88	W. J. H.				2	INCORP. DES. 3	11/11/88	W. J. H.				2
3	INCORP. DES. 4	11/11/88	W. J. H.				3	INCORP. DES. 4	11/11/88	W. J. H.				3
4	INCORP. DES. 5	11/11/88	W. J. H.				4	INCORP. DES. 5	11/11/88	W. J. H.				4
5	INCORP. DES. 6	11/11/88	W. J. H.				5	INCORP. DES. 6	11/11/88	W. J. H.				5
6	GENERAL REVISION	11/11/88	W. J. H.				6	GENERAL REVISION	11/11/88	W. J. H.				6
7	ISSUED FOR CONSTRUCTION	11/11/88	W. J. H.				7	ISSUED FOR CONSTRUCTION	11/11/88	W. J. H.				7

THIS DOCUMENT CONTAINS NEITHER RECOMMENDATIONS NOR CONCLUSIONS OF THE NATIONAL BUREAU OF STANDARDS. IT IS THE POLICY OF THE NATIONAL BUREAU OF STANDARDS TO MAKE AVAILABLE THE INFORMATION OF A TECHNICAL NATURE REGARDING ITS RESEARCH AND DEVELOPMENT ACTIVITIES TO THE EXTENT PRACTICABLE.

[illegible]



TI APERTURE CARD

Also Available On
Aperture Card

NOTES:

1. INLET OVERFLOW AND INSTRUMENT CONNECTIONS AT BOTTOM OF TANK ARE TO BE MADE FROM BOTTOM OF TANK TO PUMP.
2. ALL INSTRUMENT NUMBERS AND OTHER DEVICES ON THIS DIAGRAM ARE PREFIXED BY THE UNIT NUMBER (UNLESS OTHERWISE NOTED).
3. ALL INSTRUMENTS ON THIS PAID HAVE SYSTEM DESIGNATION "W". UNLESS OTHERWISE NOTED.
4. LEAK TEST CONNECTIONS AND VENTS LOCATED ON BOTTOM OF PIPE.
5. LOCATE NEAR CONTAINMENT ISOLATION VALVES.
6. LOWER LOOP TO EXTEND 12" BELOW OVERFLOW CONNECTION AND UPPER LOOP 6" BELOW SLUMP SPILLAGE. LOCATE STEVEN BURN PENT ON TOP OF UPPER LOOP.
7. ALL INSTRUMENTS ON THIS PAID HAVE SEPARATION GROUP "W" UNLESS OTHERWISE NOTED.
8. UNLESS OTHERWISE NOTED UNIT 1 IS SHOWN ON THIS DIAGRAM. FOR APPLICATION OF THIS DIAGRAM TO UNIT 2, USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING/INSTRUMENTS/EQUIPMENT. ETC. REFER TO UNITS, BAY/PROCESS AND BAY/PROCESS FOR IDENTIFICATION NUMBER DETAILS.
9. WHEN APPLYING THIS DIAGRAM TO UNIT 2 CHANGE ALL DESIGNATORS OF "1" IN CROSS-REFERENCE DRAWING TO "2".

8602050017.26

THIS DWG. SUPERSEDES DWS. 5827-05033. THIS DWS. CHANGES THE UNIT DESIGNATOR OF DWS. 5827-05033.



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

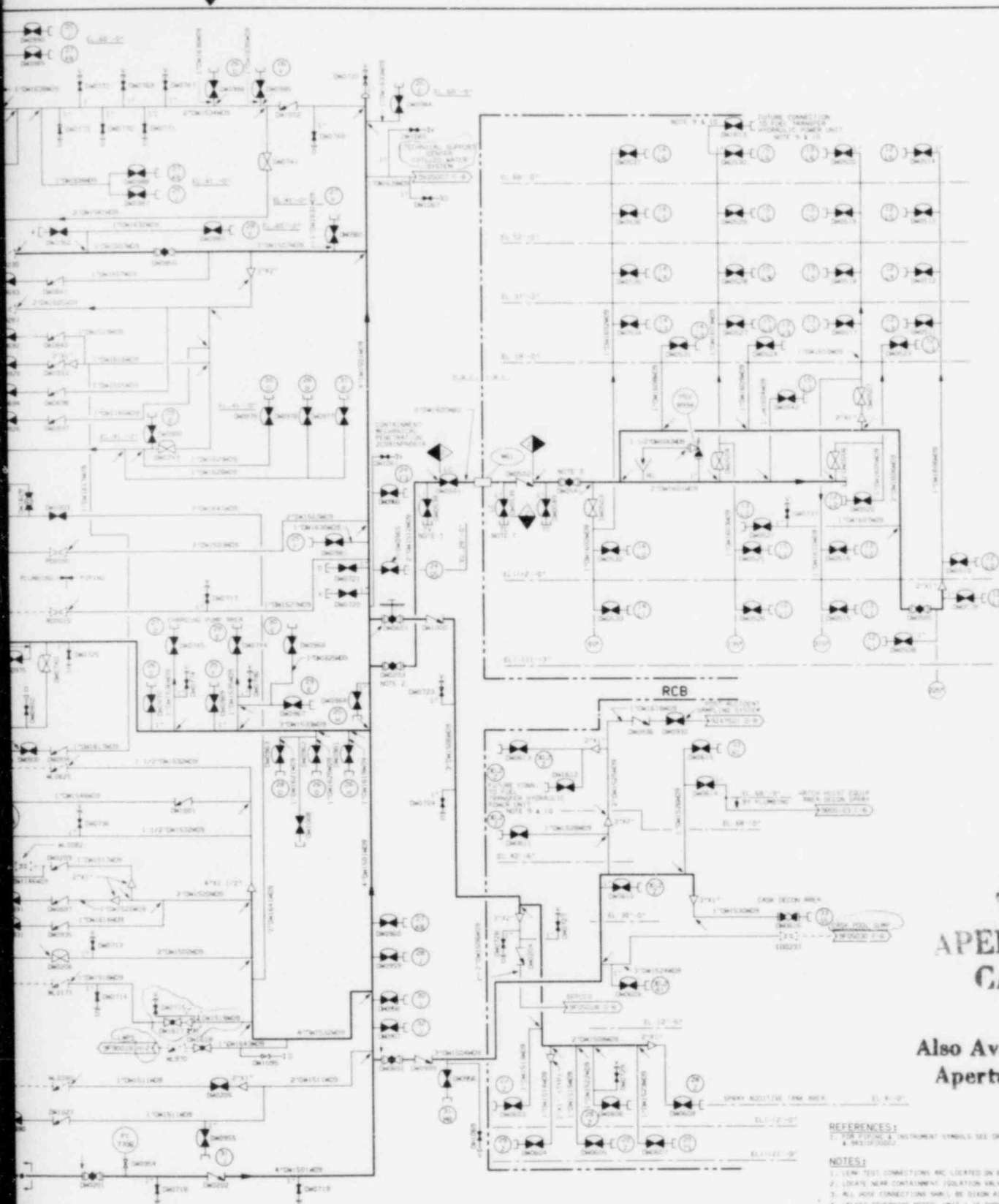
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM
REACTOR MAKEUP WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	58279F05033	4

REVISION	RE	CHK	SL	ESN	PE	DATE
5						
4						
3						
2						
1						

[illegible][illegible]



TI APERTURE CARD

Also Available On
Aperture Card

REFERENCES:
1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWING 860205001.
2. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWING 860205001.

- NOTES:
1. LEAK TEST CONNECTIONS ARE LOCATED ON BOTTOM OF PIPE.
 2. LOCATE NEAR CONTAINMENT ISOLATION VALVES.
 3. ALL PIPE CONNECTIONS SHALL BE DESIGN AIN AND COUPLING.
 4. ALL PIPE STRIKING NOTES: UNIT 1 IS SHOWN ON THIS PAGE. FOR APPLICATION OF THIS TO UNIT 2, USE UNIT 1. IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC.
 5. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESIGNATION "FM".
 6. ALL INSTRUMENTS ON THIS PAGE HAVE SEPARATION GROUP "M".
 7. ELEVATION AND COLUMN LINE ALPHABETIC DESIGNATIONS ARE FOR INDICATING THE PHYSICAL LOCATION OF NOISE CONNECTIONS. NOTE THAT DESIGNATIONS IN 1 & 2 INDICATE AREA AND LEVEL.
 8. WHEN APPLYING THIS PAGE TO UNIT 2, CHANGE ALL UNIT DESIGNATIONS OF 19" IN CROSS-REFERENCE ARROWS TO "2".

THIS DRAWING SUPERSEDES BAR DRAWING 860205001 AND CHANGES THE UNIT DESIGNATION OF DRAWING 860205001.

ICAL & ELECTRICAL AUXILIARIES BUILDING

FUEL HANDLING BUILDING

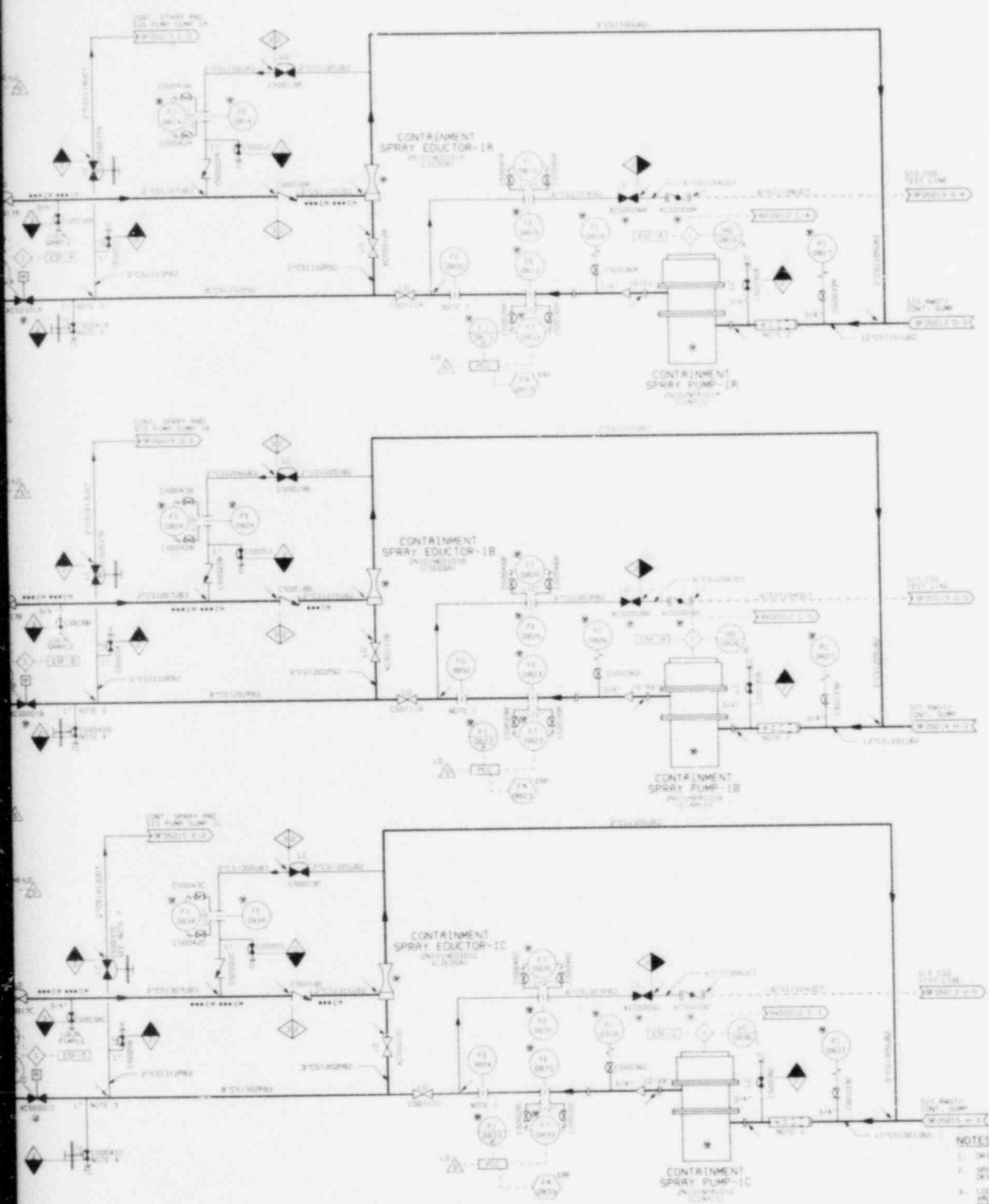
9. MATERIAL IS VALVED AND 2" (11111) STAINLESS STEEL TEES PER UNIT 25 AVAILABLE FROM BULK SUPPLY.
10. VALVES RESERVED FOR THIS CHANGE HAVE BUTT WELDED ENDS.

REVISION	RE	CHK	DL	EGS	PE	DATE
5						
4						
3						
2						
1						

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14828	55199 05034	4

8602050017 - 27



**TI
APERTURE
CARD**

Also Available On
Aperture Card

- NOTES:**
1. INSTRUMENT REQUIRED TO PREVENT EXCESSIVE PUMP RUNOUT.
 2. SPECIAL PIPING WITH STRAINER SEE NOTE STANDARD DESIGN CRITERIA 1.1.2.
 3. LOCATE FLUSHING CONNECTION AS CLOSE AS POSSIBLE TO VALVE HEADS. A FLUSH CONNECTION TO DRAIN HEADS SHOULD BE MADE WITH 2" PIPING.
 4. TEST CONNECTIONS ATTACHED TO BOTTOM OF PIPING TO FACILITATE DRAINING OF LINES.
 5. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS DIAGRAM FOR APPLICATION OF THIS STANDARD TO UNIT 2. USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, ETC. REFER TO PART 5 (SHEET 00001) AND SCHEDULES FOR DETAILS OF IDENTIFICATION NUMBERS.
 6. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM DESIGNATOR CS AND DEPARTMENT GROUP NO. UNLESS OTHERWISE NOTED.
 7. FOR UNIT 2 ONLY, VALVE CS0001C IS A BELLING SEAL VALVE.
- REFERENCES:**
1. FOR PIPING AND INSTRUMENT SYMBOLS SEE STANDARD SYMBOLS A-1A (00000).
 2. PIPING SYMBOLS LISTED IN SUB E.

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

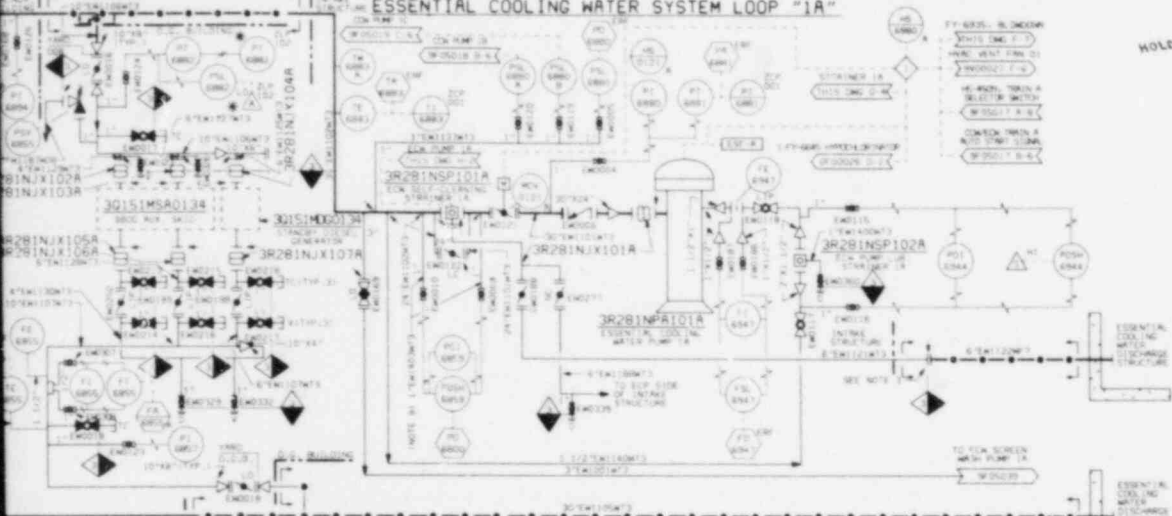
PIPING AND INSTRUMENTATION DIAGRAM
CONTAINMENT SPRAY SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SN109F05037	7

REVISION	NO.	DATE	BY	CHKD.	APP.
1	1	10-22-84	W.A.		
2	2	11-20-84	W.A.		

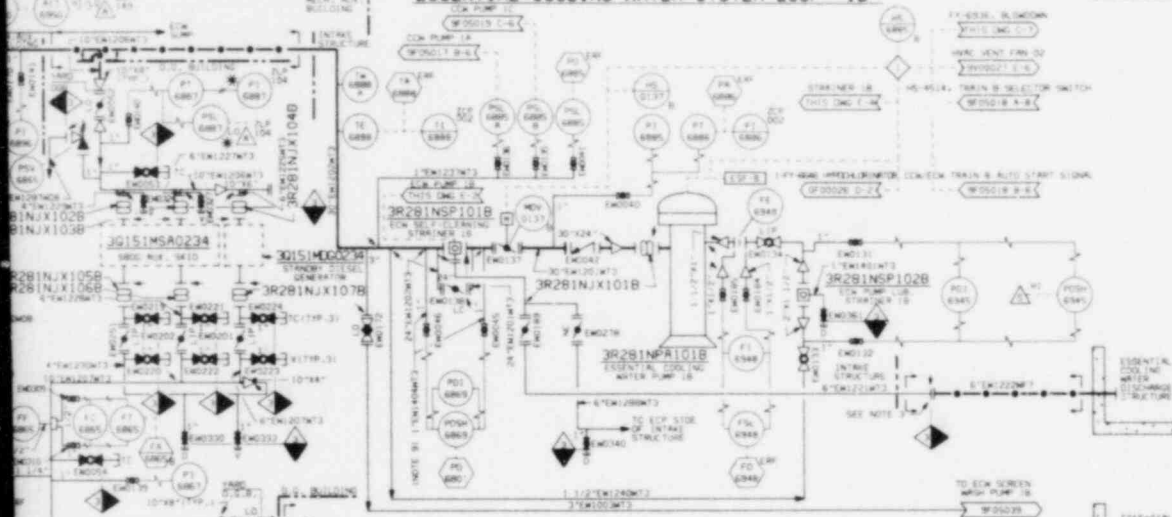
8602050017-28

ESSENTIAL COOLING WATER SYSTEM LOOP "1A"



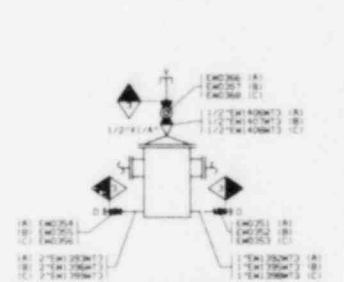
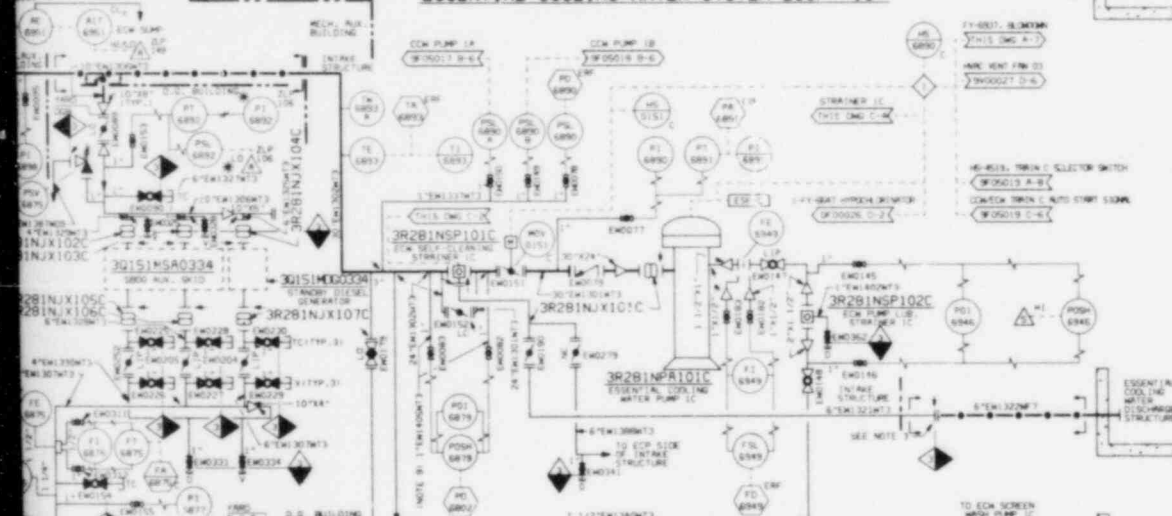
- NOTES:**
1. ALL OPERATING POINTS WILL BE THE NORMAL OPERATING POINT. THE OPERATING POINTS WILL BE SHOWN ON THE P&ID. THE OPERATING POINTS WILL BE SHOWN ON THE P&ID. THE OPERATING POINTS WILL BE SHOWN ON THE P&ID.
 2. INSTRUMENTATION POINTS WILL BE SHOWN ON THE P&ID. THE INSTRUMENTATION POINTS WILL BE SHOWN ON THE P&ID. THE INSTRUMENTATION POINTS WILL BE SHOWN ON THE P&ID.
 3. LOCATE FLANGE OUTSIDE INTRINSIC STRUCTURE.
 4. ALL INSTRUMENTS ON THIS P&ID HAVE SYSTEM DESIGNATION IN.
 5. ALL INSTRUMENTS ON THIS P&ID ARE SEPARATION GROUP N UNLESS OTHERWISE DESIGNATED.
 6. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P&ID. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2.
 7. WHEN APPLYING THIS P&ID TO UNIT 2, CHANGE ALL UNIT DESIGNATIONS TO 2. UNLESS OTHERWISE NOTED, SEE UNIT 2.
 8. THE NEW VALUES LISTED BELOW ARE ALSO VALUES ON UNIT 2.

ESSENTIAL COOLING WATER SYSTEM LOOP "1B"



- NOTES:**
1. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P&ID. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2. FOR MORE DETAIL ON THIS P&ID, SEE UNIT 2.
 2. WHEN APPLYING THIS P&ID TO UNIT 2, CHANGE ALL UNIT DESIGNATIONS TO 2. UNLESS OTHERWISE NOTED, SEE UNIT 2.
 3. THE NEW VALUES LISTED BELOW ARE ALSO VALUES ON UNIT 2.

ESSENTIAL COOLING WATER SYSTEM LOOP "1C"



TI APERTURE CARD

Also Available On Aperture Card

THIS DRAWING SUPERSEDES DRAWINGS 5R281F05038 & 5R281F05039

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

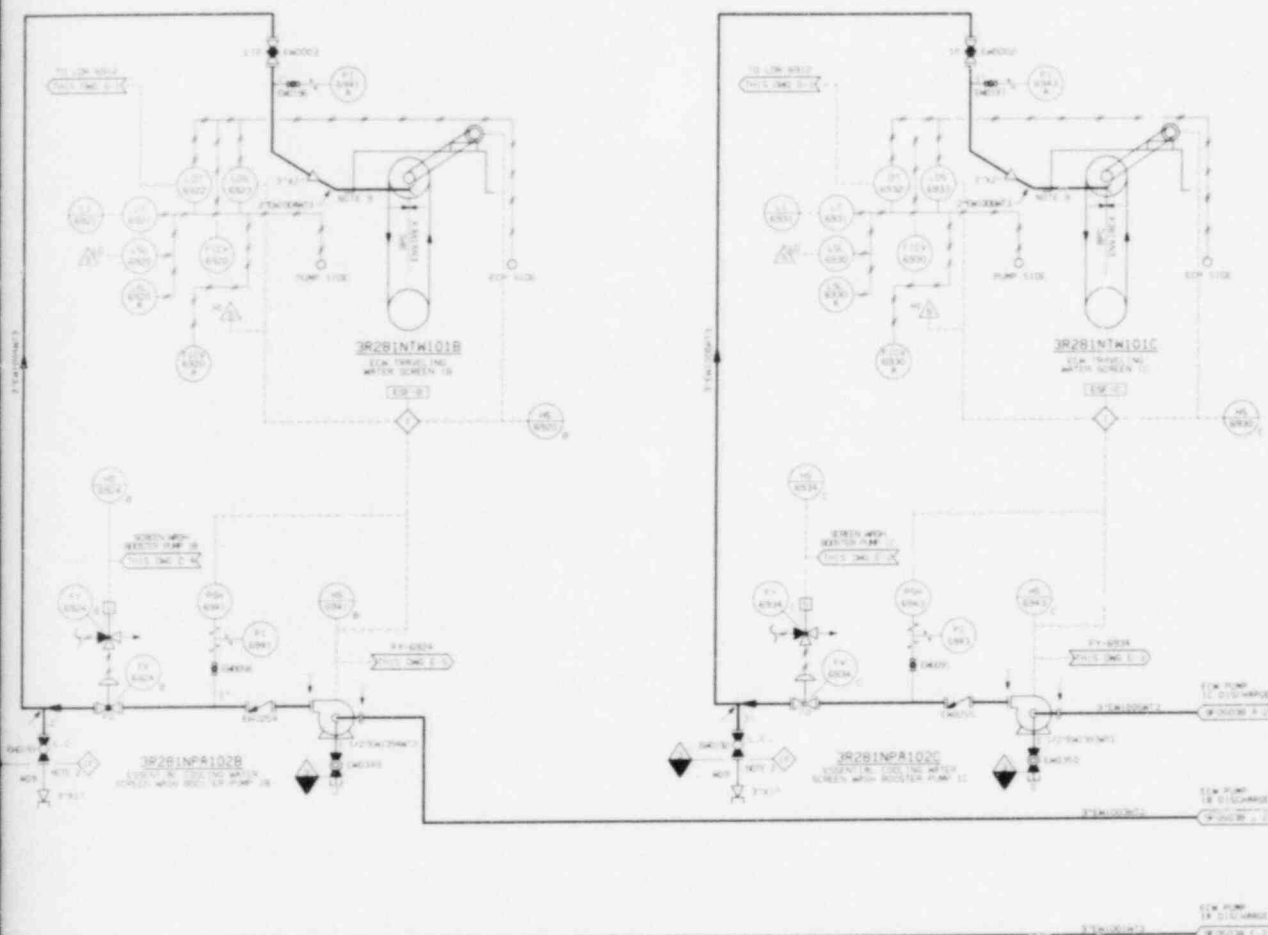
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	5R281F05038	5

REVISION	RE	CHK	Q	EDS	PE	DATE
1						
2						
3						
4						
5						

8602050017-29

NO	NO	0	ISSUED TO INCORPORATE DCA 3.5 & 4.7	10/1/85	10/1/85	NO	10/1/85
		0	ISSUED TO INCORPORATE DCA 3.5 & 4.8				11/1/85
NO	NO	0	ISSUED TO INCORP. DCA 3.5				11/1/85
		0	ISSUED TO INCORP. DCA 3.7				11/1/85
		0	GENERAL REVISION				11/1/85
		0	ISSUED FOR CONSTRUCTION (REVISION)				11/1/85
CHIEF ENGR	CLIENT	NO.	REVISION	RE	CHK	DL	DATE



NOTES:

1. ALL INSTRUMENT TAG NUMBERS SHOWN ON THIS DRAWING ARE PRELIMINARY. THE FINAL NUMBERS WILL BE ASSIGNED BY THE INSTRUMENT SHOP. SEE GENERAL NOTE C-20 (REVISED 00000).
2. LOCATE VALVES AND PIPE CONNECTIONS ON TRAVELING WATER SCREEN HEADS.
3. DETELED.
4. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESCRIPTIONS.
5. ALL INSTRUMENTS ON THIS PAGE HAVE IDENTIFICATION GROUPS. SEE GENERAL NOTE C-20 (REVISED 00000).
6. INSTRUMENT IDENTIFICATION GROUPS ARE SHOWN ON THIS PAGE FOR AMPLIFICATION. SEE TAGS 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

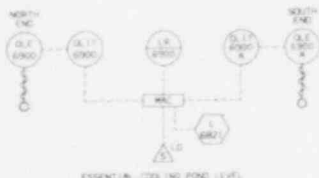
REFERENCES:

1. FOR PIPING AND INSTRUMENT SYMBOLS SEE: 3R281N7101B AND 3R281N7101C.

THIS DRAWING CHANGES THE UNIT DESIGNATION OF 3R281N7101B AND ALSO SUPERSEDES 3R281N7101B AND 3R281N7101C.

TV
APERTURE
CARD

Also Available On
Aperture Card



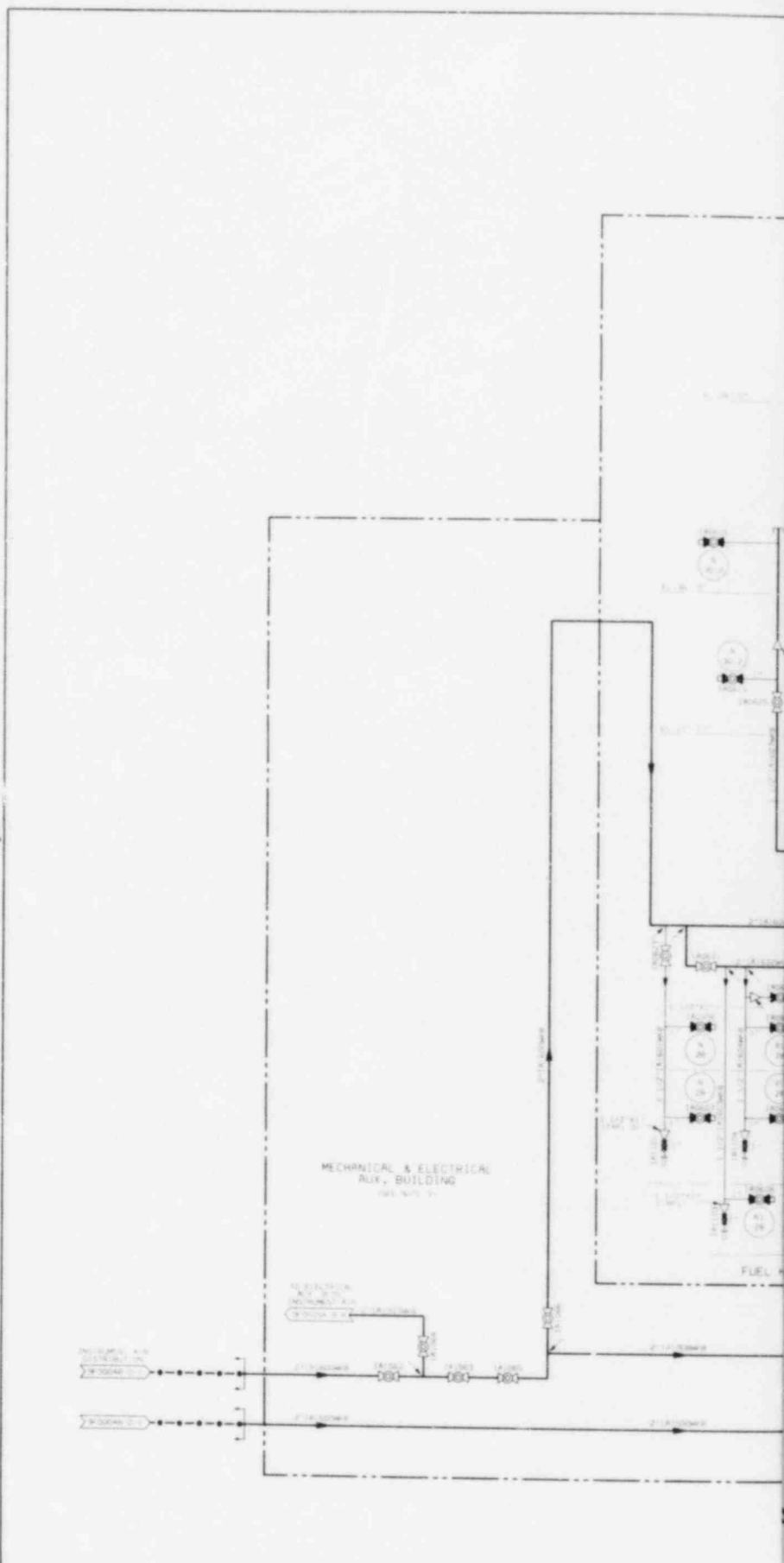
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

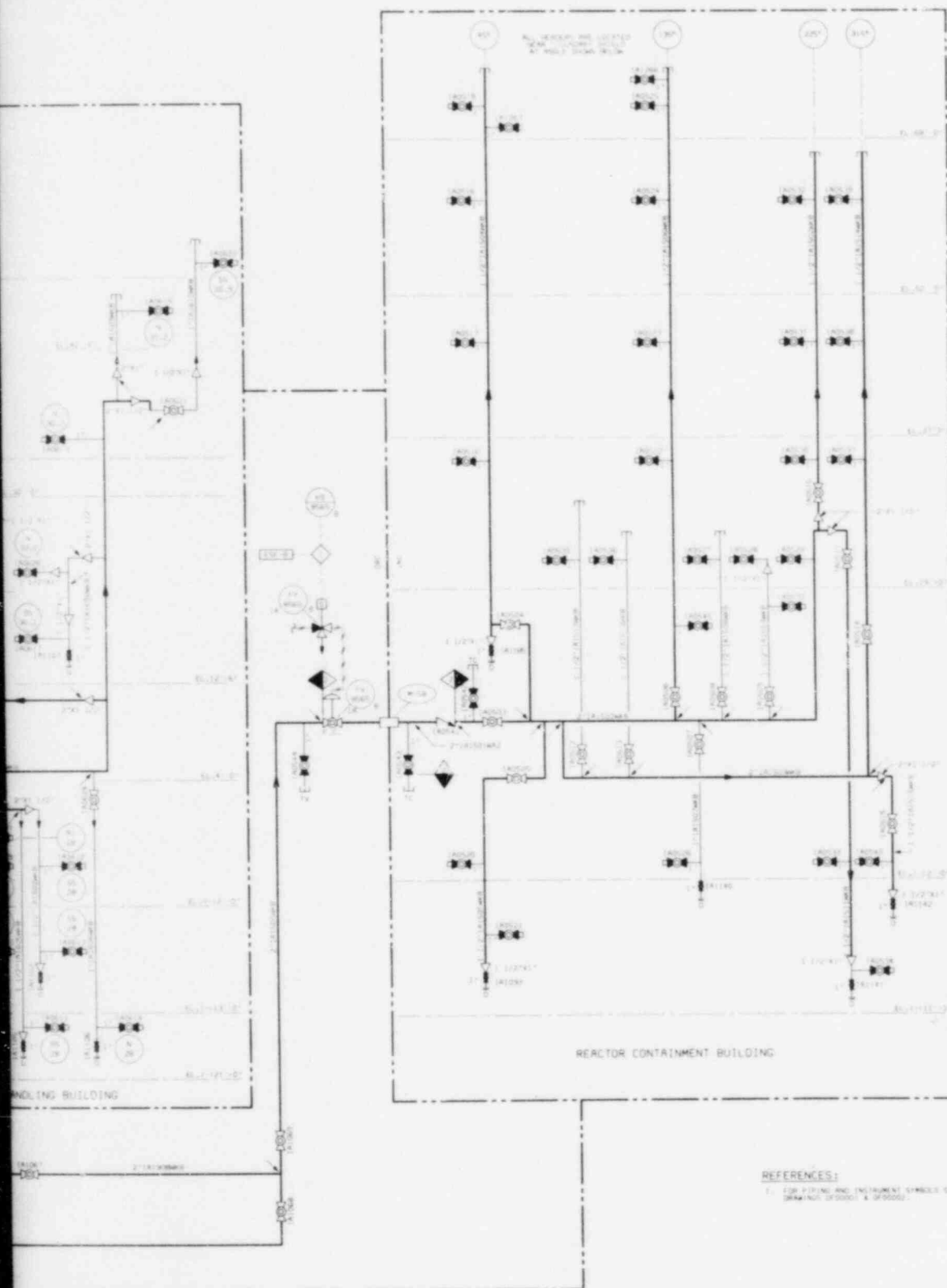
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM
ESSENTIAL COOLING WATER SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SR289F05039	5

8602050017-30

[illegible]



TI APERTURE CARD

Also Available On
Aperture Card

NOTES:

1. TYPICAL ONE TEE WITH A PIGGY-BACK VALVE WITH A PIGGY-BACK VALVE ISolation VALVE. UNLESS NOTED OTHERWISE, MINIMUM OF ONE TEE WITH VALVE IN EACH ROOM LESS THAN 400 SQ. FT. AND TWO TEE'S IN ROOMS IN EACH ROOM 400 SQ. FT. OR LARGER.
2. ELEVATION AND COLUMN LINE ALPHABETIC NOTATION FOR PHYSICAL LOCATIONS OF VALVES AND SENSOR INTERFACES.
3. REFER TO ONE, TWO AND THREE FOR MECHANICAL, PUMP, BLEED AND DRAIN, PIPING FOR ELECT. BLDG.
4. ALL INSTRUMENT TAG NUMBERS SHOWN ON THIS DRAWING ARE IDENTIFIED BY THE UNIT NUMBER UNLESS OTHERWISE NOTED. SEE GENERAL NOTE 5 ON SHEET 000000.
5. AIR TO DRY CRYSTAL HANDLING SYSTEM FOR UNRELIABLE SEAL AND LEAK DETECTION. SEE DRAWING NO. 100000 FOR DETAILS.
6. INSTRUMENT TESTING ONLY REQUIRED FOR THIS SYSTEM.
7. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN. THIS PART FOR APPLICATION OF THIS PART TO UNIT 2, USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC. REFER TO DRAWING NO. 000000 AND 000000000 FOR IDENTIFICATION NUMBER DETAILS.
8. WHEN APPLYING THIS PART TO UNIT 2, CHANGE ALL UNIT IDENTIFIERS OF TEE IN CROSS-REFERENCE APPROPRIATELY.

REFERENCES:

1. FOR PIPING AND INSTRUMENT SYMBOLS, SEE DRAWING 000000 & 000000.

THIS DRAWING SUPERSEDES ALL PREVIOUS EDITIONS AND CORRECTIONS TO THE ORIGINAL DRAWING 000000.



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

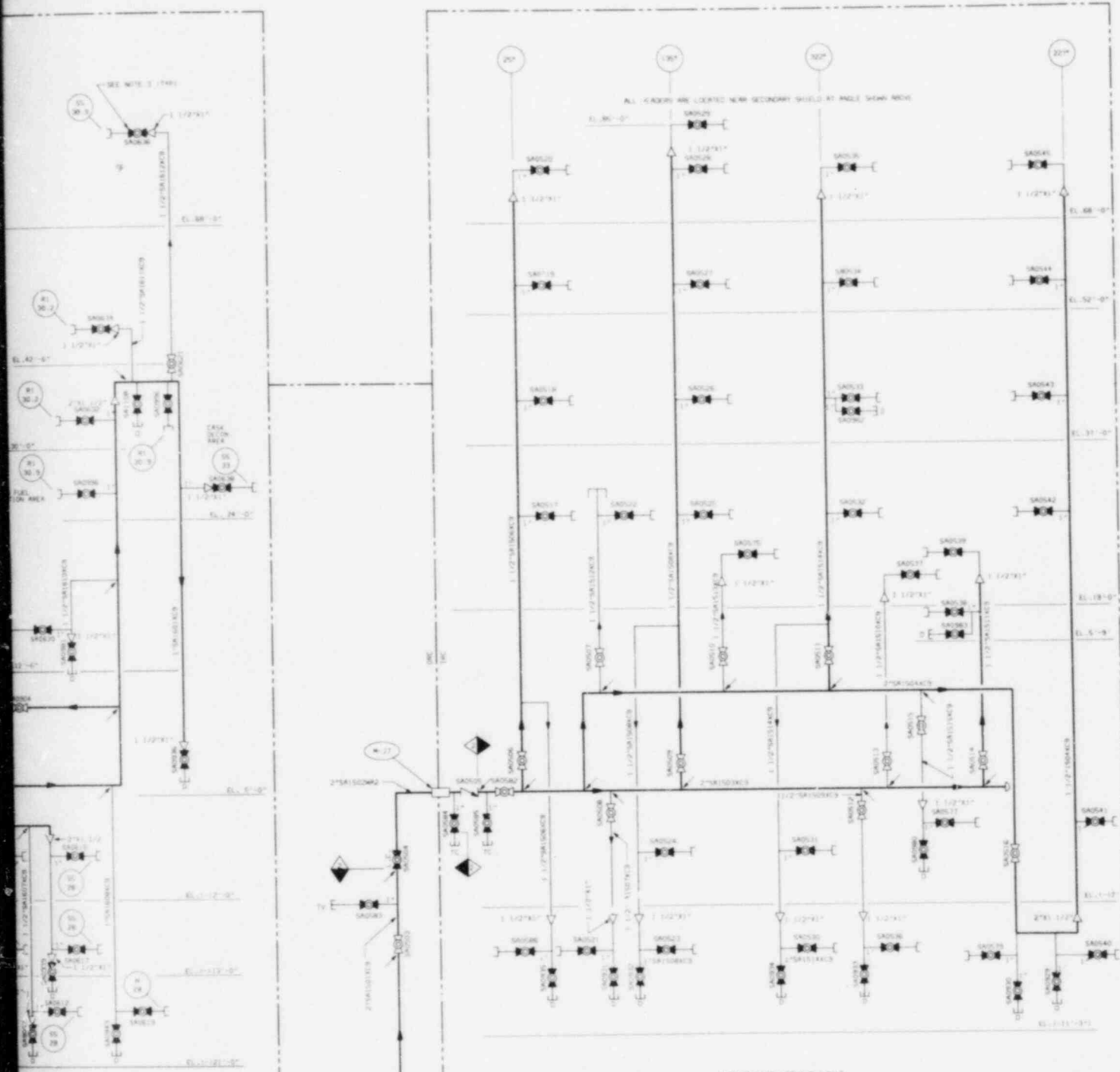
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENT DIAGRAM
FUEL HANDLING BLDG. &
REACTOR CONTAINMENT BLDG.
INSTRUMENT AIR

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	SW119F05040	5

REVISION	BY	CHK	DL	EDS	PR	DATE
5						
4						
3						
2						
1						

8602050017 - 31



**TI
APERTURE
CARD**

**Also Available On
Aperture Card**

NOTES:

1. REFER TO DMC 000001 FOR MECHANICAL & ELECTRICAL AXL. BLUE.
2. ELEVATIONS AND COLUMN LINE ALPHANUMERIC DESIGNATIONS ARE FOR PHYSICAL LOCATION OF VALVES ONLY.
3. LOCATE BLOCK VALVE FOR EACH AIR CONNECTION AS CLOSE TO CONNECTION POSSIBLE.
4. PNEUMATIC TESTING ONLY REQUIRED FOR THIS SYSTEM.
5. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P. & C. FOR APPLICATION OF THIS P. & C. TO UNIT 2. USE UNIT 2 IDENTIFICATION NUMBERS FOR LUMP VALVES, INSTRUMENTS, EQUIPMENT, ETC. REFER TO DRAWINGS SAG00001 AND SAG00002 FOR IDENTIFICATION NUMBERS IN TABLE.

REFERENCES:

1. FOR PIPING AND INSTRUMENT SYMBOLS SEE DRAWINGS SAG00001 & SAG00002.

THIS DRAWING SUPERSEDES D & R DRAWING NO. SAG00001-D AND ALSO CHANGES THE UNIT DESIGNATOR OF DMC NO. SAG00001.



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

**HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT**

SCALE JOB NO. **DRAWING NO.** **REV.**
NONE **14928** S0109F05041 2

REVISION RE CKR BL EDS PE DATE

5

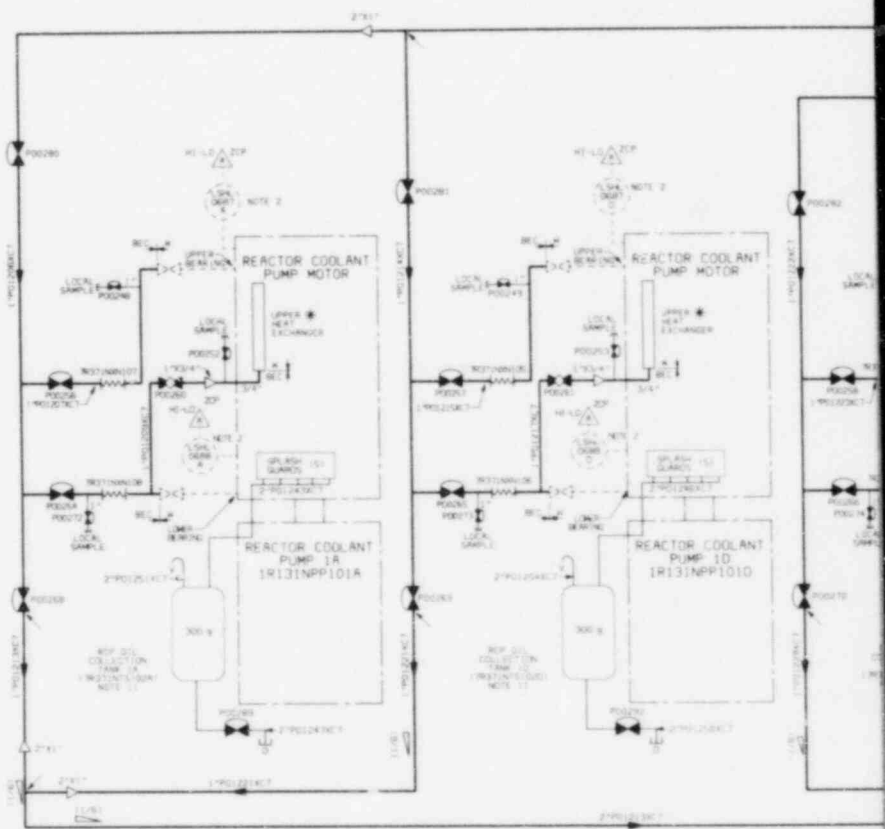
4

3

8602050017 - 32

THIS DRAWING AND THE DESIGN IT CONTAINS ARE THE PROPERTY OF BENTLEY, THEY ARE HEREBY LOANED AND IN THE BORROWER'S EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXCHANGED, OR USED EXCEPT IN THE LIMITED WAY AND PURVE USE PERMITTED BY ANY WRITTEN COMMENT GIVEN BY THE LENDER TO THE BORROWER.

CONTAINMENT



NO.	NO.	NO.	REVISION	RE	OK	AL	ES	PL	DATE	CHIEF ENGR	CLIENT	NO.
1	1	1	ISSUED FOR CONSTRUCTION						12-1-85			
2	2	2	ISSUED FOR CONSTRUCTION						12-1-85			
3	3	3	ISSUED FOR CONSTRUCTION						12-1-85			
4	4	4	ISSUED FOR CONSTRUCTION						12-1-85			
5	5	5	ISSUED FOR CONSTRUCTION						12-1-85			
6	6	6	ISSUED FOR CONSTRUCTION						12-1-85			
7	7	7	ISSUED FOR CONSTRUCTION						12-1-85			
8	8	8	ISSUED FOR CONSTRUCTION						12-1-85			



1. VACUUM INSTRUCTIONS AND INFORMATION TO BE SUPPLIED UNDER 4. & 5. COVERED.
2. INFORMATION TO BE SHOWN ON THE A/C SYSTEM (1-10) AND AIRWAYS (11-15) IS COVERED.
3. INSTALLATION OF PROTECTIVE REGULATOR AND TUBING IS COVERED BY A/C SYSTEM AND AIRWAYS (11-15).
4. ALL INSTRUMENTS THE NUMBER SHOWN ON THIS DIAGRAM ARE IDENTICAL TO THE A/C NUMBER 1 IS IDENTICAL TO A/C 11, 2 IS IDENTICAL TO A/C 22, ETC.
5. ALL INSTRUMENTS SHOWN ON THIS FIELD HAVE EXPIRED EXPIRATION BY EXCEPT 10A, 10B, 1 & 2 ARE ALSO USED.
6. ALL INSTRUMENTS SHOWN ON THIS FIELD ARE IDENTICAL TO 10A.
7. ANALOG CONTROLLER NOTED: UNIT 1 IS SHOWN ON THIS DIAGRAM FOR REPRESENTATION OF THIS DIAGRAM. UNIT 2 IS SHOWN ON THE OTHER SIDE OF THE DRAWING FOR PUMPING, ANALYSIS, AND INSTRUMENTS, EQUIPMENT, ETC. FOR THE ANALOG CONTROLLER. SEE THE OTHER SIDE FOR CONTROLLER INFORMATION DETAILS.
8. WHEN APPLYING THIS DIAGRAM TO UNIT 2, CHECK THE ANALOG CONTROLLER FOR UNIT 2.
9. INSTR. PULSATION DAMPER.
10. GATE VALVE INFORMATION AS CLOSE TO PUMP AS POSSIBLE.
11. FOR SLO COLLECTION TANKS TO BE LOCATED IN THE SLO COLLECTION TANK, THE TANK FROM THE SLO AND GATES MUST BE SUPPLIED DOWNWARD FOR GRAVITY DRAIN.
12. BALL VALVE 11 TO BE USED IN SLO OF PUMP VALVE

[FOR PLANE & INSTRUMENT SYMBOLS SEE ORDNANCE
OR 50001 & 50 0000]

THIS CASE CONCERNS SAN DIEGO 487295042-0
AND 487295042-1.

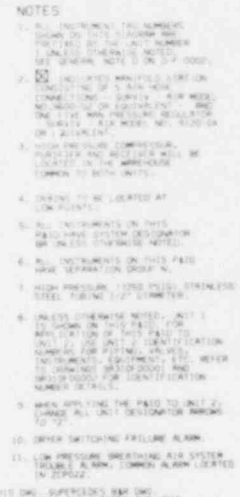
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
REACTOR COOLANT PUMP OIL CHANGING SYSTEM

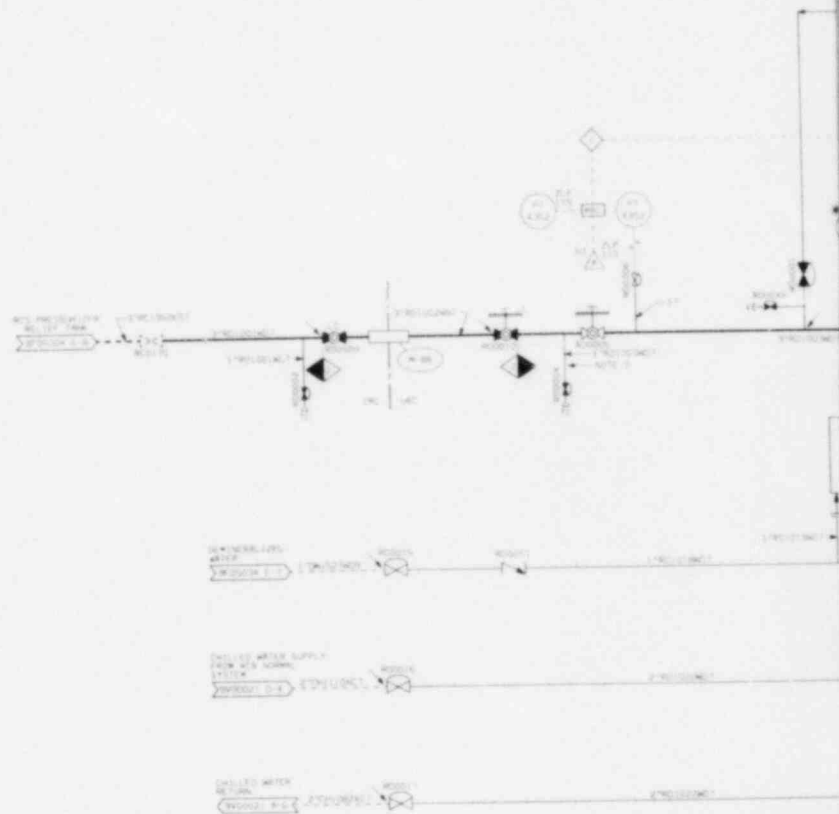
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	5R379F05042	3

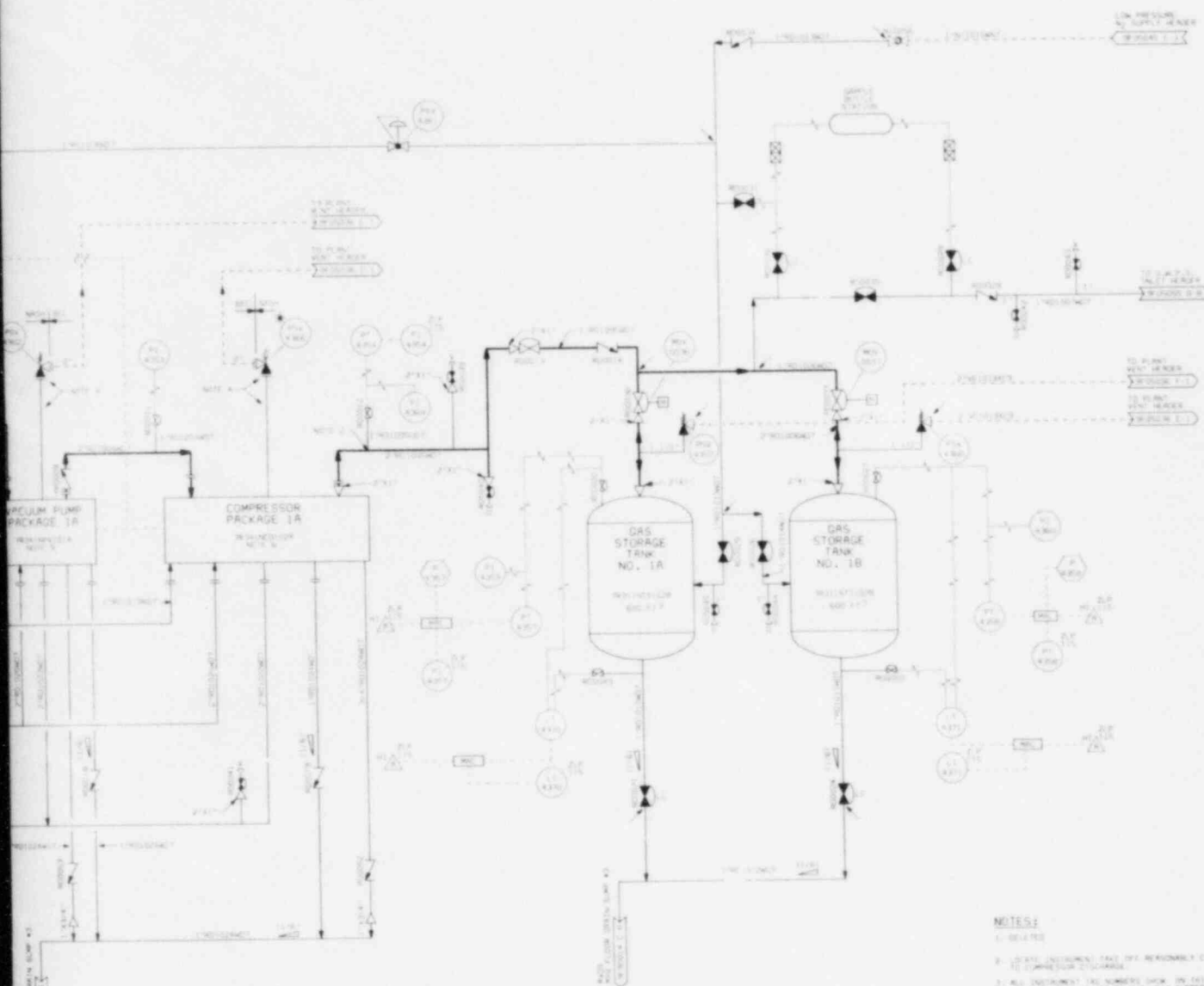
REVISION	REV	CHKD	QUL	EGS	PE	DATE
5				4		

[illegible]



SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14928	50119F05044	5

[illegible]



TI
APERTURE
CARD

Also Available On
Aperture Card

NOTES:

1. DETAIL TO
2. LOCATE INSTRUMENT TAGS OFF REASONABLY CLOSE TO COMPRESSOR STORAGE
3. ALL INSTRUMENT TAG NUMBERS SHOWN ON THIS DRAWING ARE FOR THE VACUUM PUMP AND COMPRESSOR. OTHERWISE, NOTES, SEE GENERAL, NOTE 3 ON SHEET 00000.
4. PIPING AND INSTRUMENTS SHOWN ON THIS DRAWING ARE FOR THE VACUUM PUMP AND COMPRESSOR.
5. PACKAGE DETAILS SHOWN ON FORCING AND WORKSHOP IN.
6. PACKAGE DETAILS SHOWN ON FORCING AND WORKSHOP IN.
7. LOCATE TEST CONNECTION REASONABLY CLOSE TO VALVE ROADS.
8. ALL INSTRUMENTS ON THIS DRAWING HAVE SYSTEM DESIGNATION, ALL UNLESS OTHERWISE NOTED.
9. ALL INSTRUMENTS ON THIS DRAWING HAVE SEPARATION GROUP, ALL UNLESS OTHERWISE NOTED.
10. IN THE OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS DRAWING FOR APPLICATION OF THIS DRAWING TO UNIT 2. THE UNIT IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC., REFER TO SHEET 00000 AND 000000000 FOR IDENTIFICATION NUMBER DETAILS.
11. WHEN APPLYING THIS DRAWING TO UNIT 2, CHANGE ALL DESIGNATIONS OF "1" IN DRAWING REFERENCE AMOUNT TO "2".

REFERENCES:

1. FOR PIPING & INSTRUMENT SYMBOLS SEE DRAWINGS 00000 & 000000

THIS Dwg. SUPERSEDES ALL DRAWING
PREVIOUSLY ISSUED AND CANCELS THE DRAFT DESIGNATION
OF ALL PREVIOUS DRAFTS

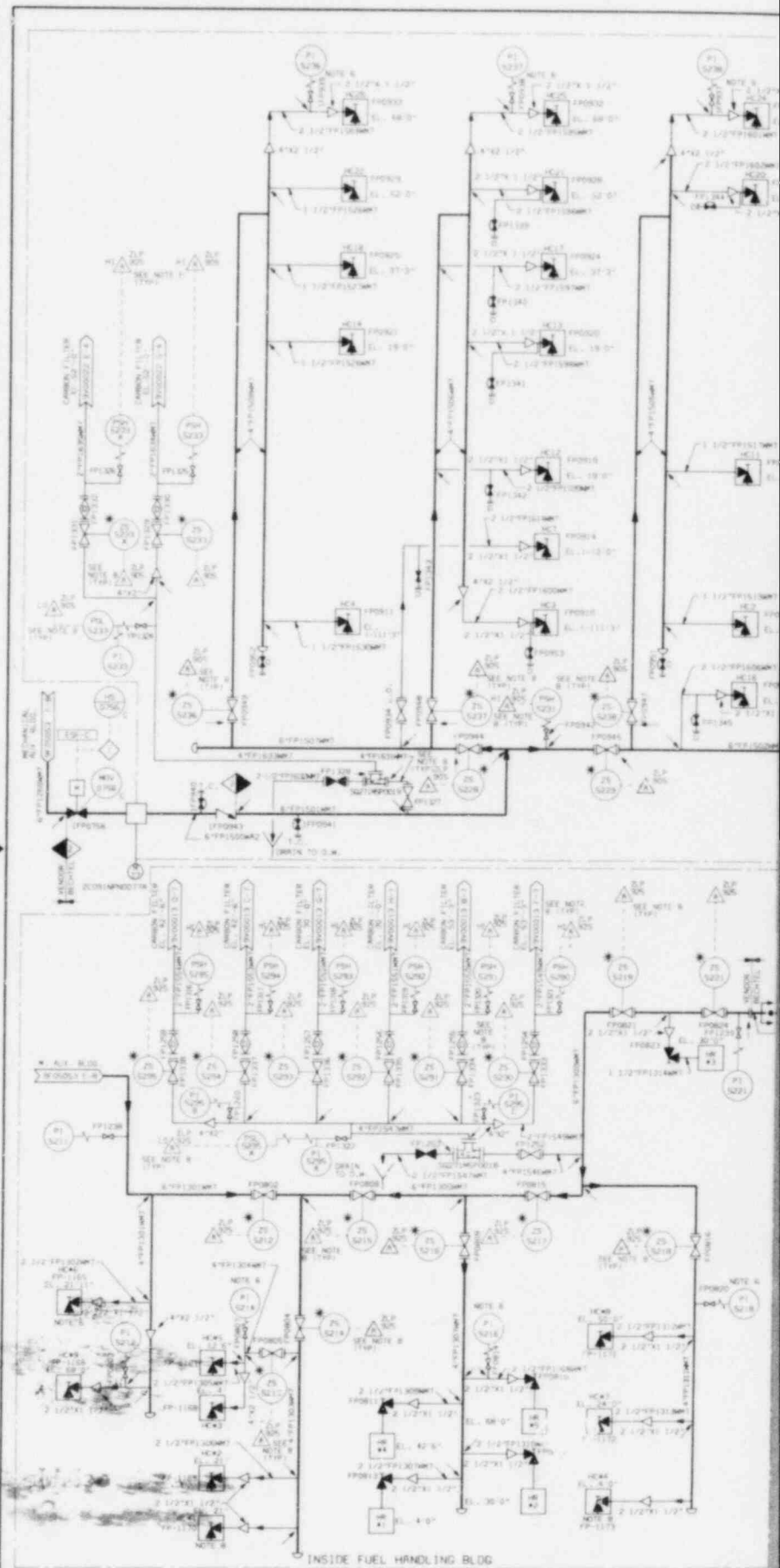
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

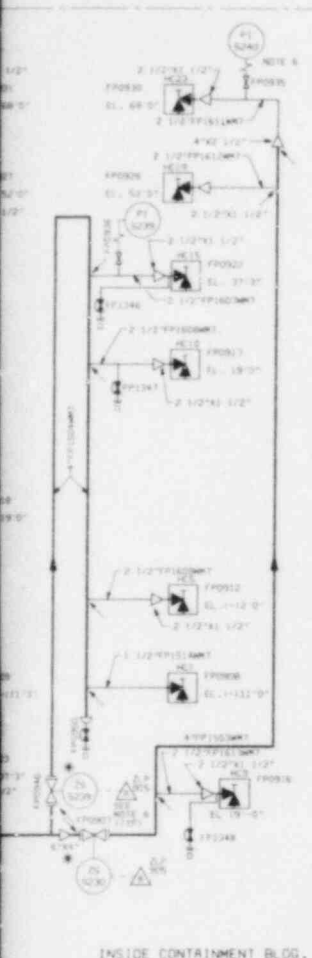
PIPING & INSTRUMENTATION DIAGRAM
RCS VACUUM DEAERATING SYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	SR349F05046	3

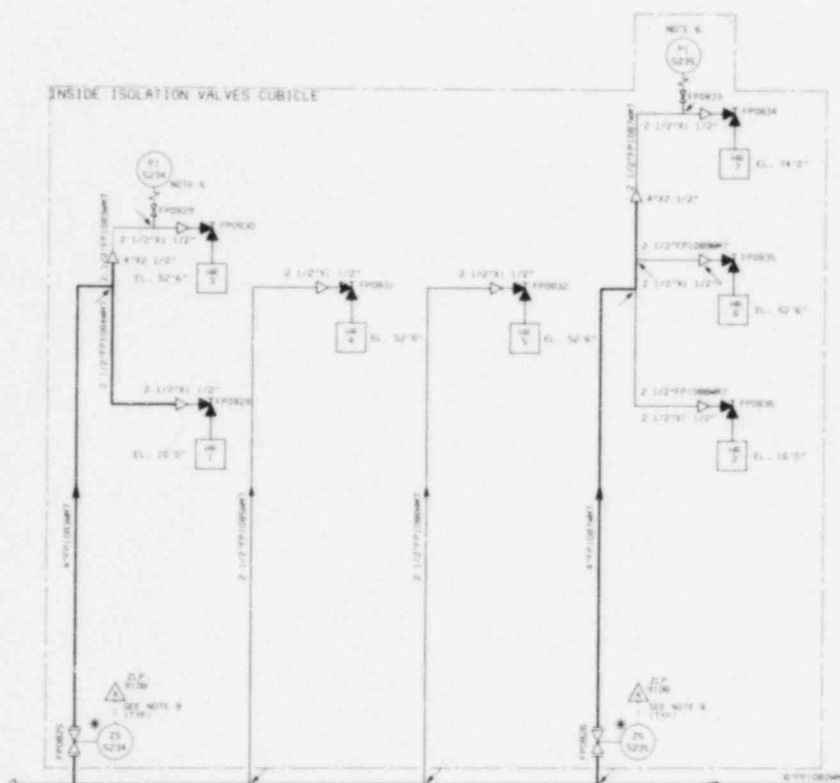
REVISION	BY	CHK	SL	ESS	PE	DATE
5						
4						
3						
2						

8602050017 - 35

[illegible]



INSIDE ISOLATION VALVES CUBICLE

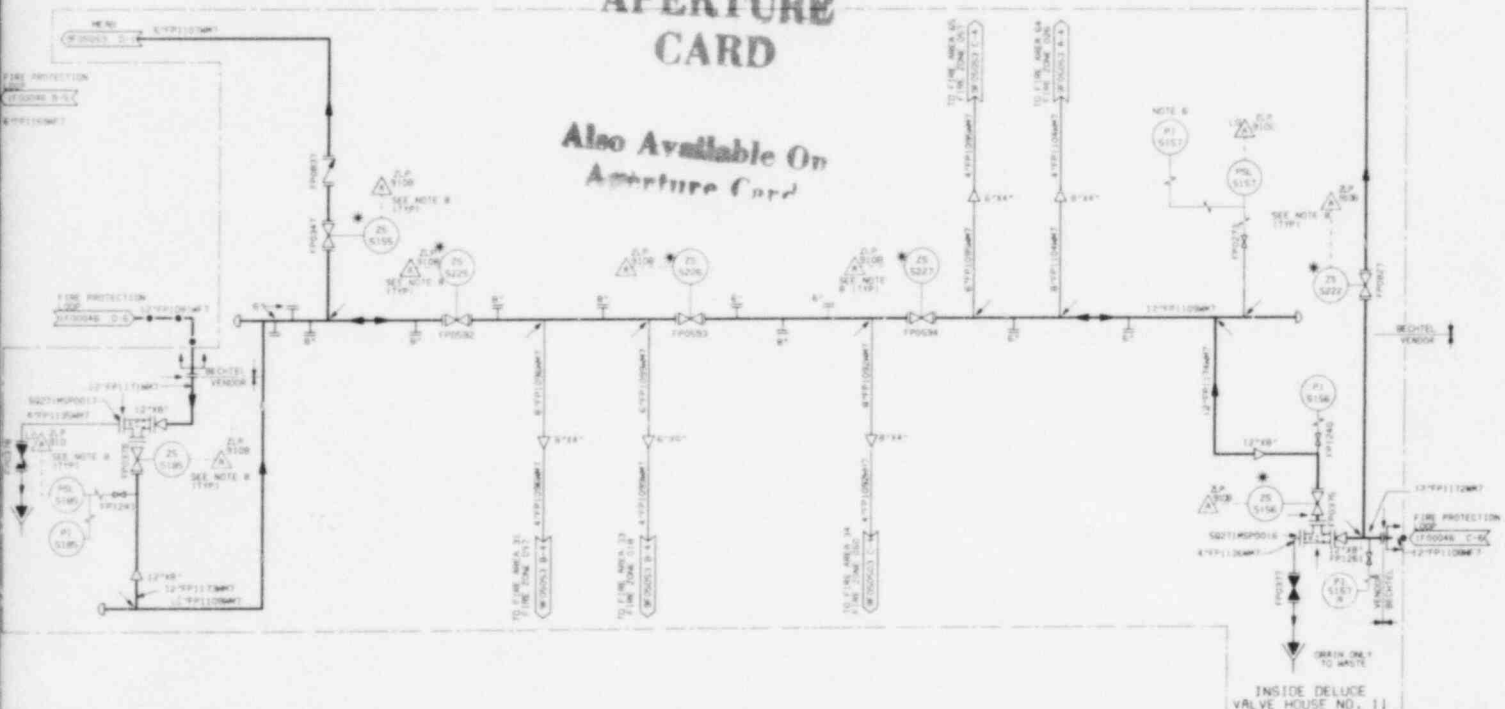


NOTES:

1. ALL GATE VALVES WITH ALARMS ON THIS DRAWING WILL ALARM WHEN CLOSED.
2. INDICATES FIXED WATER SPRAY SYSTEM.
3. ALL NOTE CABBINETS WILL BE FED FROM LEFT HAND SIDE.
4. PIPING MATERIAL BY OTHERS TO BE IN ACCORDANCE WITH SPEC. 100.
5. ALL INSTRUMENTS ON THIS DRAWING ARE PROVIDED BY THE UNIT NUMBER. ANALYSIS OTHERWISE NOTED. SEE NOTE 2 ON 502700000.
6. PRESSURE DRUGS TO BE INSTALLED AT THE HIGH POINT OF THE LINE.
7. ALL FF VALVES ARE TO BE PROVIDED BY AN ALI, WITH THE EXCEPTION OF SP0001, SP0002, & SP0003.
8. ALL ANNUNCIATORS WILL BE DISPLAYED ON THE LOCAL FIRE CONTROL PANEL AND TRANSMITTED THROUGH THE FIRE PROTECTION DATA ACQUISITION SYSTEM TO A CRT DISPLAY IN THE CONTROL ROOM.
9. H.R. ANDER REEL, HEMHOSE CABINET.
10. DELUGE VALVES NORMALLY CLOSED.
11. CORROSION SPRAYING ROOM CHANGABLE PENETRATION AREA. PIPING AND VALVES.
12. ALL GASES & SWITCHES WILL BE SUPPLIED BY BECHTEL. NOT INSTALLED BY THE SYSTEM CONTRACTOR. CORROSION SPRAYING ROOM CHANGABLE PENETRATION AREA. PIPING AND VALVES. INSTRUMENTS, EQUIPMENT, ETC. REFER TO DRAWING 502700000 AND 502700000 FOR IDENTIFICATION NUMBER DETAILS.
13. ALL PIPING IN REB IS SUPPLIED BY BECHTEL.
14. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESIGNATION FF.
15. ALL INSTRUMENTS ON THIS PAGE HAVE SYSTEM DESIGNATION FF.
16. VENTS AND DRAINS FOR THE FIB & TAC WILL BE LOCATED UPON THE DESIGN OF THE FIRE PROTECTION SYSTEM FOR THESE BUILDINGS.
17. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS PAGE. FOR APPLICATION OF THIS PAGE TO UNIT 2, USE UNIT 2 DESIGNATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC. REFER TO DRAWING 502700000 AND 502700000 FOR IDENTIFICATION NUMBER DETAILS.
18. WHEN APPLYING THIS PAGE TO UNIT 2 CHANGE ALL UNIT DESIGNATIONS OF "1" IN CROSS REFERENCE DRAWING TO "2".

TI
APERTURE
CARD

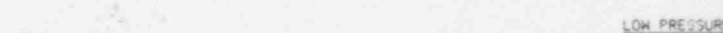
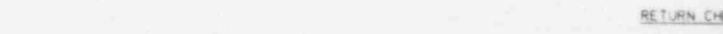
Also Available On
Aperture Card



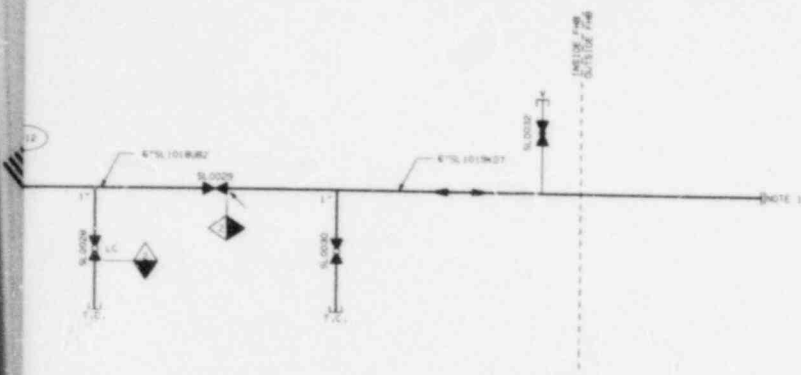
BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
FUEL HANDLING, IVC, ELEC. AUX. BLDG.
CONTAINMENT BLDG. & DELUGE VALVE HOUSE NO. 11
FIRE PROTECTION SYSTEM
SCALE: NONE JOB NO. 14928 DRAWING NO. 50279F05047 REV. 4

8602050012 -36



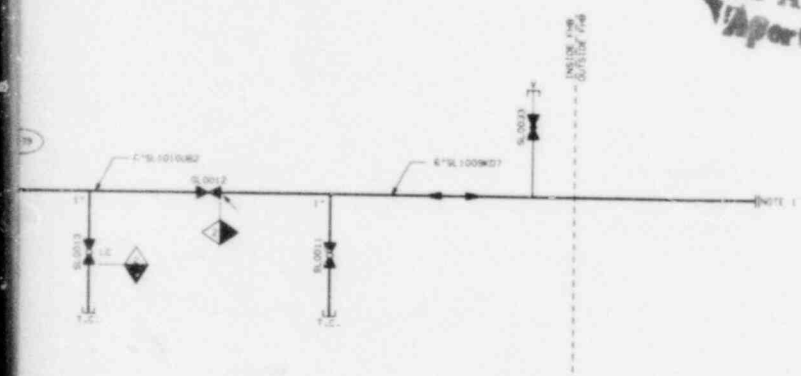
N/A	M/C	3	INCORPOR DON S 6-7-8 & 9	08	01	01	01	N/A	2-22-85										
N/A	N/E	2	INCORPOR DON S 4, 5 & 6					N/A	0-13-84										
		1	INCORPORATED DON S 1-2 & 3						2-22-84										
		0	ISSUED FOR CONSTRUCTION						3-20-83										
CHIEF ENGR	CLIENT	NO.	REVISION	RE	CKR	DL	ENR	PE	DATE	CHIEF ENGR	CLIENT	NO.							



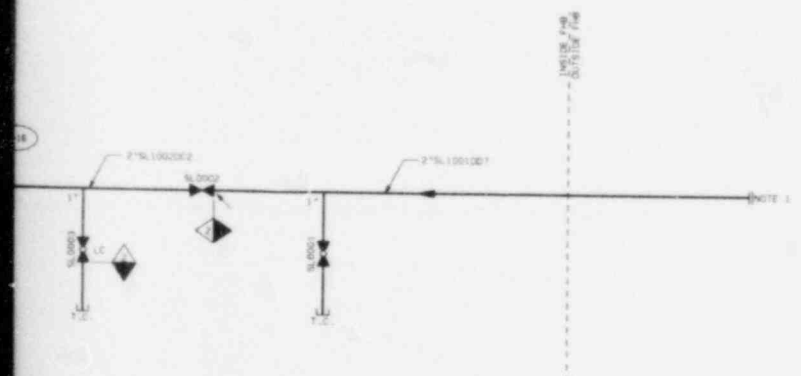
CHEMICAL CLEANING

II
APERTURE
CARD

Also Available
Aperture



PERIPHERAL LINE



SURE LINE

NOTES:

1. PIPING AS SHOWN ON THIS P & ID IS A PORTION OF THE TOTAL SYSTEM. THE REMAINDER OF THE SYSTEM WILL BE SUPPLIED BY H & P AND IS NOT SHOWN HERE.
2. FLANGES SHOULD BE LOCATED NEAR EACH STEAM GENERATOR AT APPROXIMATE ELEVATION 41'-0".
3. LOCAL DRAINOUT AND LOW POINT DRAIN SHOULD BE PROVIDED FOR ALL PIPING SYSTEMS.
4. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS P & ID. FOR APPLICATION OF THIS P & ID TO UNIT 2, USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC. REFER TO DRAWINGS S01500001 AND S01500000 FOR IDENTIFICATION NUMBER DETAILS.

THIS DWG. SUPERSEDES DWR DNG. S01500001 AND S01500001.

REVISION	RE	CHK	QCL	EDS	PS	DATE
5						
4						
3						
2						
1						

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

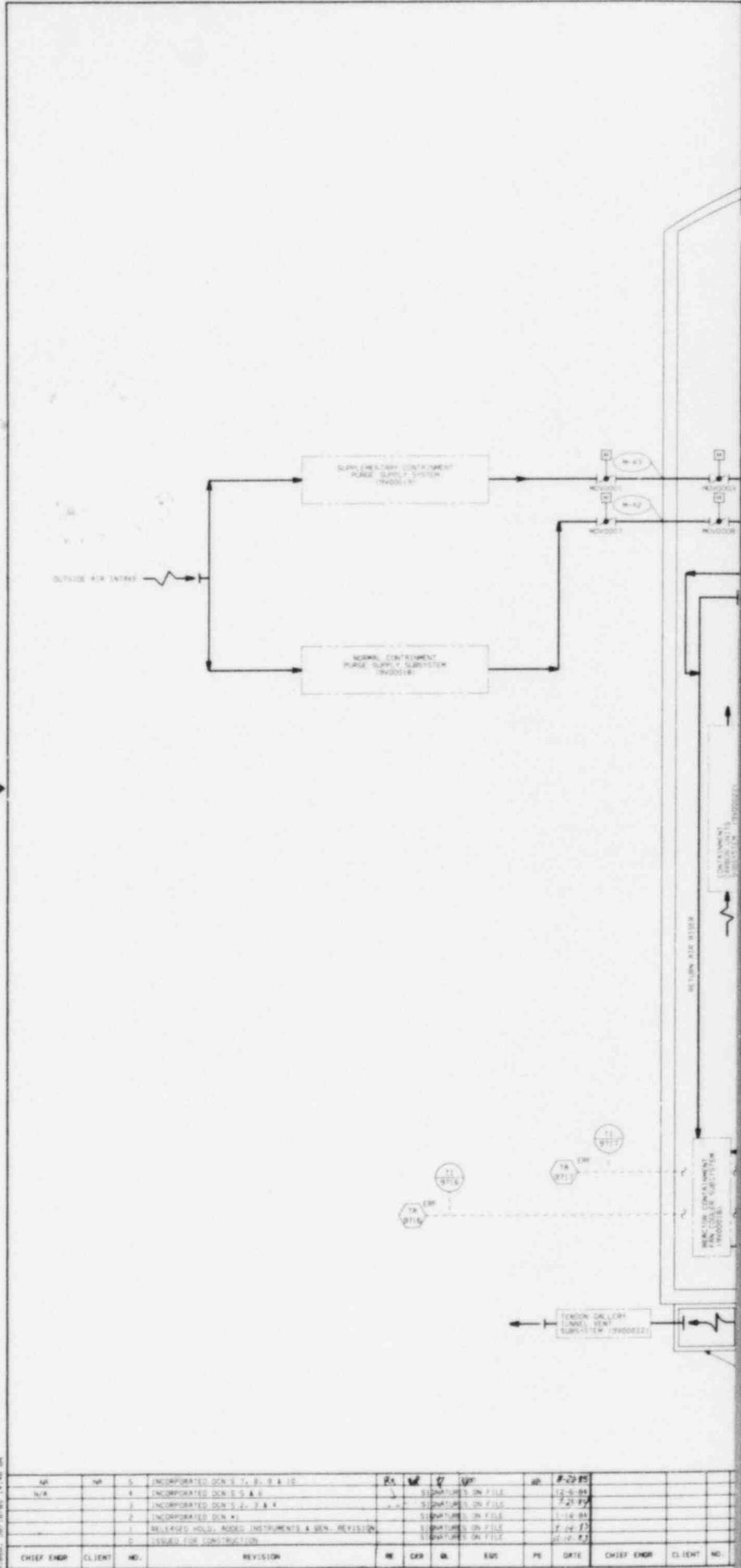
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
STEAM GENERATORS SLUDGE
CLEANING AND CHEMICAL
CLEANING SYSTEM

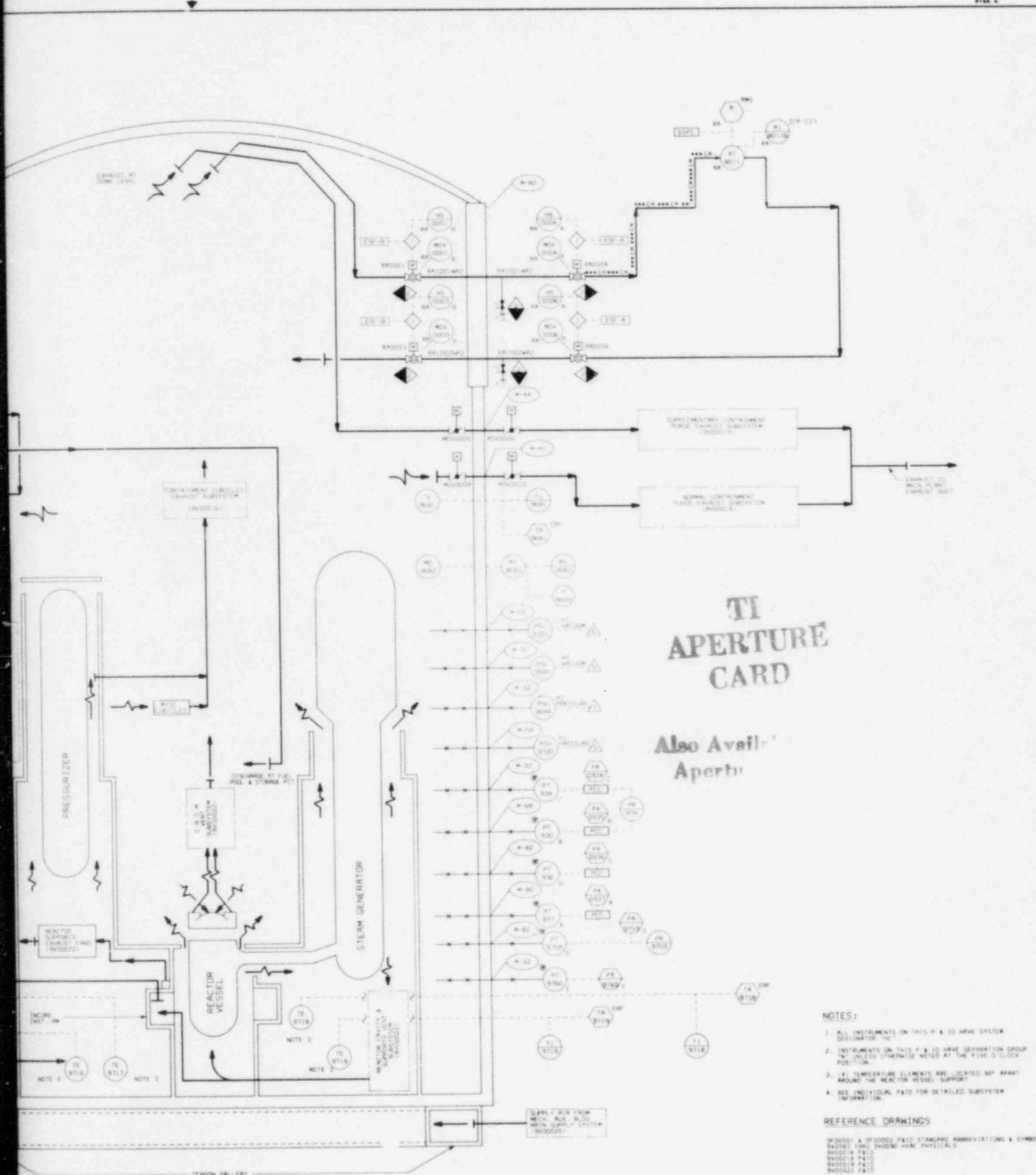
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14828	55206F05057	3

8602050017-37

THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF HENKEL. THEY ARE HEREBY LOANED TO THE ENGINEER'S EXPRESSED AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT IN THE LIMITED WAY AND FOR THE USE AUTHORIZED BY ANY WRITTEN CONSENT GIVEN BY THE ENGINEER.



NO.	NO.	NO.	REVISION	RE	CHK	BL	ENG	PE	DATE	CHIEF ENGR	CLIENT	NO.
1	1	1	INCORPORATED CON. S. 1, 2, 3 & 10	RS	W	Q	W	AP	8-20-85			
2	2	2	INCORPORATED CON. S. 1, 2 & 10						12-5-84			
3	3	3	INCORPORATED CON. S. 2, 3 & 4						7-21-84			
4	4	4	INCORPORATED CON. S. 1						1-14-84			
5	5	5	REPLACED HOLD, ADDED INSTRUMENTS & CON. REVISION						7-14-83			
6	6	6	ISSUED FOR CONSTRUCTION						12-12-83			



SYSTEM COMPOSITE DIAGRAM
 (SV0001, SV0002, SV0003 & SV0004)

BECHTEL ENERGY CORPORATION
 HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
 SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM
 HVAC REACTOR CONTAINMENT BLDG.
 SYSTEM COMPOSITE

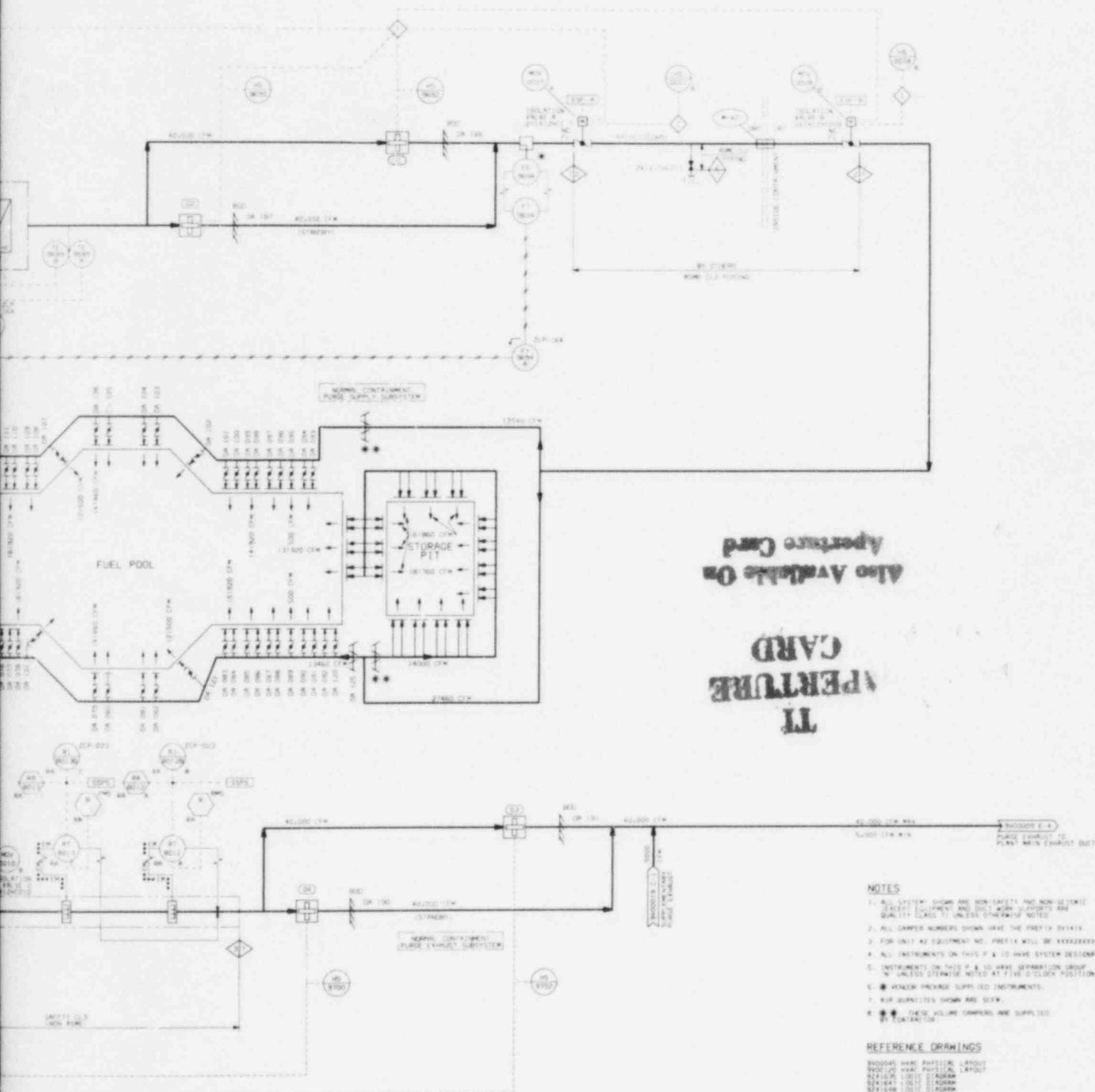
SCALE	JOB NO.	DRAWING NO.	REV.
1/4" = 1'-0"	14928	SV149V00017	5

REVISION

NO.	DATE	BY	CHKD.	APP.
5				
4				
3				
2				
1				

8602050017-38

[illegible]



IT
APERTURE
CARD
ALSO AVAILABLE ON
Aperture Card

NOTES

1. ALL SYSTEMS (HARDWARE AND NON-HARDWARE) SHOULD BE IDENTIFIED BY THE PREFIX AND QUALITY CLASS IF UNLESS OTHERWISE NOTED.
2. ALL CARRIER NUMBERS SHOULD HAVE THE PREFIX 012345.
3. FOR UNIT KEY EQUIPMENT, NO PREFIX WILL BE XXXXXXXXXX.
4. ALL INSTRUMENTS ON THIS P & I TO HAVE SYSTEM DESIGNATOR "H".
5. INSTRUMENTS ON THIS P & I HAVE SEPARATION GROUP "N" UNLESS OTHERWISE NOTED AT FILE 0-CLASH POSITION.
6. ★ VEHICLE PACKAGE SUPPLIED INSTRUMENTS.
7. AIR QUANTITIES SHOWN AND SCOW.
8. ★ ★ THESE VOLUME CARRIERS ARE SUPPLIED

REFERENCE DRAWINGS

SVC0045	HWT	PwFCILAL	LATOST
SVC0120	HWT	PwFCILAL	LATOST
BZK1678	IOTC	OIAGRM	
BZK1941	IOTC	OIAGRM	
BZK1948	IOTC	OIAGRM	
DFOO061	F & S	SWMO-5	
DF00052	F & S	SWMO-5	

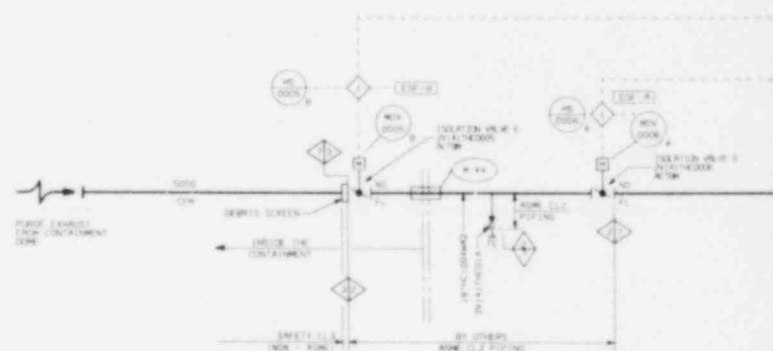
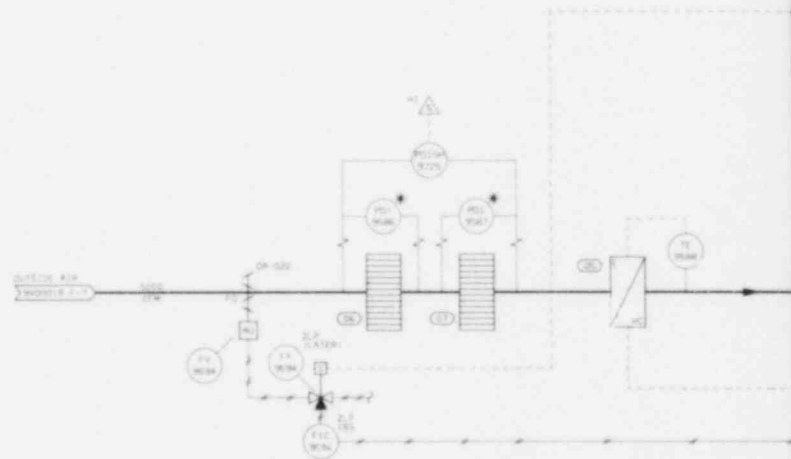
 **BECHTEL ENERGY CORPORATION**
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING AND INSTRUMENTATION DIAGRAM
REACTOR CONTAINMENT BLDG.
NORMAL PURGE SUBSYSTEM

SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	SV149V00018	4

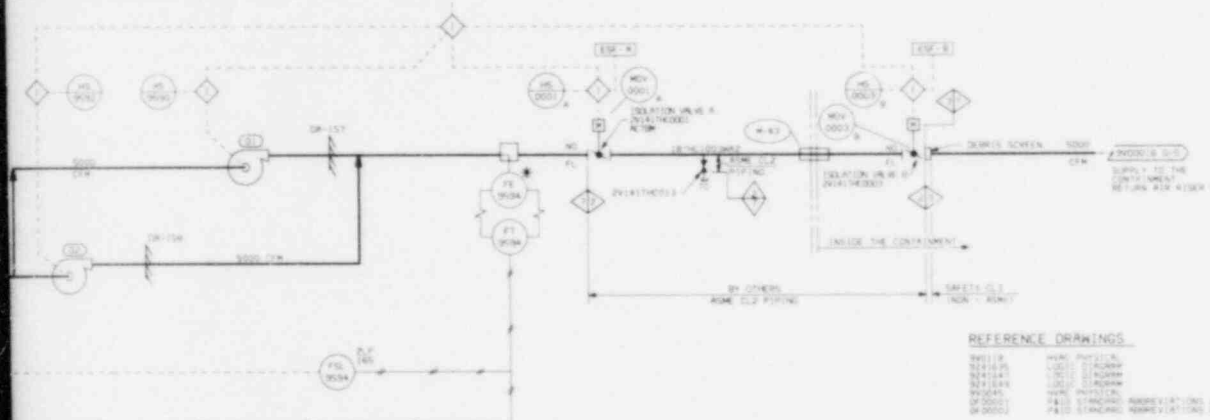
THIS DRAWING AND THE DESIGN IT CARRIES ARE THE PROPERTY OF BENTON, BOWEN & BOWEN. THEY ARE MADE A LOAN TO YOU AND WILL NOT BE REPRODUCED, COPIED, FORWARDED, OR USED EXCEPT IN THE LIMITED WAY AND UNDER THE LIMITED CONSENT GIVEN BY THE LENDER TO THE BORROWER.



NO.	REV.	DESCRIPTION	BY	CHKD	DATE	APP'D	DATE	CHKD ENGR	CLIENT NO.
1	1	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
2	2	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
3	3	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
4	4	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
5	5	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
6	6	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
7	7	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
8	8	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
9	9	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
10	10	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
11	11	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
12	12	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
13	13	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
14	14	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
15	15	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
16	16	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
17	17	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
18	18	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
19	19	INCORPORATED DOWNSIDE	HA	HA	7/1/83				
20	20	INCORPORATED DOWNSIDE	HA	HA	7/1/83				

SIZE E

EQUIPMENT NUMBERING INDEX		
KEY NO.	EQUIPMENT NUMBER	DESCRIPTION
01	86141VMD01	SUPP PURGE SUP FAN (11A)
02	86141VMD02	SUPP PURGE SUP FAN (11B)
03	86141VMD03	SUPP PURGE EXH FAN (11A)
04	86141VMD04	SUPP PURGE EXH FAN (11B)
05	86141VMD05	SUPP PURGE SUP WTR COOL
06	86141VMD06	SUPP PURGE SUP FINE FILTER
07	86141VMD07	SUPP PURGE SUP H.E. FILTER



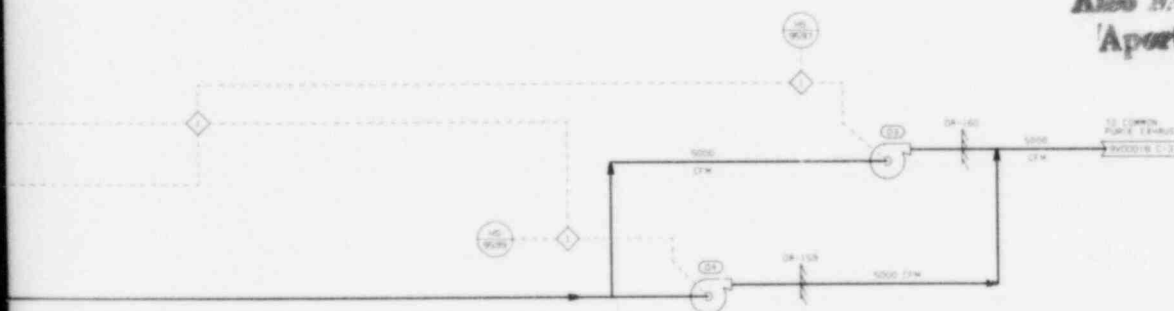
REFERENCE DRAWINGS

86119	HVAC PARTIAL
86120	LOGIC CONTROL
86121	LOGIC CONTROL
86122	LOGIC CONTROL
86123	LOGIC CONTROL
86124	LOGIC CONTROL
86125	LOGIC CONTROL
86126	LOGIC CONTROL
86127	LOGIC CONTROL
86128	LOGIC CONTROL
86129	LOGIC CONTROL
86130	LOGIC CONTROL
86131	LOGIC CONTROL
86132	LOGIC CONTROL
86133	LOGIC CONTROL
86134	LOGIC CONTROL
86135	LOGIC CONTROL
86136	LOGIC CONTROL
86137	LOGIC CONTROL
86138	LOGIC CONTROL
86139	LOGIC CONTROL
86140	LOGIC CONTROL
86141	LOGIC CONTROL
86142	LOGIC CONTROL
86143	LOGIC CONTROL
86144	LOGIC CONTROL
86145	LOGIC CONTROL
86146	LOGIC CONTROL
86147	LOGIC CONTROL
86148	LOGIC CONTROL
86149	LOGIC CONTROL
86150	LOGIC CONTROL
86151	LOGIC CONTROL
86152	LOGIC CONTROL
86153	LOGIC CONTROL
86154	LOGIC CONTROL
86155	LOGIC CONTROL
86156	LOGIC CONTROL
86157	LOGIC CONTROL
86158	LOGIC CONTROL
86159	LOGIC CONTROL
86160	LOGIC CONTROL
86161	LOGIC CONTROL
86162	LOGIC CONTROL
86163	LOGIC CONTROL
86164	LOGIC CONTROL
86165	LOGIC CONTROL
86166	LOGIC CONTROL
86167	LOGIC CONTROL
86168	LOGIC CONTROL
86169	LOGIC CONTROL
86170	LOGIC CONTROL
86171	LOGIC CONTROL
86172	LOGIC CONTROL
86173	LOGIC CONTROL
86174	LOGIC CONTROL
86175	LOGIC CONTROL
86176	LOGIC CONTROL
86177	LOGIC CONTROL
86178	LOGIC CONTROL
86179	LOGIC CONTROL
86180	LOGIC CONTROL
86181	LOGIC CONTROL
86182	LOGIC CONTROL
86183	LOGIC CONTROL
86184	LOGIC CONTROL
86185	LOGIC CONTROL
86186	LOGIC CONTROL
86187	LOGIC CONTROL
86188	LOGIC CONTROL
86189	LOGIC CONTROL
86190	LOGIC CONTROL
86191	LOGIC CONTROL
86192	LOGIC CONTROL
86193	LOGIC CONTROL
86194	LOGIC CONTROL
86195	LOGIC CONTROL
86196	LOGIC CONTROL
86197	LOGIC CONTROL
86198	LOGIC CONTROL
86199	LOGIC CONTROL
86200	LOGIC CONTROL

SUPPLEMENTARY CONTAINMENT PURGE
SUPPLY SUBSYSTEM

**TI
APERTURE
CARD**

Also Available On
Aperture Card



SUPPLEMENTARY CONTAINMENT PURGE
EXHAUST SUBSYSTEM

NOTES

1. ALL SYSTEMS SHOWN ARE NON-SAFETY AND NON-DETERMINISTIC (EXCEPT EQUIPMENT AND LOGIC CONTROL) AND ARE DESIGNED TO MEET QUALITY CLASS 1 REQUIREMENTS (UNLESS NOTED OTHERWISE).
2. ALL ORDER NUMBERS SHOWN ARE THE PROJECT ONLY.
3. ALL INSTRUMENTS ON THIS FIELD HAVE SYSTEM DESIGNATOR "H".
4. * VENDOR PACKAGE SUPPLIES INSTRUMENTS.
5. FOR UNIT NO. 2 EQUIPMENT NO. PREFIX WILL BE XXXXXXXXX.
6. INSTRUMENTS ON THIS FIELD HAVE SEPARATION GROUP "H" UNLESS OTHERWISE NOTED AT THE SYMBOL POSITION.
7. DELETED.
8. ALL QUANTITIES ARE IN SCFM.



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENTATION DIAGRAM - HVAC
REACTOR CONTAINMENT BLDG.
SUPPLEMENTARY PURGE SUBSYSTEM

SCALE: NONE JOB NO. 14926 DRAWING NO. SV149V00019 REV. 5

REVISION: RE CWR BL EWS PE DATE

5

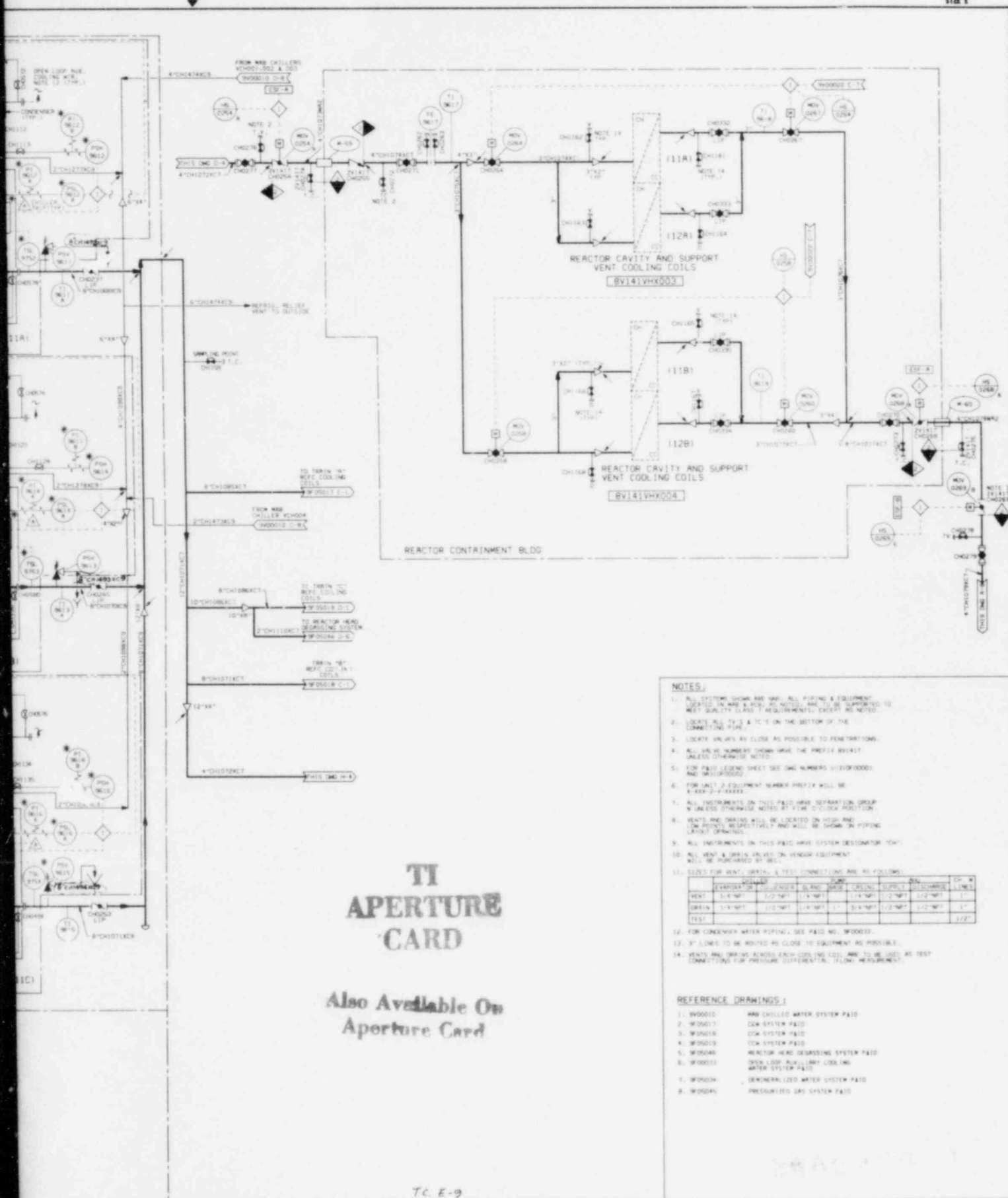
4

3

2

1

8602050017-40



TC E-9



BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

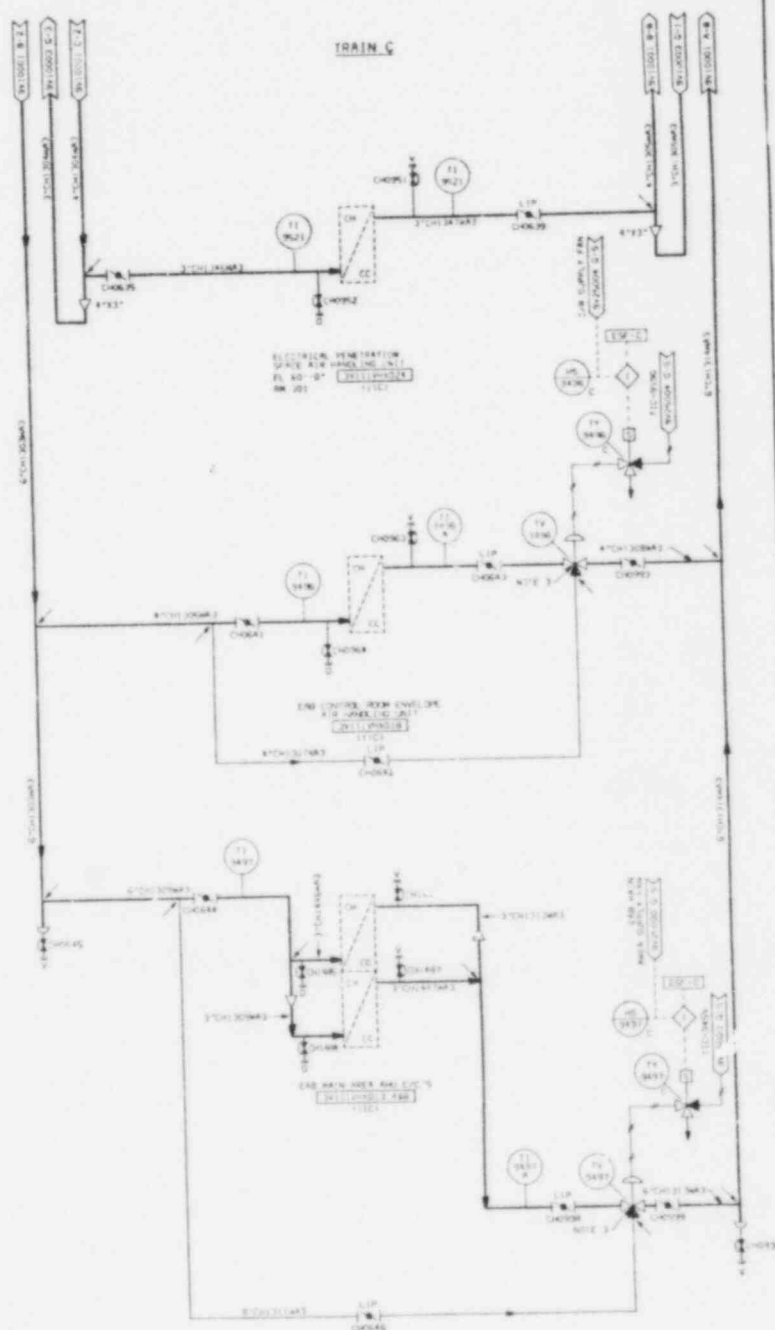
PIPING & INSTRUMENTATION DIAGRAM - HVAC
REACTOR CONTAINMENT BUILDING
CHILLED WATER SYSTEM

SCALE: NONE JOB NO. 14928 DRAWING NO. SV149V00021 REV. 5

8602050017 -41

LEGEND

SYMBOL	DESCRIPTION
(Circle with 'N')	NITROGEN SUPPLY
(Circle with 'P')	PUMP
(Circle with 'V')	VALVE
(Circle with 'C')	COMPRESSOR
(Circle with 'E')	EXPANDER
(Circle with 'S')	STORAGE TANK
(Circle with 'T')	THERMOCOUPLE
(Circle with 'F')	FLOW METER
(Circle with 'D')	DRAIN
(Circle with 'A')	ANALYZER
(Circle with 'M')	MOTOR
(Circle with 'H')	HEATER
(Circle with 'L')	LIQUID
(Circle with 'G')	GAS
(Circle with 'SOL')	SOLVENT
(Circle with 'W')	WATER
(Circle with 'OIL')	OIL
(Circle with 'AIR')	AIR
(Circle with 'N2')	NITROGEN
(Circle with 'O2')	OXYGEN
(Circle with 'H2O')	WATER
(Circle with 'CO2')	CO2
(Circle with 'CH4')	METHANE
(Circle with 'C2H6')	ETHANE
(Circle with 'C3H8')	PROPANE
(Circle with 'C4H10')	BUTANE
(Circle with 'C5H12')	PENTANE
(Circle with 'C6H14')	HEXANE
(Circle with 'C7H16')	HEPTANE
(Circle with 'C8H18')	OCTANE
(Circle with 'C9H20')	NONANE
(Circle with 'C10H22')	DECANE
(Circle with 'C11H24')	UNDECANE
(Circle with 'C12H26')	DODECANE
(Circle with 'C13H28')	TRIDECANE
(Circle with 'C14H30')	TETRADECANE
(Circle with 'C15H32')	PENTADECANE
(Circle with 'C16H34')	HEXADECANE
(Circle with 'C17H36')	HEPTADECANE
(Circle with 'C18H38')	OCTADECANE
(Circle with 'C19H40')	NONADECANE
(Circle with 'C20H42')	EICOSANE



Also Available On
Aperture Card

1. FOR GENERAL NOTES SEE P&ID NO. 9110001.
2. VENTS AND DRAIN ROOFS EACH EQUIPPED WITH ARM TO BE USED AS TEST CONNECTIONS FOR PRESSURE DIFFERENTIAL FLOW MEASUREMENT.
3. VALVE PORT FOR SURGE LINE WILL BE CLOSED AT FAILURE MODE.

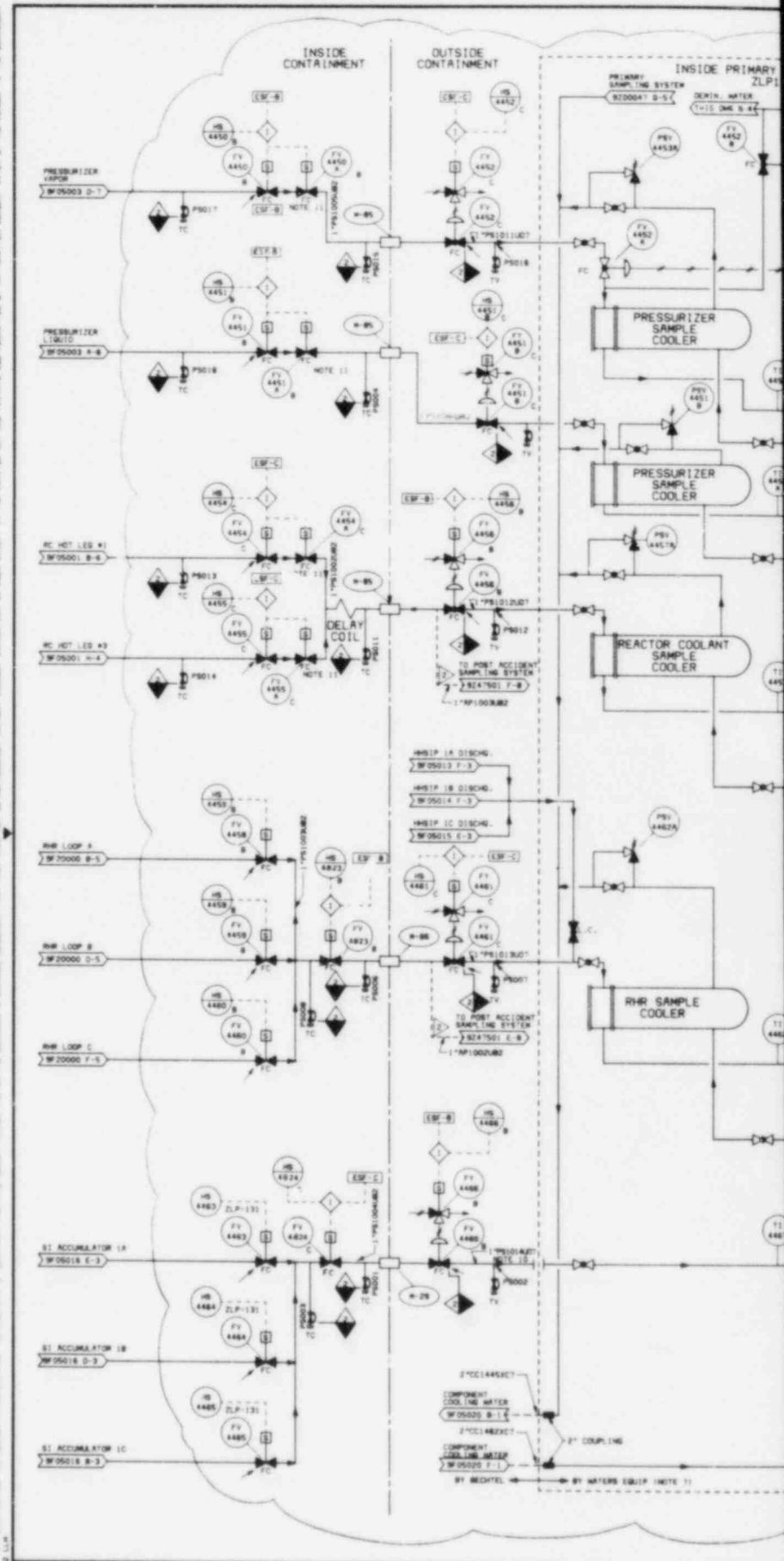
```

1. 0x250000 P&ID WARC F&B WRN AREA SYSTEM
2. 0x750000 P&ID WARC CNTRL ON W&D OPS SYSTEM
3. 0x000000 P&ID WARC F&B PE&B PARTITION SPACE WARC SYSTEM

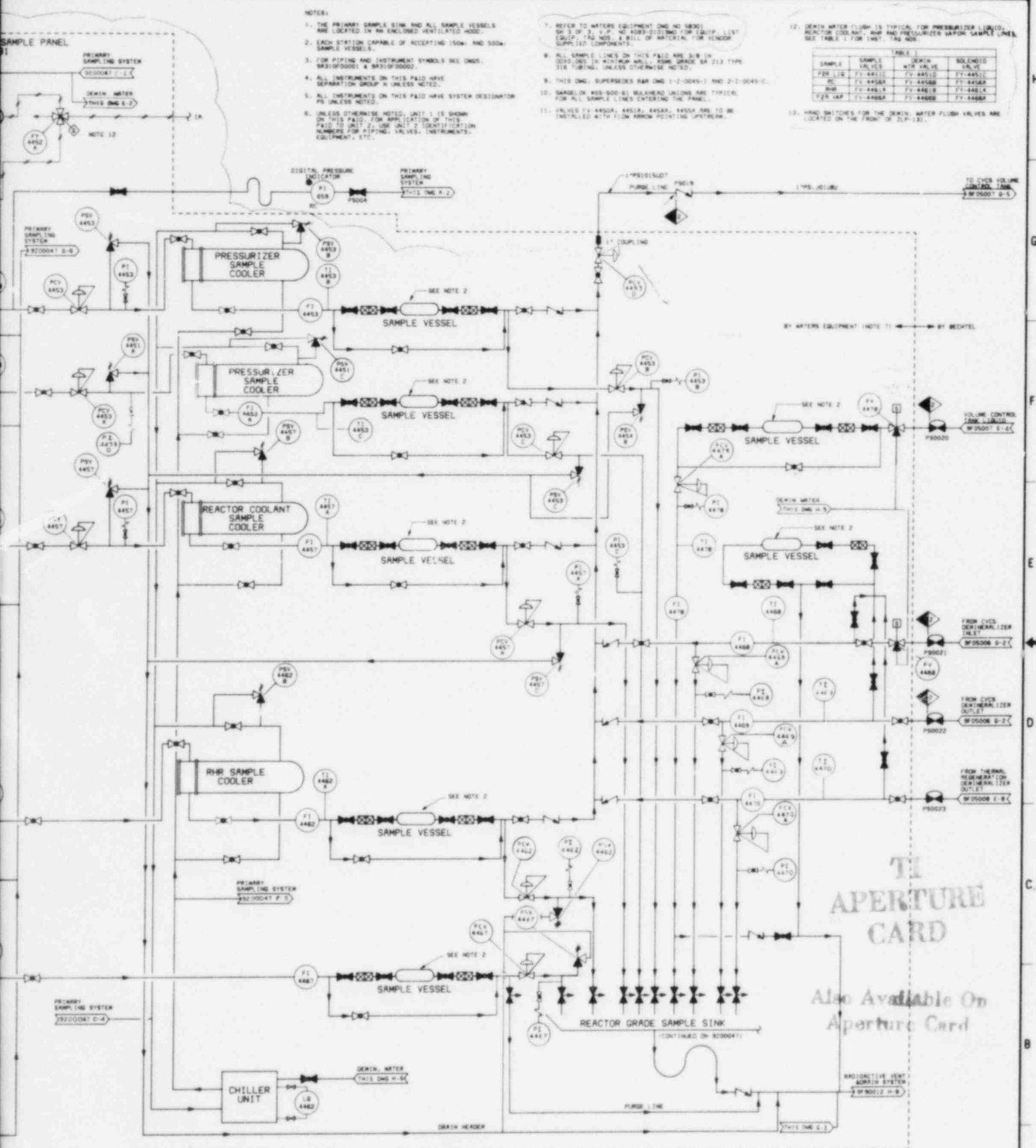
```

REVISION	BY	CHE	SA	FOR	RE	DATE
----------	----	-----	----	-----	----	------

THIS DRAWING AND THE DESIGN IT COVERS ARE THE PROPERTY OF BECHTEL. THEY ARE HEREBY LOANED TO THE BORROWER & SUPPLIER AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED EXCEPT IN THE LIMITED WAY AND PRIVATE USE PERMITTED BY THE LENDER TO THE BORROWER.



NO.	DATE	BY	CHKD	APPD	REVISION
1	10/1/84	JR			REVISED AS NOTED
2	10/1/84	JR			REVISED AS NOTED
3	10/1/84	JR			ISSUED FOR CONSTRUCTION



NOTES:

1. THE PRIMARY SAMPLE SINK AND ALL SAMPLE VESSELS ARE LOCATED IN AN ENCLOSED VENTILATED HOOD.
2. EACH STATION CAPABLE OF ACCEPTING 1500- AND 500- SAMPLE VESSELS.
3. FOR PIPING AND INSTRUMENT SYMBOLS SEE UNCL. 84310F00001 & 84310F00002.
4. ALL INSTRUMENTS ON THIS PAID HAVE SEPARATION GROUP H UNLESS NOTED.
5. ALL INSTRUMENTS ON THIS PAID HAVE SYSTEM DESIGNATION PS UNLESS NOTED.
6. UNLESS OTHERWISE NOTED, UNIT 1 IS SHOWN ON THIS PAID. FOR APPLICATION OF THIS PAID TO UNIT 2, USE UNIT 2 IDENTIFICATION NUMBERS FOR PIPING, VALVES, INSTRUMENTS, EQUIPMENT, ETC.

7. REFER TO WATERS EQUIPMENT DWG NO. W6001 SH 1 OF 2, U.P. NO. 4093-010100 FOR EQUIP. LIST (EQUIP. TAG NOS. & BILL OF MATERIAL FOR VENDOR SUPPLIED COMPONENTS).
8. ALL SAMPLE LINES ON THIS PAID ARE 3/8 IN. OD, 1/2 IN. MIN. WALL THICKNESS, 316 TYPE 316 TUBING, UNLESS OTHERWISE NOTED.
9. THIS DNG. SUPERSEDES BAR DNG 1-2-0045-1 AND 2-2-0045-2.
10. SAGOLIN 400-000-01 BULKHEAD UNIONS ARE TYPICAL FOR ALL SAMPLE LINES ENTERING THE PANEL.
11. VALVES PV-4450A, 4451A, 4452A, 4453A ARE TO BE INSTALLED WITH FLOW ARROW POINTING UPSTREAM.

12. DRAIN WATER FLUSH IS TYPICAL FOR PRESSURIZER LIQUID, REACTOR COOLANT, RHR AND PRESSURIZER VAPOR SAMPLE LINES. SEE TABLE 1 FOR INST. TAG NOS.
13. HAND SWITCHES FOR THE DRAIN WATER FLUSH VALVES ARE LOCATED ON THE FRONT OF ZIP-131.

TABLE 1			
SAMPLE	SAMPLE VALVE	DRAIN WATER VALVE	ISOLATED VALVE
PER LIO	PV-4451C	PV-4451D	PV-4451E
PC	PV-4452A	PV-4452B	PV-4452C
RHR	PV-4453A	PV-4453B	PV-4453C
PER IAP	PV-4454A	PV-4454B	PV-4454C

BECHTEL ENERGY CORPORATION
HOUSTON, TEXAS

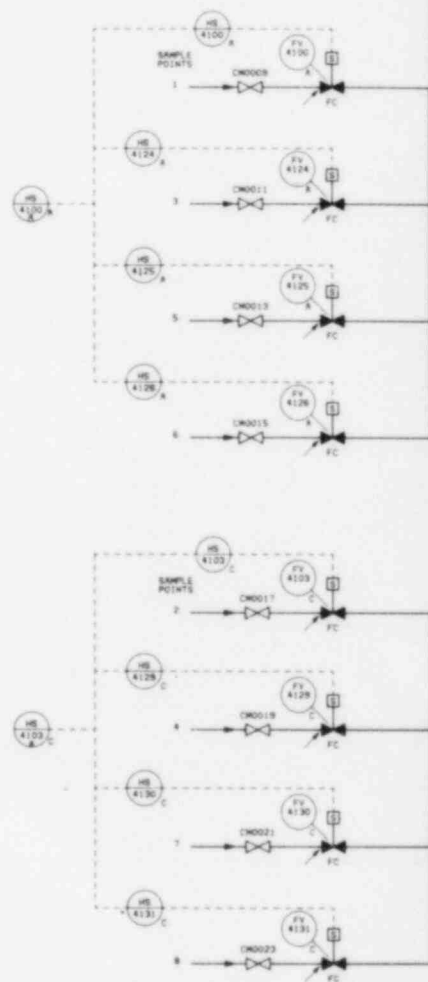
HOUSTON LIGHTING & POWER CO.
SOUTH TEXAS PROJECT

PIPING & INSTRUMENT DIAGRAM
PRIMARY SAMPLING SYSTEM

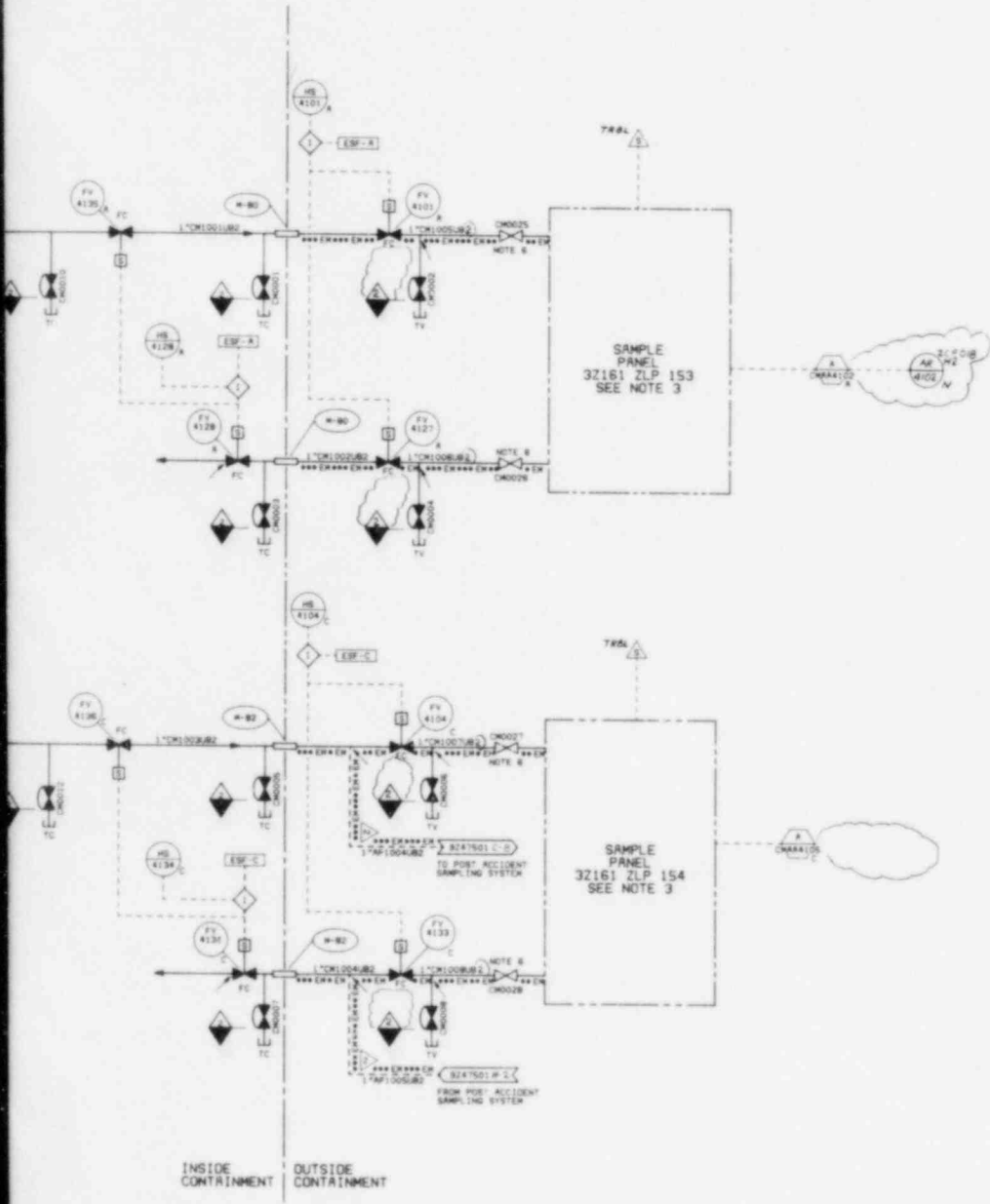
SCALE	JOB NO.	DRAWING NO.	REV.
NONE	14926	52329Z00045	2

8602050017 -44

THIS DRAWING AND THE DESIGN IT CONTAINS ARE THE PROPERTY OF RECEIVED. THEY ARE HEREBY LOANED AND ON THE BORROWER'S EXPRESS AGREEMENT THAT THEY WILL NOT BE REPRODUCED, COPIED, LOANED, EXHIBITED, OR USED IN ANY MANNER WITHOUT THE WRITTEN CONSENT GIVEN BY THE BORROWER.



DATE		BY	REVISION	NO	CHK	BL	ENG	FE	DATE	CHK	ENG	CL	NO
1/18	1/18	4	HAND CHANGES AS NOTED		1/18	1/18			1/18	1/18			
		2	REVISD AS NOTED, REF. DCRP #53										
		3	INCORPORATED DCRP 5.2.2 & 4		1/18	1/18			1/18	1/18			
		2	INCORPORATED DCRP #1 (MOD)		1/18	1/18			1/18	1/18			
		1	REVISD AS NOTED		1/18	1/18			1/18	1/18			
		0	ISSUED FOR CONSTRUCTION		1/18	1/18			1/18	1/18			
CHIEF ENGR	CL	NO.	REVISION		NO	CHK	BL	ENG	FE	DATE	CHIEF ENGR	CL	NO.



TI APERTURE CARD

Also Available On
Aperture Card

<p>BECHTEL ENERGY CORPORATION HOUSTON, TEXAS</p>					<p>PIPING AND INSTRUMENT DIAGRAM CONTAINMENT HYDROGEN MONITORING SYSTEM</p>				
<p>HOUSTON LIGHTING & POWER CO. SOUTH TEXAS PROJECT</p>					SCALE	JOB NO.	DRAWING NO.	REV.	
					NONE	14929	52169Z00046	5	

8602050017-45