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INSERVICE TESTING PROGRAM (PLAN) FOR PUMPS AND VALVES FOR FERMI 2 POWER PLANT

DOCUMENT NO. ISI-IST Program

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Revision 3, Change 8 Summary (LCR 94-197-ISI)

Incorporated the following plant changes into the IST Pump and Valve Program:

DOC. No.	LCR	DESCRIPTION
EDP-26310	94-127-ISI	Replaced check valve G3300F120 with MOV G3352F220 as RWCU return containment isolation valve. Revised Valve Tables to reflect this change.
EDP-13751	93-114-ISI	Added new check valves B2100F248A, B2100F248B, B2100F249A, and B2100F249B to the Valve Tables. These check valves are the isolations for the RPV Water Level backfill flow from the CRD water system. VR-58 was added to the Relief Request section to document the justification for the testing requirements and frequencies.
EDP-11655	93-174-ISI	Added the HPCI/RCIC air operated test return valve (drag valve) to Valve Table and deleted the MOV E4150F011.
EDP-14080	94-148-ISI	Revised stroke time limits for valves C1100F010 and C1100F011 in Valve Table. New solenoids and tubing runs changed the reference stroke times. Valves F180 and F181 were also evaluated with this EDP. F180 stroke time was changed in Valve Table.
EDP-26520	94-081-ISI	Check valve E4100F046 deleted from Valve Table, internals removed from valve.
EDP-27070	94-200-ISI	Revised stroke times for MOV B2103F016 due to gear ratio change.
EDP-27071	94-196-ISI	Revised stroke times for MOV E1150F021A/B due to gear ratio change.
EDP-13576	94-197-ISI*	Revised stroke times for MOV E2150F015B due to Limit Switch configuration changes.
EDP-26710	94-124-ISI	Changed G5100F607 valve V# to V8-4682 in Valve Table due to replacement.
EDP-13687	93-035-ISI	Changed P4400F606B valve V# to V8-4678 in Valve Table due to replacement.

* No other LCR-ISI No. assigned.

Revision 3, Change 8 Summary (LCR 94-197-ISI)

DOC. No.	LCR	DESCRIPTION
TSR-26658	94-097-ISI	Changed P4400F606A valve V# to V8-4677 in Valve Table due to replacement.
TSR-26684	94-132-ISI	Changed V# on relief valve E1100F025A in Valve Table.
TSR-26921	94-197-ISI*	Changed stroke time limits on the following AOVs as a result of air regulator and spring adjustments: T4901F467, T4800F451, E1100F079B, T4901F468
	94-052-ISI 94-197-ISI	Primary Containment penetration X-9A and X-9B, along with associated PC isolation boundary valves, designated as bypass leakage boundary: B2100F010A, B2100F010B, E4150F006, and E4150F013 (added AT-4 test to B2100F010A and B and E4150F013). Deleted AT-4 test requirements from E4150F008, E41F011, and E5150F022, changed category of these valves to "B".

The following additional changes have been made:

- Relief Request VR-59 has been added to resolve RACTS item 94283 for valves E1100F050A and B. This relief request provides for relief from the requirements of ASME Section XI, paragraph IWV-3522(b) for actual observance of the opening torque when the valve is in new condition for valves which are mechanically actuated. VR-8 was also revised to rev. 2 to indicate additional relief for these valves from that originally identified.

- Valve Description for test AT-10, eliminated exception to ASME Section XI, paragraph IWV-3427(b). Per GL 89-04, this is applicable only to containment isolation valves.

- Page B54 of 61 was revised to indicate that stroke times shown in the Valve Table are for information only. (The Stroke Time Basis Book and Surveillance Procedures contain the controlled information.)

* No other LCR-ISI No. assigned.

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INTRODUCTION

The Fermi-2 Energy Center (EF2) ASME Inservice Testing Program for Pumps and Valves was placed in effect at Fuel Load. The period of time this program will remain in effect is for the 120 month (10 year) inspection interval which commenced with Commercial Operation. This program will be updated periodically to reflect plant modifications and prior to the start of the second 120 month interval in accordance with the requirements of 10CFR50.55a(g).

The program contained herein outlines the Inservice Testing (IST) requirements for the Fermi-2 Energy Center (EF2). This program is based on the requirements of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1980 Addenda. All references to IWP or IWV in this document correspond to Subsection IWP or IWV of ASME Section XI, 1980 Edition through the Winter 1980 Addenda unless otherwise noted.

This IST program was developed using the ISI classifcation boundaries and the following documents:

- Title 10, Code of Federal Regulations, Part 50
- Division I Regulatory Guides
- Standard Review Plan 3.9.6, "Inservice Testing of Pumps and Valves"
- Division I Draft Regulatory Guide and Value/Impact Statement, "Identification of Valves for Inclusion in Inservice Test Programs"
- "NRC Staff Guidance for Preparing Pump and Valve Testing Programs and Associated Relief Request", January 1978
- Final Safety Analysis Report, Enrico Fermi Atomic Power Plant, Unit 2
- Technical Specification, Enrico Fermi, Unit 2
- Interpretation XI-1-79-19
- NRC Generic Letter 89-04

The inservice tests identified in this program will verify the operational readiness of pumps and valves whose functions are required for safety. Pumps and valves which function to mitigate the consequences of an accident or to bring the reactor to a stable condition have been included in this program. The IST classification of each pump and valve matches the ISI classification indicated on the ISI, P&IDs with one exception, pumps and valves in the IST program which are not within the ISI classification boundaries are indicated as E1, E2, E3, or E4 where the E signifies that this component is located on piping with no ISI classification and the number (i.e. 1, 2, 3, 4) refers to the design class taken from the P&IDs and the master valve lists.

PLANT SYSTEMS LISTING

Plant Identification System (PIS)
Codes for Plant Systems

B21 - PIS Number for the Nuclear Boiler System

B31 - PIS Number for the Reactor Recirculation System

C11 - PIS Number for the Control Rod Drive System

C41 - PIS Number for the Standby Liquid Control System

C51 - PIS Number for the Neutron Monitoring System

E11 - PIS Number for the Residual Heat Removal System

E21 - PIS Number for the Core Spray System

E41 - PIS Number for the High Pressure Coolant Injection System

E51 - PIS Number for the Reactor Core Isolation Cooling System

G11 - PIS Number for the Radwaste System

G33 - PIS Number for the Reactor Water Cleanup System

G41 - PIS Number for the Fuel Pool Cooling and Cleanup System

G51 - PIS Number for the Torus Water Management System

N11 - PIS Number for the Main Steam Supply System

N21 - PIS Number for the Feedwater System

P11 - PIS Number for the Condensate Storage and Transfer System

P34 - PIS Number for the Post Accident Sampling System

P44 - PIS Number for the Emergency Equipment Cooling Water System

P45 - PIS Number for the Emergency Equipment Service Water System

P50 - PIS Number for the Station and Control Air System

R30 - PIS Number for the Diesel Generator System

T23 - PIS Number for the Primary Containment System

T41 - PIS Number for the Control Center HVAC System

T46 - PIS Number for the Standby Gas Treatment System

T48 - PIS Number for the Containment Atmosphere Control System

T49 - PIS Number for the Primary Containment Pneumatic System

T50 - PIS Number for the Primary Containment Atmosphere Monitoring System

PART - A

INSERVICE TESTING PROGRAM FOR PUMPS

1.0 Applicable Code

This Inservice Testing Program for ISI Class 1, 2, 3 and non-ISI class pumps meets the requirements of Subsection IWP of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1980 Addenda. Where these requirements are determined to be impractical, specific requests for relief have been written and are included in Section 2.0.

2.0 Relief Requests for Inservice Testing of Pumps

2.1 Relief Request Description Format

Relief requests are included where specific requirements of ASME Section XI are determined to be impractical. The following information has been included in each pump relief request:

- Description of the pump(s) for which relief is requested.
- Pump number(s)
- Class
- Description of pump function(s)]
- Section XI testing requirement
- Basis for relief from Section XI requirement
- Alternate testing

2.2 Relief Request/Index/Listing

Relief Request Number	Subject	Component Affected
PR-1-R1	Vibration Limits	All Pumps excluding RHR pumps and HPCI pumps
PR-2	Bearing Temperatures	All pumps
PR-3	Inlet Pressure Measurement	RHRSW, DGSW and EESW
PR-4	Inlet Pressure Measurement	Standby Liquid Control
PR-6	Parallel Operation of Pumps	E21, Core Spray
PR-7	Parallel Operation of Pumps	RHRSW
PR-8	Vibration Limits	RHR Pumps
PR-10-R3	Vibration Limits	HPCI Pumps

RELIEF REQUEST NO. PR-1-R1

PUMP: All pumps in the IST program (Except for the RHR Pumps and HPCI Pumps)

PUMP NO: See Inservice Testing Program.
ISI Class 1, 2, 3 and E4 Pumps

CLASS: 2, 3, E3 and E4

FUNCTIONS: Reactor shutdown without control rods, emergency core cooling, emergency equipment cooling, supply fuel oil to the diesel.

SECTION XI REQUIREMENTS: Vibration amplitude displacement shall be measured quarterly during inservice testing. (Table IWP-3100-1 and IWP 3400 (a)).

BASIS FOR RELIEF: Enrico Fermi Atomic Power Plant proposes an alternate program which is believed to be more comprehensive than that required by Section XI. The proposed program is based on vibration readings measured in velocity units rather than vibration amplitude in mils displacement. This technique is more sensitive to small changes that are indicative of developing mechanical problems and hence more meaningful. Velocity measurements detect not only high amplitude vibrations that indicates a major mechanical problem, but also the equally harmful low amplitude, high frequency vibrations resulting from misalignment, imbalance, or bearing wear that usually go undetected by simple displacement measurements.

In conclusion, the foregoing reasons demonstrate that the proposed program of vibration measurements is a more practical method of testing which meets the intent of the ASME Code requirements.

ALTERNATE TESTING: Pump vibration measurements will be taken in vibration velocity (in/sec). The evaluation of the readings will be as follows:

Acceptable Range	Alert Range	Required Action Range
$\leq$ 0.235 in/sec	0.236 in/sec to 0.314 in/sec	$\geq$ 0.314 in/sec

Alternate vibration testing for the RHR Pumps (E1102C002 A through D) is given in Relief Request PR-8, and for the HPCI Pumps (E4101C001A and B) in Relief Request PR-10-R3.

RELIEF REQUEST NO. PR-2

PUMP: All pumps in the IST program.

PUMP NO: See Inservice Testing Program
Class 1, 2, 3 and Ex Pumps

CLASS: 2, 3, E3 and E4

FUNCTIONS: Reactor shutdown without control rods, emergency core cooling emergency equipment cooling, supply fuel oil to the diesel.

SECTION XI REQUIREMENTS: Bearing temperature shall be measured yearly during inservice testing (Table IWP-3100-1 and IWP-3300).

BASIS FOR RELIEF: Enrico Fermi Atomic Power Plant proposes an alternate program which is believed to be more comprehensive than that required by Section XI. The proposed program is based on vibration readings measured in velocity units. This technique is sensitive to small changes that are indicative of developing mechanical problems and hence more meaningful. In addition, these readings go far beyond the capabilities of a bearing temperature monitoring program. A bearing will be seriously degraded prior to the detection of increased heat at the bearing housing. Quarterly vibration velocity readings will achieve a much higher probability of detecting developing problems than annual bearing temperature readings.

Finally, IWP-3500 required "three successive readings taken at ten minute intervals that do not vary more than three percent." Meeting this requirement for pumps having no recirculation test loop would be very difficult because the system water temperature, and consequently the lubricant temperature, are expected to drift more than three percent during 20 minutes. Also, the temperature of the lubricating fluid will vary with ambient conditions and make meaningful data trending impractical.

As described above, a program of bearing temperature trends and the evaluation of the results would in some cases be difficult to analyze. Improper interpretation of results could result in unnecessary pump maintenance. In addition, it is impractical to measure bearing temperatures on many of the pumps in the program. Some specific examples are as follows:

(1) Core Spray: The pump bearings are lubricated by emergency equipment cooling water flow. Changes in emergency equipment cooling water system temperature would seriously affect the accuracy of trends.

(2) Residual Heat Removal (RHR): Same as (1) above.

RELIEF REQUEST NO. PR-2 (Continued)

(3) High Pressure Coolant Injection: This pump is driven by a steam turbine which exhausts steam into the pressure suppression chamber. Extended run times to stabilize bearing temperatures could heat the suppression pool water to a temperature exceeding the Technical Specifications limit of 105°F (Technical Specification paragraph 3.6.2.1.a.2.a).

In conclusion, the foregoing reasons demonstrate that the proposed program of vibration measurements is a more practical method of testing which meets the intent of the ASME Code requirements.

ALTERNATE TESTING: Pump vibrations measurements will be taken in vibration velocity units (in/sec). The evaluation of the readings will be per the ranges given in the Relief Request PR-1. Temperature measurements will not be taken.

RELIEF REQUEST NO. PR-3

PUMP: Residual Heat Removal, Emergency Equipment and Diesel Generator Service Water.

PUMP NO: E1151C001A, E1151C001B, E1151C001C, E1151C001D; Residual Heat Removal Service Water.

P4500C002A, P4500C002B; Emergency Equipment Service Water.

R3001C005, R3001C006, R3001C007, R300C008; Diesel Generator Service Water.

CLASS: 3

FUNCTION: Emergency Equipment, RHR Heat Exchanger, and Diesel Generator Cooling.

SECTION XI REQUIREMENTS: Inlet pressure (Pi) shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400(a)).

BASIS FOR RELIEF: The pump impellers of the subject pumps are submerged in the RHR reservoir. The inlet pressure at the impeller is simply the hydrostatic head. Because there is no instrumentation at the pump inlet, the hydrostatic head will be computed from the reservoir level.

The inlet pressure measurement, by computation of hydrostatic head developed from the reservoir level, is a practical method of testing given the placement of the impellers in the RHR reservoir.

ALTERNATE TESTING: The inlet pressure measurement will be based on reservoir level.

RELIEF REQUEST NO. PR-4

PUMP: Standby Liquid Control

PUMP NO: C4103C001A, C4103C001B

CLASS: 2

FUNCTION: To provide a method of shutting down the reactor without the use of control rods.

SECTION XI REQUIREMENTS: Differential pressure and suction pressure shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400(a)).

BASIS FOR RELIEF: No suction tap or inlet pressure instrumentation is provided for the Standby Liquid Control pumps. Suction pressure when testing is small compared to discharge pressure (less than 3 psig compared to 1190 psig). The pumps are positive displacement pumps and since the suction pressure is low, the differential pressure is essentially equal to discharge pressure (1187 psig vs. 1190 psig). The suction pressure is less than one percent of discharge pressure and can be considered insignificant.

ALTERNATE TESTING: Discharge pressure, flow rate and vibration will be measured during inservice testing. Check adequate suction head to ensure safe pump operation by determining liquid level in the storage tank.

RELIEF REQUEST NO. PR-6

PUMP(S): Core Spray

PUMP NO (s): E2101C001A, E2101C001B, E2101C001C, E2101C001D

CLASS: 2

FUNCTION: Provide emergency core cooling

SECTION XI REQUIREMENTS: Articles IWP-1500 and IWP-3000 indicate that a set of basic reference parameters must be established for each pump.

BASIS FOR RELIEF: Each core spray division is designed to have two pumps operating in parallel in accordance with Technical Specification Paragraph 3.5.1.a. If one pump is determined to be inoperable, then the division is declared inoperable. Due to this two pump design, the system configuration does not allow for single pump testing. The throttle valves (E21-F015A and B) on the test lines for each core spray division tend to close due to reduced flow during one pump operation. Consequently, both pumps in each division must be running during performance of operability testing.

Detroit Edison proposes measuring flow rate and differential pressure while both pumps in each division are operating. Also, acceptance criteria have been developed which are more restrictive for flow rate and differential pressure than the criteria given in Table IWP-3100-2. The reduced ranges compensate for the loss in sensitivity from the single pump test to the two pumps in parallel test.

The reduced ranges are based on an evaluation of each pump curve. Curve 1 in Figure PR-6 represents the pump curve (differential pressure, P, versus flow rate, Q) for a normally operating pump. Curve 2 represents the performance of a similar pump but at a degraded state (0.9 P versus Q). For a given differential pressure, the flow rate from Curve 1 was added to the corresponding flow rate from Curve 2. This summation produces Curve 3 which reflects the parallel operation of two pumps, one operating normally (Curve 1) and one operating in a degraded state (Curve 2). Comparing Curve 3 to Curve 4, which reflects two normally operating pumps, a new acceptance criteria is determined. Because of instrument error limitations, the upper alert and required action ranges given in Table IWP 3100-2 will be retained.

ALTERNATE TESTING: Flow rate will be set to a reference value and differential pressure will be measured while both pumps in each division are operating. The following acceptance criteria will applied:

Acceptable Range	Alert Range		Required Action Range	
	Low Values	High Values	Low Values	High Values
0.96 to 1.02 Pr	0.94 to 0.96 Pr	1.02 to 1.03 Pr	<0.94 PR	>1.03 Pr

RELIEF REQUEST NO. PR-6 (Continued)

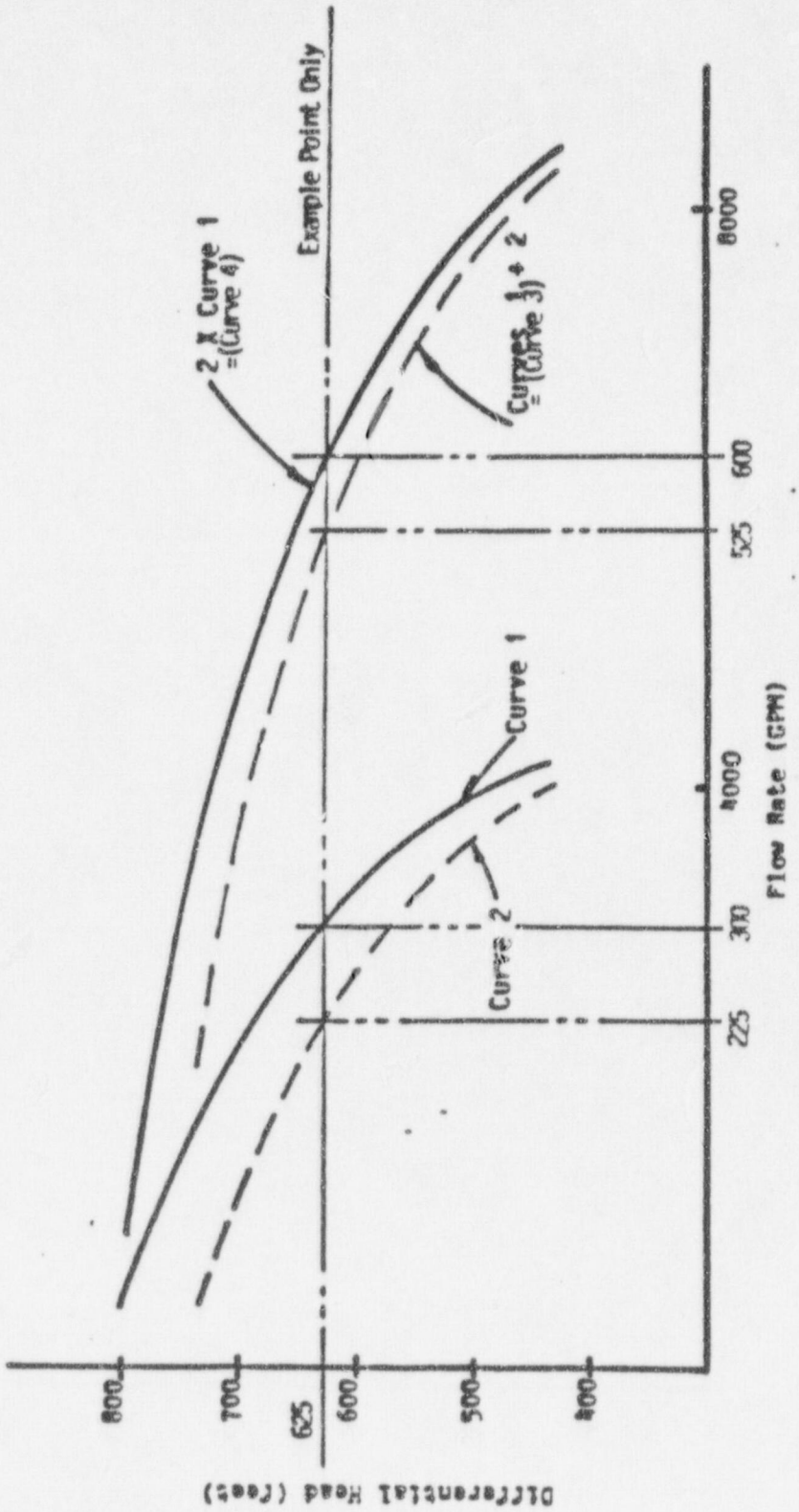

Figure PR-6 Two Pump Acceptance Criteria

RELIEF REQUEST NO. PR-7

PUMP(S): RHR Service Water

PUMP NO (s): E1151C001A, E1151C001B, E1151C001C, E1151C001D

CLASS: 3

FUNCTION: Provide cooling water to the RHR heat exchangers.

SECTION XI REQUIREMENTS: Articles IWP-1500 and IWP-3000 indicate that a set of basic reference parameters must be established for each pump.

BASIS FOR RELIEF: Each RHR service water division is required to have two pumps operating in parallel in accordance with Technical Specification Paragraph 3.7.1.1. If one pump is determined to be inoperable, then the configuration does not allow for single pump testing. The throttle valves (E11-F068A and B) are sized for two pump operation with flows greater than 9000 GPM. During single pump operation, the pumps experience runout at approximately 6000 GPM. To keep flow in the stable range (approximately 5000 GPM) the valves must throttle from 3 to 8 percent open. This reduced flow operation is outside the throttling capability of the valve and causes valve vibration (see DETROIT EDISON Memorandum NE-84-0193) and control instabilities. Consequently, both pumps in each division must be running during operability testing.

Detroit Edison proposes measuring flow rate and differential pressure while both pumps in each division are operating. The acceptance cirteria described in Relief Request PR-6 will be applied to the RHR service water pumps.

ALTERNATE TESTING: Flow rate will be set to a reference value and differential pressure will be measured while both pumps in each division are operating. The following acceptance criteria will be applied:

Acceptable Range	Alert Range		Required Action Range	
	Low Values	High Values	Low Values	High Values
0.96 to 1.02 Pr	0.94 to 0.96 Pr	1.02 to 1.03 Pr	<0.94 Pr	>1.03 Pr

RELIEF REQUEST PR-8

PUMP: RHR Pumps

PUMP NO.: E1102C002A, E1102C002B, E1102C002C, E1102C002D

CLASS: 2

FUNCTION: Provide low pressure coolant injection

SECTION XI REQUIREMENTS: Vibration amplitude displacement shall be measured quarterly during inservice testing (Table IWP-3100-1 and IWP-3400 (a)).

BASIS FOR RELIEF: During preoperational testing, the vibration velocity measurements for the RHR pumps were high (.19 to .27 ips) relative to the vibration velocity ranges given in Relief Request PR-1. Three of the four pumps fell into the alert range.

The preoperational vibration velocity measurements were part of a series of vibration tests which included vibration amplitude. The results of the tests are summarized in Detroit Edison Engineering Research Report 84D98-2 which concludes:

> "The vibration measurements which were taken during the preoperational test indicate that the pumps are operating in a satisfactory condition."

Given that the pumps are operating acceptably at the higher vibration velocities, a new set of vibration velocity ranges were developed with the assistance of the vendor as described in Detroit Edison Engineering Research Report 85D15-5, Revision 1.

Report 85D15-5 recommends the measurement of overall velocity (filter out), overall amplitude (filter out) and running speed amplitude (filter in). All three quantities will be measured at the pump bearing and compared to the ranges given below.

ALTERNATE TESTING: Pump vibration overall velocity, overall amplitude and running speed amplitude measurements will be taken. The evaluation of the readings will be as follows:

RELIEF REQUEST PR-8 (Continued)

Overall Velocity

Acceptable Range:	Less than 2.0 Vr
Alert Range:	Greater than or equal to 2.0 Vr and less than or equal to 4.0 Vr
Required Action Range:	Greater than 4.0 Vr

Where Vr = reference vibration velocity in/sec. Also, no vibration velocity can exceed a value of 1.0 in/sec.

Overall Amplitude

The ranges given in Table IWP-3100-2 will be applied.

Running Speed Amplitude

The ranges given in Table IWP-3100-2 will be applied.

RELIEF REQUEST PR-10-R3

PUMP: HPCI Main and Booster Pump

PUMP NO.: E4101C001A and E4101C001B

CLASS: 2

FUNCTION: Provide High Pressure Coolant Injection

SECTION XI REQUIREMENTS: Vibration amplitude displacement shall be measured during inservice testing (Table IWP-3100-1 and IWP-3400 (a)). (Velocity readings are taken in lieu of mils displacement readings per Relief Request PR-1).

BASIS FOR RELIEF: During preoperational testing of the HPCI System, vibration of the HPCI Main and Booster Pump were measured and determined to fall within the Required Action Range of Relief Request PR-1. This high apparent vibration was caused by induced vane passing frequency from the 4 vane booster pump impeller.

Pursuant to this high apparent vibration, Relief Request PR-9-R2 and PR-10-R2 were written requesting relief from the requirements of Relief Request PR-1 until RF01 at which time the HPCI Booster Pump Impeller would be changed from a 4 to a 5 vane impeller, reducing the induced vane passing frequency caused by the 4 vane impeller design.

During RF01, the HPCI Booster Pump Impeller was changed from a 4 to a 5 vane impeller. This eliminated the induced vane passing vibration emanating from the Booster Pump. As part of the post modification testing, vibration data was taken to provide baseline vibration signatures. While vibration levels were reduced significantly, both pumps are still exhibiting vibration levels approaching or exceeding the IST Program Alert level of 0.236 in/sec of Relief Request PR1.

RELIEF REQUEST PR-10-R3 (Continued)

The following table demonstrates the large reduction in vibration achieved when the HPCI Booster Pump Impeller was changed from a 4 to a 5 vane impeller:

HPCI Vibration Reference Values

	MAIN PUMP	
	Vertical Vibration (in/sec)	Horizontal Vibration (in/sec)
Before Impeller Changeout	.176	.598
After Impeller Changeout	.185	.230
	BOOSTER PUMP	
	Vertical Vibration (in/sec)	Horizontal Vibration (in/sec)
Before Impeller Changeout	.264	.549
After Impeller Changeout	.120	.145

Vertical and Horizontal vibration velocities are frequency dependent with readings being higher for machines operating at higher speeds. HPCI operates at approximately 4000 RPM which is significantly higher than most rotating machinery (Typical machinery operate at 1800 RPM).

The HPCI Main and Booster Pump design is such that the vibration in the horizontal direction is reasonant with the normal pump operating speed (approximately 4000 RPM) resulting in higher vibration levels. Vibration levels for the vertical direction will be less than the horizontal direction as pump design provides for a more rigid restraint in the vertical direction.

These higher levels of vibration are not detrimental to the long term operability of the machine and will not prevent early detection of pump degradation as intended by the ASME Section XI Code and the DECO IST Program.

In support of this conclusion it should be noted that if current HPCI vibration levels were taken in mils (as allowed by the ASME Section XI Code), the highest reading would be less than 1.4 mils overall which is well below the upper end of the acceptance range of 2.8 mils as provided by the Code for the specific HPCI Pump.

Given that the pump is operating acceptably at vibration velocities at or approaching the IST Program Lower Alert Level, a new set of vibration velocity ranges have been developed. These new vibration velocity ranges will allow for early detection of pump degradation prior to component failure.

RELIEF REQUEST PR-10-R3 (Continued)

ALTERNATE TESTING: Pump vibration measurement will be taken in vibration velocities (in/sec) with the Acceptable, Alert and Required Action Ranges as follows:

Using the Guidelines contained in ASME/ANSI OMa-1988, Part 6, Table 3, (Ranges for Test Parameters).

Where V_r = Reference Vibration Velocity (in/sec) peak

Acceptable Range	< or = 2.5 V_r
Alert Range	> 2.5 V_r to 6 V_r or > 0.325 in/sec
Required Action Range	> 6V_r or > 0.70 in/sec

Where Main Pump V_r = 0.21 in/sec

Where Booster pump V_r = 0.13 in/sec

By applying the foregoing guidelines, the new HPCI Main and Booster pump vibration acceptance criteria are:

NEW PUMP VIBRATION ACCEPTABLE RANGES

MAIN PUMP

Acceptable Range	Alert Range	Required Action Range
≤ = 0.325 in/sec	0.326 in/sec to 0.700 in/sec	> .700 in/sec

BOOSTER PUMP

Acceptable Range	Alert Range	Required Action Range
≤ = 0.325 in/sec	0.326 in/sec to 0.700 in/sec	> .700 in/sec

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3.0 Inservice Testing Program - Pump Tables

The tables contained in this Section list all pumps included in the Fermi 2 IST Program. The data contained in these tables identify all pumps subject to inservice testing, the inservice test quantities, the inservice testing interval, and any applicable remarks. The column headings in these tables are listed and explained below:

3.1 Table Description

- **PUMP NUMBER:** The Plant Identification System (PIS) number
- **PUMP NAME**
- **CLASS:** The ISI classification as shown on the color coded classification boundary diagram. For pumps listed on lines with no ISI classification, an E1, E2, E3 or E4 is indicated where the number refers to design Class A, B, C and D, taken from the P&ID's.
- **SPEED, INLET PRES, DIFF PRES, FLOW RATE, VIBRATION AND BEARING TEMP:** Inservice Test Quantities to be measured in accordance with Table IWP-3100-1
- **TEST FREQ.:** The frequency of IST as prescribed in IWP-3400
- **REMARKS:** The data in this column includes the respective test procedure numbers which implement required testing or general information pertaining to the pump. NOTE: THIS FIELD IS NOT CONTROLLED.

3.2 "Inservice Test Quantities" Columns

When the letter "Y" appears in a particular test quantity column, that quantity will be measured during inservice testing in accordance with Subsection IWP. If a modified test is planned or if the letter "N" appears in a particular test quantity column, a request for relief number will be referenced. Requests for relief are abbreviated PR-__. The actual request for relief is contained in Section 2.

3.3 Measurement of Inservice Test Quantities

- Speed: Per IWP-4400, shaft speed measurement are not applicable (NA) for pumps coupled to synchronous or induction type drivers. For variable speed drives, pump speed shall be set at the reference speed per IWP-3100.

- Inlet Pressure: For pumps taking suction from a tank or the RHR Service Water Complex basin, inlet pressure will be calculated (using appropriate density corrections) from a measured tank or basin level. Section 2, Relief Request PR-3 addresses pumps whose inlet pressure will be calculated. All other inlet pressure measurements will be taken using pressure instruments at or near the pump inlet unless a relief requests states otherwise.

- Differential Pressure: Most differential pressure measurements will be calculated from inlet and discharge pressure measurements. In some cases, a differential pressure gauge will be used.

- Flow Rate: Pump discharge flow rate shall be measured.

- Vibration: In accordance with Section 2, Relief Request No. PR-1, EF2 proposes to measure vibration velocity rather than vibration amplitude.

- Bearing Temperature: In accordance with Section 2, Relief Request PR-2, EF2 will not measure bearing temperatures.

3.4 Allowable Ranges of Test Quantities

The allowable ranges specified in Table IWP-3100-2 will be used for differential pressure and flow measurements, except where specific relief has been granted. Should the measured test quantity fall outside the allowable range, the corrective action specified in IWP-3230 will be taken. For more information, see Interpretation Xi-1-79-19.

3.5 Bearing Lubricant

As specified in Table IWP-3100-1, the pump bearing lubricant level, pressure, or flow will be observed during inservice testing.

3.6 Exempted Pumps within Systems Classified for ISI

The Reactor Recirculation centrifugal pumps have been exempted from the IST program because they do not perform a safety function. The reactor recirculation jet pumps have been exempted from the IST program because Subsection IWP is applicable to centrifugal and positive displacement pumps only. These pumps have been exempted in accordance with IWP-1100.

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INSERVICE TEST PROGRAM

PUMP TABLES

PUMP NUMBER	PUMP NAME	CL	SPEED	INSERVICE TEST QUANTITIES: INLET PRES.	DIFF. PRES.	FLOW RATE	VIBRA.	BEARING TEMP.	TEST FREQ	REMARKS
C4103C001A	Standby Liquid Control	2	NA	N:PR-4	Y:PR-4	Y	Y:PR-1	N:PR-2	OP	24.139.02
C4103C001B	Standby Liquid Control	2	NA	N:PR-4	Y:PR-4	Y	Y:PR-1	N:PR-2	OP	24.139.02
E1102C002A	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.01
E1102C002B	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.06
E1102C002C	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.01
E1102C002D	Residual Heat Removal	2	NA	Y	Y	Y	Y:PR-8	N:PR-2	OP	24.204.06
E1151C001A	RHR Service Water	3	NA	Y:PR-3	Y:PR-7	Y:PR-7	Y:PR-1	N:PR-2	OP	24.205.05
E1151C001B	RHR Service Water	3	NA	Y:PR-3	Y:PR-7	Y:PR-7	Y:PR-1	N:PR-2	OP	24.205.06
E1151C001C	RHR Service Water	3	NA	Y:PR-3	Y:PR-7	Y:PR-7	Y:PR-1	N:PR-2	OP	24.205.05
E1151C001D	RHR Service Water	3	NA	Y:PR-3	Y:PR-7	Y:PR-7	Y:PR-1	N:PR-2	OP	24.205.06
E2101C001A	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.02
1C001B	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.03
E2101C001C	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.02
E2101C001D	Core Spray	2	NA	Y	Y:PR-6	Y:PR-6	Y:PR-1	N:PR-2	OP	24.203.03
E4101C001A	HPCI - Main	2	Y	Y	Y	Y	Y:PR-10	N:PR-2	OP	24.202.01
E4101C001B	HPCI - Booster	2	NA	NA	NA	NA	Y:PR-10	N:PR-2	OP	24.202.01
P4400C001A	Emergency Equip Cooling Water	3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.207.08
P4400C001B	Emergency Equip Cooling Water	3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.207.08
P4500C002A	Emergency Equip Service Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.208.02
P4500C002B	Emergency Equip Service Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.208.03
R3000C001(A)	Diesel Fuel Oil Xfer - EDG 11	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34
R3000C002(A)	Diesel Fuel Oil Xfer - EDG 12	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3000C003(B)	Diesel Fuel Oil Xfer - EDG 11	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34

PUMP NUMBER	PUMP NAME	CL	SPEED	INLET PRES.	DIFF. PRES.	FLOW RATE	VIBRA.	BEARING TEMP.	TEST FREQ	REMARKS
				---------- INSERVICE TEST QUANTITIES ----------						
R3000C004(B)	Diesel Fuel Oil Xfer - EDG 12	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3000C009(A)	Diesel Fuel Oil Xfer - EDG 13	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3000C010(A)	Diesel Fuel Oil Xfer - EDG 14	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
R3000C011(B)	Diesel Fuel Oil Xfer - EDG 13	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3000C012(B)	Diesel Fuel Oil Xfer - EDG 14	E3	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
R3001C005(A)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.34
R3001C006(C)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.35
R3001C007(B)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.36
R3001C008(D)	Diesel Generator Svc Water	3	NA	Y:PR-3	Y	Y	Y:PR-1	N:PR-2	OP	24.307.37
T4100C040	Chill Wtr./Cont. Cent. A/C	E4	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.413.01
T4100C041	Chill Wtr./Cont. Cent. A/C	E4	NA	Y	Y	Y	Y:PR-1	N:PR-2	OP	24.413.01

PART - B

INSERVICE TESTING PROGRAM FOR VALVES

1.0 Applicable Code

This Inservice Testing Program for ISI Class 1, 2, 3 and non-ISI Class Valves meets the requirements of Subsection IWV of Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition through the Winter 1980 Addenda. Where these requirements are determined to be impractical, specific requests for relief have been written and included in Section 2.0

2.0 Relief Requests for Valve Inservice Testing Program

2.1 Relief Request Description Format

The following information has been included in each valve relief request:

- o System listing
- o Valve number(s)
- o Category (see Section 3.0 for category description)
- o Valve Function
- o Section XI testing requirement
- o Basis for relief from Section XI requirement
- o Alternate testing

2.2 Relief Request Index/Listing

Relief Request Number	Subject	System Affected
VR-1	Stroke valves during Cold Shutdown	N11, Main Steam
VR-2-R1	Stroke valves during Cold Shutdown/Refueling	B21, Feedwater
VR-4	Exercise valves during Cold Shutdown	P44, EECW
VR-5	Exercise valves during Cold Shutdown	P44, EECW
VR-6	Solenoid stroke time evaluation	All
VR-7-R1	Exposure of low pressure piping to the RCPB pressure	E11, E21, E41 and E51
VR-8-R2	Exposure of low pressure piping to the RCPB pressure	E11, E21

Relief Request Number	Subject	System Affected
VR-9	Test excess flow check valves during Refuelings	B21, B31, G33, E51, E21, E41
VR-10	HPCI Torus Suction Check Valve testing methodology	E41
VR-12	Scram Valve testing	C11, CRD Hydraulic
VR-14	Test Valves once per 18 months	B21, S/RV's
VR-15	Testing of MSIV's during Cold Shutdown	B21, MSIV's
VR-16	Test ADS accumulator check valves during Refueling	B21, T49 Accumulator Supply Check Valves
VR-17	Test SRV vacuum breakers during Refueling	B21, SRV Vacuum Breakers
VR-18	Test valves during Cold Shutdown	B31, Recirc Seal Injection lines
VR-20-R2	Test valves during Cold Shutdown	C41, Standby Liquid Control
VR-21	Test valves during Cold Shutdown	B31, Recirc
VR-23	Fail Safe Testing Methodology	All Systems
VR-32	Test Valves during Reactor Refueling	P44, EECW
VR-35	Test valves during Cold Shutdown	E11, RHR
VR-36	Test valves during Cold Shutdown	E41, E51, G11, G33, P44
VR-40	Keep fill system check valve operability testing methodology.	E21, Core Spray

Relief Request Number	Subject	System Affected
VR-41	Keep fill system check valve operability testing methodology	E11, RHR
VR-43	CRD check valve testing once per 18 months	C11, CRD
VR-44	CRD check valve testing once per 7 days	C11, CRD
VR-45	Check valve disassembly and inspection	E21, Core Spray
VR-46-R4	Air Leakage testing of valve groups	See Relief Request
VR-47-R1	Water Leakage testing of valve groups	See Relief Request
VR-48-R1	Check valve disassembly and inspection	P44, EECW
VR-49-R3	PIV testing of valve groups	E11, RHR
VR-50-R1	Bypass leakage testing of valve groups	E41, HPCI
VR-51	Alternate stroke time testing of 3 way solenoid valves @ 6 month intervals	R30, Diesel Air Start Valves
VR-52-R1	Containment Isolation valve testing at Cold Shutdowns	B21, MSIV Leakage Control Systems
VR-53	Group testing of Drywell Vacuum Breakers	T23, Drywell Vacuum Breakers
VR-55	Thermal Relief Valve Testing at Refuelings	E11, RHR
VR-57	Drywell Vacuum Breakers Testing at Cold Shutdowns	T23, Drywell Vacuum Breakers
VR-58	Nuclear Boiler, RPV Water Level Instrumentation Backfill Valves Stroke Testing	B21, Instrument Check Valves
VR-59	Residual Heat Removal Check Valve Stroking with Mechanical Actuator	E11, RHR

RELIEF REQUEST NO. VR-1

SYSTEM: MAIN AND REHEAT STEAM AND NUCLEAR BOILER

COMPONENT: N1100F607 N1100F609

N1100F608 N1100F610

CATEGORY: B

FUNCTION: These valves are blocking valves for the MSIV Leakage control system. They need to close properly to allow the MSIV leakage control system to function properly.

TEST REQUIREMENT: Exercise and time valves every three months

BASIS FOR RELIEF: Full stroke testing these valves during normal reactor operation requires isolating one of the four main steam lines. Isolation of these lines results in primary system pressure spikes, reactor power fluctuations, and increased flow in the unisolated steam lines. This unstable operation can lead to reactor scram. In addition, pressure transients resulting from stroke testing MSIVs increase the chances of actuating primary system safety/relief valves.

It is proposed that full stroke testing be performed at cold shutdowns. This request also contributes to a reduction of the relief valve challenge rate as recommended in NUREG-0626.

ALTERNATE TESTING: These valves will be full stroked exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-2-R1

SYSTEM: FEEDWATER

COMPONENT: B2100F010A B2100F076A

B2100F010B B2100F076B

CATEGORY: A/C

FUNCTION: Valves B2100F010A&B and B2100F076A&B close for containment isolation. Valve B2100F010A opens for HPCI injection.

TEST REQUIREMENTS: Exercise check valves every three months.

BASIS FOR RELIEF: These check valves cannot be tested for operability to the closed position during reactor operation because the feedwater system is needed to maintain primary coolant inventory and these check valves can only close with the cessation of feedwater flow. If a feedwater isolation valve was closed during operation, the feedwater nozzle and spargers would undergo a severe thermal shock when feedwater was restored. This thermal shock could cause cracking and possible failure of the spargers and nozzles. Finally, the air operators on the check valves cannot close the valves against feedwater flow. After startup from a cold shutdown, when normal feedwater is established, these valves are confirmed open. Plant Operations records will be available for verification of normal operation.

Although the check valves can be tested in the open direction during startup after a cold shutdown, the closed status of these check valves must be tested during reactor refueling. There is no means of confirming closed valve position other than during the AT-1 test.

ALTERNATE TESTING: The check valves will be verified open during plant startup after cold shutdown by the verification of feedwater flow to the Reactor. The check valves will be verified closed during reactor refueling by confirmation of acceptable leak test results (AT-1).

RELIEF REQUEST NO. VR-4

SYSTEM: CLOSED COOLING WATER AND EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: P4400F182 P4400F604

CATEGORY: B: P4400F604
C: P4400F182

FUNCTION: These valves must close to isolate the non-safety related, non-seismic piping supplying cooling water to the CRD drive pumps from the EECW system.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: During power operation the RBCCW system supplies cooling water to the CRD pumps. Closing the subject valves would interrupt cooling water flow to the CRD pumps. These valves will not be exercised during normal operation because interruption of flow would cause damage to the pumps.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-5

SYSTEM: EMERGENCY EQUIPMENT COOLING WATER

COMPONENT:

P4400F606A	P4400F282A
P4400F606B	P4400F282B
P4400F607A	P4400F615
P4400F607B	P4400F616

CATEGORY: A/C: P4400F282A, P4400F282B
A: all others

FUNCTION: These valves are primary containment isolation valves for the four EECW lines.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valves in the close direction every three months.

BASIS FOR RELIEF: During power operation, the RBCCW system supplies cooling water to components inside the drywell, including the reactor recirculating pumps and motors. Closing the subject valves would interrupt cooling water flow to the reactor recirculating pump and motor bearings. These valves will not be exercised during normal operation because interruption of flow would cause damage to the pump and motor.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown except for P4400F282A and B which will be verified to close every 2 years concurrent with Local Leak Rate tests.

RELIEF REQUEST NO. VR-6

SYSTEM: ALL SYSTEMS

COMPONENT: All solenoid operated valves.

CATEGORY: A and B

FUNCTION: System dependent

TEST REQUIREMENTS: Stroke time evaluation per IWV-3413(b)

BASIS FOR RELIEF: It is impractical to apply the requirements of IWV-3413(B) to valves with very short stroke times (i.e. 2 seconds). Solenoid operated valves typically have full stroke times under one second. For these short stroke time valves, variances of 50 percent or more can occur in the measured times for reasons that are in no way related to valve performance, for example, operator reaction times. In these specific cases, verifying that the valve's stroke time does not exceed 2 seconds would be sufficient to evaluate valve performance.

ALTERNATE TESTING: For solenoid operated valves where position indication is provided, the measured stroke time shall not exceed 2 seconds.

RELIEF REQUEST NO. VR-7-R1

SYSTEM: RESIDUAL HEAT REMOVAL, CORE SPRAY, HIGH PRESSURE COOLANT INJECTION, AND REACTOR CORE ISOLATION COOLING.

COMPONENT:

E1150F008	E2150F005A
E1150F009	E2140F005B
E1150F015A	E4150F006
E1150F015B	E5150F013
E1150F608	

CATEGORY: A

FUNCTION: These valves are designated as pressure isolation valves (PIVs). Pressure isolation valves are defined as valves which isolate the portions of a system designed for low pressure service from the portions of a system connected to the Reactor Coolant Pressure Boundary (RCPB) which are designed for high pressure service. For additional information, see NUREG-0677.

TEST REQUIREMENTS: Exercise and time valves during normal operation.

BASIS FOR RELIEF: Inadvertent opening of these valves is prevented by interlocks which require the primary system pressure to be below the secondary system design pressure prior to opening. Routinely stroking these valves during power operation would place the plant in a degraded or unsafe condition by exposing low pressure piping to Reactor Coolant Pressure (Reference: EF2 SER page 3-30).

ALTERNATE TESTING: Exercising and timing test will be performed during cold shutdown.

RELIEF REQUEST NO. VR-8-R2

SYSTEM: RESIDUAL HEAT REMOVAL AND CORE SPRAY.

COMPONENT: E1100F050A E2100F006B

E1100F050B

E2100F006A

CATEGORY: A/C

FUNCTION: These valves are designated as pressure isolation valves (PIVs). Pressure isolation valves are defined as valves which isolate the portions of a system designed for low pressure service from the portions of a system connected to the Reactor Coolant Pressure Boundary (RCPB) which are designed for high pressure service.

TEST REQUIREMENTS: Exercise check valves E1100F050A & B and E2100F006A & B in the open and close direction every three months.

BASIS FOR RELIEF: The current design configuration of these valves/systems prohibit fully exercising them through full flow testing. Acceptable alternatives identified in NRC Generic Letter 89-04 Paragraph D and Attachment 1, Position 2 also address disassembly as a viable alternative.

It is imprudent/impractical to disassemble the valves for inspection or inject full flow through these valves during cold shutdowns because: (1) dead legs of piping flushed into the reactor would seriously impact chemistry requirements which could delay plant start-up significantly; (2) disassembly requires an extensive manpower and resource commitment; (3) exposure to personnel is substantial, approximately 4.7 Man Rem in RF-01; (4) drywell entry is prohibited unless de-inerted.

ALTERNATE TESTING: Demonstrate full-stroke capability by disassembly and inspection in accordance with the guidelines contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 2, issued April 3, 1989 or by mechanically full stroke testing these valves during refueling outages. For Valves E11-F050A and B mechanical actuation will be accomplished by use of a full stroke actuator. See Relief Request VR-59 for additional information on the mechanical actuator. For valves E21-F006A and B, one valve will be disassembled and inspected every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on an evaluation of this data. This level of testing/inspection will acceptably demonstrate the operability and satisfactory condition of these valves.

RELIEF REQUEST NO. VR-9

SYSTEM: NUCLEAR BOILER, REACTOR FEEDWATER, REACTOR RECIRCULATION, REACTOR WATER CLEANUP, REACTOR CORE ISOLATION COOLING, CORE SPRAY, AND HIGH PRESSURE COOLANT INJECTION.

COMPONENT: Excess flow check valves

CATEGORY: C

FUNCTION: Excess flow check valves limit leakage from the RCPB due to instrumentation piping failures and perform a containment isolation function.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: Excess flow check valves cannot be exercised without isolating instrumentation downstream of the excess flow check valve. Isolating instruments during normal operation would produce erroneous instrument readings which could lead to a degraded or unsafe plant condition.

ALTERNATE TESTING: Excess flow check valves will be exercised in the closed direction at each refueling outage.

RELIEF REQUEST NO. VR-10

SYSTEM: HIGH PRESSURE COOLANT INJECTION

COMPONENT: E4100F045

CATEGORY: C

FUNCTION: This valve is designed to prevent backflow into the Torus in the event of pump suction shift from the condensate storage tank (CST) to the Torus. The safety related stroke direction of this valve is in the open direction to provide suction flow to the HPCI pump.

TEST REQUIREMENTS: Exercise check valve every three months.

BASIS FOR RELIEF: There is no convenient method for verifying the ability of this valve to swing to the full open position. The system test circuits utilize the CST for pump suction rather than the suppression pool. Taking suction from the suppression pool during testing is undesirable because torus water would be transferred to the condensate storage tank. Since torus water is not demineralized, the entire condensate storage tank inventory would have to be processed after the test.

In lieu of the Code required full stroke test, valve operability will be demonstrated by disassembling the valve and verifying that the valve disk swings freely to the full open position. Since this valve has no function during normal operation, no wear-induced degradation of the valve internals is expected.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on the results of that data.

RELIEF REQUEST NO. VR-12

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F114

C1103F126

C1103F127

CATEGORY: B and C

FUNCTION: For a scram to occur, check valve C1103F114 opens, and diaphragm operated valves C1103F126 and C1103F127 open.

The valves listed above can be found on each CRD hydraulic control unit. There are 185 CRD hydraulic control units, one for each CRD.

TEST REQUIREMENTS: Exercise and time valves every three months. Exercise check valves every three months.

BASIS FOR RELIEF: The proper operation of each of these valves is demonstrated during scram testing. During scram testing, each drive's scram insertion time is measured and a fail-safe actuator test is performed. The Technical Specifications provide a limit for individual CRD scram insertion times to specific values (Technical Specification paragraphs 3.1.3.3 and 3.1.3.4). If a particular CRD's scram insertion time is less than the specified limit, the above mentioned valves are functioning properly.

ALTERNATE TESTING: The frequency of individual scram insertion tests is: 1) 100% of control rod drives following core alterations or after a reactor shutdown greater than 120 days with reactor power equal to or less than 40% and; 2) 10% of control rods at least once every 120 days of operations, per Technical Specification paragraph 4.1.3.2.

RELIEF REQUEST NO. VR-14

SYSTEM: NUCLEAR BOILER

COMPONENT: S/RV ADS Valves

PIS No

B2104F013R

B2104F013E

B2104F013J

B2104F013H

B2104F013P

CATEGORY: B/C

FUNCTION: The functions of the S/RVs are: 1) act as a primary system safety valve which actuates on high system pressure; 2) open upon receipt of an auto depressurization signal to blowdown reactor and; 3) act as a primary system relief valve which can be manually actuated from the control room.

TEST REQUIREMENTS: Exercise and time valve every three months.

BASIS FOR RELIEF: Relief is requested from the Section XI required testing frequency of once every three months. These valves will be exercised once every eighteen (18) months as specified in Technical Specification paragraph 4.5.1.d.2.

In addition, relief is requested from the stroke timing requirements of Section XI. It is impractical to measure stroke times for an S/RV since the stroke times are on the order of 100 msec. Steam flow measurements and/or turbine bypass valve position will verify that the S/RVs have performed their function in less than or equal to 2 seconds. Time "zero" for this stroke time measurement corresponds to the instant the S/RV hand switch is aligned in the "open" position.

ALTERNATE TESTING: These valves will be exercised at least once per 18 months when the reactor is operating at sufficient power to bypass a quantity of steam through the turbine bypass valve(s) equal to or greater than the capacity of an S/RV. Since the turbine bypass valves respond automatically to RPV dome pressure, the actuation of a S/RV will result in rapid closure of the turbine bypass valves. Conversely, closing the S/RV will be accomodated by rapid opening of the turbine bypass valves. A change in turbine bypass valve position can be directly associated with a certain steam flow rate. This flow rate would be equal to the quantity of steam discharged by the S/RV.

No stroke time measurements will be performed. An abrupt change in turbine bypass valve position or steam line flow (per Tech. Spec. 4.5.1.d.2) within 2 seconds will be adequate to demonstrate valve operability.

RELIEF REQUEST NO. VR-15

SYSTEM: NUCLEAR BOILER

COMPONENT: B2103F022A

B2103F022B

B2103F022C

B2103F022D

B2103F028A

B2103F028B

B2103F028C

B2103F028D

CATEGORY: A

FUNCTION: These valves (MSIVs) are the primary containment isolation valves for the main steam lines.

TEST REQUIREMENTS: Exercise and time valves every three months (BTC).

BASIS FOR RELIEF: Full stroke testing these valves during normal reactor operation requires isolating one of the four main steam lines. Isolation of these lines results in primary system pressure spikes, reactor power fluctuations, and increased flow in the unisolated steam lines. This unstable operation can lead to a reactor scram, and as discussed in NUREG-0626, pressure transients resulting from full stroke testing MSIVs increase the chances of actuating primary system safety margins.

This request also contributes to a reduction of the relief valve challenge rate as recommended in NUREG-0626.

ALTERNATE TESTING: These valves will be part stroke exercised every three months and full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-16

SYSTEM: NUCLEAR BOILER, PRIMARY CONTAINMENT PNEUMATIC SUPPLY

COMPONENT:

T4901F034	B2100F029D
T4901F034B	T4901F019
T4901F034C	T4901F022
T4901F034D	T4901F025
B2100F029A	T4901F028
B2100F029B	T4901F031
B2100F029C	

CATEGORY: C

FUNCTION: These valves must close upon loss of normal air or nitrogen supply to the S/RV ADS accumulations and the MSIV accumulators. These valves will open when the safety related control air system starts up after the loss of normal air or nitrogen supply.

TEST REQUIREMENTS: Exercise valves in the open and closed direction every three months.

BASIS FOR RELIEF: The position of these simple check valves cannot be verified during normal operation or cold shutdown since special testing will be required. In addition, access to these valves is limited since they are inside the drywell.

ALTERNATE TESTING: These valves will be exercised during refueling.

RELIEF REQUEST NO. VR-17

SYSTEM: NUCLEAR BOILER

COMPONENT:

B2100F037A	B2100F037J
B2100F037B	B2100F037K
B2100F037C	B2100F037L
B2100F037D	B2100F037M
B2100F037E	B2100F037N
B2100F037F	B2100F037P
B2100F037G	B2100F037R

CATEGORY: C

FUNCTION: During an S/RV discharge, these valves must be closed. After an S/RV discharge, the steam remaining in the S/RV discharge line will condense and try to draw a vacuum in the line. These check valves (vacuum breakers) open and admit air to the S/RV discharge line thus relieving the vacuum condition.

TEST REQUIREMENTS: Exercise check valve in the open and close direction every three months.

BASIS FOR RELIEF: These check valves have no external means of actuation for exercising. The only practical method for exercising these valves open and closed is by manually pushing the disk from its seat. Since this requires access to the valves, which are located in the drywell, the test must be deferred to cold shutdowns if the primary containment is de-inerted.

ALTERNATE TESTING: These check valves will be verified to be operable during cold shutdowns when the drywell is de-inerted.

RELIEF REQUEST NO. VR-18

SYSTEM: REACTOR RECIRCULATION

COMPONENT: B3100F014A B3100F016A

B3100F014B B3100F016B

CATEGORY: A

FUNCTION: These are primary containment isolation valves on the CRD seal water injection lines to the reactor recirculation pumps.

TEST REQUIREMENTS: Exercise and time valves every three months.

BASIS FOR RELIEF: Exercising these valves during normal operation would require isolating the seal water flow to the reactor recirculation pumps. Isolating the seal water flow to these pumps could potentially damage the pump.

ALTERNATE TESTING: These valves will be exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-20-R2

SYSTEM: STANDBY LIQUID CONTROL (SBLC)

COMPONENT: C4100F006

C4100F007

CATEGORY: A/C

FUNCTION: The safety functions of these check valves are to open upon system injection and close for containment isolation.

TEST REQUIREMENTS: Exercise valves every three (3) months open and closed.

Type-C Air Leak Test (10CFR50-App. J) every reactor refueling. These valves serve as Primary Containment Isolation Valves.

BASIS FOR RELIEF:

Initially both of these valves had a testability feature which utilized a shaft that penetrated the pressure boundary via a packing and stuffing box arrangement. These packing and stuffing boxes were a major source of leakage when subjected to 10CFR50, App. J Local Leak Rate Testing (LLRT). The design was such that when the packing was tightened to reduce leakage, the friction on the shaft was sufficiently increased that the disc would not operate freely. Subsequent loosening of the packing to pass the exercise test resulted in failing the LLRT test. The required tightening and loosening of valve packing to satisfy multiple testing requirements resulted in excessive manhours being expanded inside primary containment and raised ALARA concerns.

In an effort to alleviate this problem and reduce personnel exposure, the air operators on these check valves were removed and new valve shafts and end bushings were installed. Removal of these air operators neither compromises the operation nor the safety function of the subject check valves.

Now that the operators have been removed, the only method of exercising these valves is to inject water through the valves into the reactor vessel via the SBLC pump(s) and perform a leaktest to verify closure.

During plant operation at power, this would require disabling the SBLC system to prevent injection of sodium pentaborate into the reactor and to repair/replace the squib valve which was used for the test.

RELIEF REQUEST VR-20-R2 (Continued)

During cold shutdown periods, the activities associated with this test, subsequent squib valve replacement, and the associated leak test is considered well beyond the scope of a typical short-duration outage and could require unnecessary de-inerting of the primary containment.

These valves are installed in a "dead leg" of piping and, as such, are not subject to conditions or operations that could cause significant degradation of valve internals over the lifetime of the valves.

ALTERNATE TESTING: (Exercise testing of check valves C4100F006 and C4100F007)

These valves will be verified to stroke open by performance of the "SLC Manual initiation and Storage Tank Heater Operability Test". This test will be performed every 18 months. This test injects full flow from one SBLC pump through these valves into the reactor vessel. During the test, the outboard check valve, C4100F006, will be checked locally and by position indication, to be fully open. In addition, since the SBLC pumps are positive displacement pumps, pump operation without lifting a relief valve verifies full flow through the check valves.

These valves will be verified closed by performance of Local Leak Rate Testing (LLRT). These tests pressurize a test volume in which the subject check valves form a pressure boundary. If the valves are not fully closed and seated, the LLRT test will fail. Successful LLRT testing will prove that the subject valves are closed. These LLRT tests are performed every 2 years. Both the manual initiation and injection test and the LLRT test should generally occur during refueling outages.

BASIS FOR RELIEF: (Position Indication Test for check valve C4100F007)

Remote position indicator for inboard check valve C4100F007 was removed to reduce personnel exposure during recalibration and repair work on the position switches within primary containment. Remote position indication for inboard check valve C4100F007 is neither required for system operation nor required for plant safety.

ALTERNATE TESTING: (Position Indication Test for check valve C4100F007)

Due to the removal of remote position indicators for inboard check valve C4100F007, position indication tests of this valve are no longer required. Via this relief request, remote position indication testing for valve C4100F007 is being deleted. The position indication test requirement for outboard check valve C4100F006 will remain.

RELIEF REQUEST NO. VR-21

SYSTEM: REACTOR RECIRCULATION

COMPONENT: B3105F031A

B3105F031B

CATEGORY: B

FUNCTION: During a reactor recirculation loop pipe break loss of coolant accident, one of these valves will close depending on the location of the pipe break. LPCI loop selection logic determines which valve must close.

TEST REQUIREMENTS: Exercise and time valves for operability every three months.

BASIS FOR RELIEF: These valves cannot be full stroke tested during normal operation since isolation of a recirculation loop would cause a recirculation pump trip. Single loop operation is restricted by Technical Specification paragraph 3.4.1.1.a.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-23

SYSTEM: ALL SYSTEMS

COMPONENT: Valves equipped to fail open or closed.

CATEGORY: A and B

FUNCTION: Upon loss of electrical power, the valve must stroke to its fail-safe position.

TEST REQUIREMENTS: Solenoid valves which control the air supply to air operated valves and direct solenoid operated valves must stroke to their fail-safe position upon interruption of their electrical supply.

BASIS FOR RELIEF: De-energizing the solenoid valve has the same effect as loss of electrical power. Therefore, stroking the valve from the control room to its fail-safe position constitutes a Fail-Safe Test. No additional testing is necessary.

ALTERNATE TESTING: Normal stroking to the fail-safe position of valves equipped to fail open or closed constitutes a Fail-Safe Test. No additional testing is necessary.

RELIEF REQUEST NO. VR-32

SYSTEM: EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: P4400F246

P4400F274

CATEGORY: C

FUNCTION: These valves isolate the Quality Group D (non-class) penetration cooling jackets and the drywell sump heat exchanger from the balance of the system.

TEST REQUIREMENTS: Exercise valves to the full closed position every quarter.

BASIS FOR RELIEF: Because these valves are non-testable check valves inside primary containment, they can only be verified closed by a leak test. This test can only be performed during reactor refueling.

ALTERNATE TESTING: These valves will be leak tested during reactor refueling to confirm their close position.

RELIEF REQUEST NO. VR-35

SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT: E11F412

E11F413

E11F414

E11F415

CATEGORY: A

FUNCTION: These valves isolate the Reactor Protection System from Primary Containment Atmosphere.

TEST REQUIREMENTS: Exercise and time valves in the close direction every three months.

BASIS FOR RELIEF: The valves cannot be full stroke tested during normal operation since isolation of these lines could cause a reactor scram and ECCS initiation. See Relief Request VR-6 for stroke time information.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-36

SYSTEM: SUMP PUMP - RADWASTE

REACTOR CORE ISOLATION COOLING

HIGH PRESSURE COOLANT INJECTION

REACTOR WATER CLEANUP

EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: G1154F018 P4400F608

G1154F600 P4400F614

E4150F002

G3352F001

E5150F007

CATEGORY: A and B

FUNCTION: These valves serve as inboard containment isolation valves, EECW drywell sump cooling and EECW penetration jacket isolation valves.

TEST REQUIREMENTS: Exercise and time valves in the close direct every three months.

BASIS FOR RELIEF: These valves cannot be full-stroke tested during normal operation since failure of these valves during exercising at power operation would result in a plant shutdown to correct the problem.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown.

RELIEF REQUEST NO. VR-40

SYSTEM: CORE SPRAY

COMPONENT: E2100F029A E2100F029B

E2100F030A E2100F030B

CATEGORY: C

FUNCTION: These check valves prevent back flow into the keep fill system.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: The E2100F029A and E2100F030A valves are placed in series as are the E2100F029B and E2100F030B valves. There are no taps between these valves and no manual lifting levers to indicate disc position.

The only way to verify valve closure is to check for reverse flow leakage, which will confirm that one out of two valves closed.

The valves are exercised to the open position during the vent and fill portion of the core spray system operability tests.

ALTERNATE TESTING: One of the two valves will be confirmed closed by the absence of reverse flow.

RELIEF REQUEST NO. VR-41

SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT: E1100F089 E1100F184

E1100F090 E1100F185

CATEGORY: C

FUNCTION: These check valves prevent back flow into the keep fill system.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: The E1100F089 and E1100F090 valves are placed in series as are the E1100F184 and E1100F185 valves. There are no taps between these valves and no manual actuating levels to indicate disk position.

The only way to verify closure is to check for reverse flow leakage, which will confirm that one out of two valves closed.

The valves are exercised to the open position during the vent and fill portion of the residual heat removal system operability tests.

ALTERNATE TESTING: One of the two valves will be confirmed closed by the absence of reverse flow.

RELIEF REQUEST NO. VR-43

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F115 (Typical of 185 valves)

CATEGORY: C

FUNCTION: For a scram to occur, C1103F115 must close to prevent back flow into the charging water header.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: During normal operation, the drive water pumps supply drive water and cooling water to the control rods. In order to test C1103F115 in the close position, the drive water pumps must be shut down, thus interrupting the supply of cooling water to the control rods. Interruption of cooling water would cause excessive temperature in the control rods.

ALTERNATE TESTING: The check valve will be exercised once every 18 months during the CRD accumulator system integrity test. Normal pressure level in the accumulator verifies that the check valve opens properly.

RELIEF REQUEST NO. VR-44

SYSTEM: CONTROL ROD DRIVE

COMPONENT: C1103F138 (Typical of 185 valves)

CATEGORY: C

FUNCTION: For a scram to occur, C1103F138 must close to prevent back flow into the cooling water header.

TEST REQUIREMENTS: Exercise check valve in the close direction every three months.

BASIS FOR RELIEF: Due to system configuration, direct verification that the check valve closes is not practical. Indirect verification of valve closure is provided each time a control rod is moved.

If C1103F138 fails to close properly, the rod will fail to insert because drive water at a pressure between 90 psi and 260 psi above reactor pressure will flow into the cooling water header which operates at approximately 20 psi above reactor pressure.

ALTERNATE TESTING: When the reactor is in either Operation Condition 1 or 2 and the thermal power is above the preset power level of the rod worth minimizer and the rod sequence control system, all operable and withdrawn control rods will be moved at least one notch once per seven days per Technical Specification paragraph 4.1.3.1.2.

RELIEF REQUEST NO. VR-45

SYSTEM: CORE SPRAY

COMPONENT: E2100F038A E2100F038C

E2100F038B E2100F038D

CATEGORY: C

FUNCTION: These valves are designed to close to prevent backflow through core spray pumps that fail to start, thus preventing loss of core spray inventory. The valves must also open during pump startup to meet minimum flow requirements of the pumps.

TEST REQUIREMENTS: Exercise check valve every three months.

BASIS FOR RELIEF: As described in Relief Request PR-6, both Core Spray pumps in each division must be operating during surveillance testing. Therefore, detection of flow through the minimum flow line will only show that one out of two valves is open. Also, the ability to verify that the check valves close upon reversal of flow is lost during two pump testing.

In lieu of the Code required exercise test, one valve of each type will be demonstrated operable by disassembling the valve and verifying that the valve disk swings freely from and to the seat. All of the above valves are 3 inch, swing check type valves manufactured by Powell.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on an evaluation of that data.

RELIEF REQUEST NO. VR-46-R4

SYSTEM: SYSTEMS PENETRATING PRIMARY CONTAINMENT

COMPONENT: Valves subject to ASME Section XI, Category A Containment Isolation Air Leakage Tests. See Table VR-46-R4 for list of valves.

CATEGORY: A and A/C

FUNCTION: The subject valves perform a containment isolation function as defined in 10CFR50, Appendix A, Criteria 55 and 56.

TEST REQUIREMENTS: Measure valve seat leakage and compare the measured leakage to a specific maximum leakage for each valve (IWV-3426).

BASIS FOR RELIEF: Due to system configuration, the valves listed in Table VR-46-R4 cannot be individually leak tested. Table VR-46-R4 identifies the Containment Isolation Valves (CIV's) which must be collectively leak tested in valve groups. This table also provides the corresponding primary containment penetration number and valve sizes.

ALTERNATE TESTING: The Containment Isolation Valves listed in Table VR-46-R4 will be collectively leak tested according to their associated valve groups given in the table. The test leakage will be compared to the maximum leakage assigned to each group.

If the test leakage exceeds the criteria required by IWV-3426, valves in the affected group will be evaluated on a valve by valve basis consistent with the requirements of IWV-3427(a). The valve most likely to be the leaker will be repaired first and the group retested. If the test leakage is within the criteria, no further testing will be performed. In accordance to the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-46-R4

Table VR-46-R4

Containment Isolation Valves Which Must Be Tested by Group

Penetration Number	ID Numbers of Valves in Grouping	Valve Size (IN)
X-7A	B2100F022A	26
	B2100F028A	26
X-7B	B2100F022B	26
	B2100F028B	26
X-7C	B2100F022C	26
	B2100F028C	26
X-7D	B2100F022D	26
	B2100F028D	26
X-9A	B2100F076A	20
	E4150F006	14
X-9B	B2100F076B	20
	E5150F013	6
	G3300F120	4
X-11	E4150F003	10
	E4150F600	1
X-12	E1100F009	20
	E1100F608	20
X-15	T4804F603A	4
	T4804F605A	4

RELIEF REQUEST NO. VR-46-R4 (Continued)

Table VR-46-R4 (Continued)

Containment Isolation Valves Which Must Be Tested by Group

Penetration Number	ID Numbers of Valves in Grouping	Valve Size (IN)
X-22	T4901F601	1.5
	T4901F465	1.5
	T4901F007	1.5
X-25	T4803F602	24
	T4600F402	24
	T4600F411	6
X-26	T4803F601	24
	T4800F407	24
	T4800F408	10
X-27a	T5000F401B	1
X-27c	T5000F403B	1
X-27d	T5000F404B	1
X-27e	T5000F405B	1
X-27b	T5000F402B	1
	P34F404A	0.75
X-27b	T5000F402B	1
	P34F403B	0.75
X-31B	T4800F453	1
	T4800F454	1
	T4800F455	1
X-36	T4901F602	1.5
	T4901F468	1.5
	T4901F016	1.5
X-44	T4804F603B	4
	T4808F605B	4
X-48a	T5000F401A	1
X-48b	T5000F402A	1
X-48c	T5000F403A	1
X-48d	T5000F404A	1
X-48e	T5000F405A	1

RELIEF REQUEST NO. VR-46-R4 (Continued)

Table VR-46-R4 (Continued)

Containment Isolation Valves Which Must Be Tested by Group

Penetration Number	ID Numbers of Valves in Grouping	Valve Size (IN)
X-205A	T2300F450B	20
	T2300F410	20
X-205B	T2300F450A	20
	T2300F409	20
X-205C	T4800F404	20
	T4800F405	20
	T4800F409	6
X-205D	T4600F400	20
	T4600F401	20
	T4600F412	6
	T4600F410	6
X-205D	T4800F456	1
	T4800F457	1
	T4800F458	1
X-211A	E1150F024B	18
	E1150F027B	6
	E1150F028B	18
X-211B	E1150F024A	18
	E1150F027A	6
	E1150F028A	18
X-215	T4804F602A	4
	T4804F606A	4
X-218	T4804F601A	8
	T4804F604A	8
X-218	T4804F601B	8
	T4804F604B	8
X-219	T4804F602B	4
	T4804F606B	4

RELIEF REQUEST NO. VR-47-R1

SYSTEM: SYSTEMS PENETRATING PRIMARY CONTAINMENT

COMPONENT: Valves subject to ASME Section XI, Category A, Containment Isolation Water Leakage Tests. See Table VR-47-R1 for list of valves.

CATEGORY: A

FUNCTION: The subject valves perform a containment isolation function as defined in 10CFR50, Appendix A, Criteria 57.

TEST REQUIREMENT: Measure valve seat leakage and compare the measured leakage to specific maximum leakage for each valve (IWV-3426).

BASIS FOR RELIEF: Due to system configuration, the containment isolation valves (CIVs) listed in Table VR-47-R1 cannot be individually leak tested. Table VR-47-R1 gives the primary containment penetration corresponding to the containment isolation valves, the valve diameters, and the maximum allowable leakage based on the leakage limits given in EF-2 Technical Specification paragraph 3.5.1.2.e.

According to the Technical Specification, the leakage shall be limited to one gpm times the number of valves per penetration, not to exceed three gpm per penetration. For the penetrations in Table VR-47-R1, the maximum penetration limit is three gpm (11355 ml/min). This limit is divided by the sum of the valve diameters for the penetration, and multiplied by the sum of the diameters of the valves tested in a penetration group to produce the maximum leakage for that group.

ALTERNATE TESTING: The containment isolation valves listed in Table VR-47-R1 will be leak tested according to the valve groups given in Table VR-47-R1. The test leakage will be compared to the maximum leakage assigned to each group.

If the test leakage exceeds the criteria given in IWV-3426, valves in the affected group will be evaluated on a valve by valve basis consistent with the requirements of IWV-3427(a). The valve most likely to be the leaker will be repaired first and the group retested. If the test leakage is within the criteria, no further testing will be performed. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-47-R1 (Continued)

Table VR-47-R1

Maximum Leakage Rates for CIV Groups

Penetration Number	All CIVs Assigned to Penetration	Valve Size (IN)	Maximum Leakage Tested Single (ml/min)	Maximum Leakage Tested Together (ml/min)
X-227A	E2100F032B	1	379	
	E2150F031B	3	1135	
	G5100F606	4	1514	
	G5100F607	4	1514	
	E4150F012	4	1514	
	E2100F011B	2 }TESTED		
	E2100F012B	2 }TOGETHER		
	E2100F015B	10}		5299
X-227B	E5150F019	2	1136	
	E2150F031A	3	1703	
	E2100F032A	1	569	
	E2100F011A	2 }TESTED		
	E2100F012A	2 }TOGETHER		7948
	E2150F015A	10}		

RELIEF REQUEST NO. VR-48-R1

SYSTEM: EMERGENCY EQUIPMENT COOLING WATER

COMPONENT: P4400F051 P4400F116B

P4400F116A P4400F165

CATEGORY: C

FUNCTION: These valves are designed to close to prevent backflow in the Emergency Equipment Cooling Water System.

TEST REQUIREMENTS: Exercise check valve every three months to the open position.

BASIS FOR RELIEF: The current system configuration does not allow for direct or indirect verification that the check valve disk moves from its seat to the open position upon initiation of flow.

In lieu of the Code required exercise test, valve operability will be demonstrated by disassembling the valve and verifying that the valve disk swings freely from and to the seat.

ALTERNATE TESTING: Valve disassembly and inspection will occur at every refueling outage until sufficient data can be accumulated to adequately monitor valve degradation. The maximum inspection intervals will be determined based on an evaluation of that data.

ADDENDUM: The previously approved Relief Request allowed for disassembly and inspection in lieu of Code required testing. This addendum specifies the maximum inspection intervals as determined by evaluation of inspection history over three refueling outages.

Based upon these inspection results, the maximum inspection frequency of 72 months (one valve each refueling outage) is justified. Generic Letter (G.L.) 89-04, Item 2, identifies the NRC staff position for adopting acceptable alternatives to full flow testing of these check valves. These positions are addressed as identified below:

G.L. 89-04, Item 2 Paragraph	Fermi Basis for Meeting the Position
a. During valve testing by disassembly, the valve internals should be visually inspected for worn or corroded parts, and the valve disk should be manually exercised.	a. All four valves have been disassembled and inspected in each of three refueling outages completed prior to RF-04. No worn or corroded parts have been identified. Reference IST Evaluation 93-037

RELIEF REQUEST NO. VR-48-R1

G.L. 89-04, Item 2 Paragraph	Fermi Basis for Meeting the Position
b. Due to the scope of this testing, the personnel hazards involved and system operating restrictions, valve disassembly and inspection may be performed during reactor refueling outages. Since this frequency differs from the Code required frequency, this deviation must be specifically noted in the IST program.	b. This addendum to Relief Request No. VR-48 extends the frequency to the maximum inspection interval of 1 valve per refueling outage, based upon an 18 month operating cycle. Evaluation of data collected over three refueling outages indicates that minimal erosion and corrosion occur in these valves. Reference IST Evaluation 93-037.
c. Where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage, a sample disassembly and inspection plan for groups of identical valves in similar applications may be employed. The NRC guidelines for this plan are explained below:	c. Having determined that it is indeed burdensome to disassemble and inspect 4 identical check valves in the same system each refuel outage. NRC guidelines are hereby implemented and met as follows:
o The sample disassembly and inspection program involves grouping similar valves and testing one valve in each group during each refueling outage. The sampling technique requires that each valve in the group be the same design (manufacturer, size, model number, and materials of construction) and have the same service conditions including valve orientation. Additionally, at each disassembly the licensee must verify that the disassembled valve is capable of full-stroking and that the internals of the valve are structurally sound (no loose or corroded parts). Also, if the disassembly is to verify the full-stroke capability of the valve, the disk should be manually exercised.	o All four valves are Powell Model #3061 AWE 6" Swing Check Valves of identical material and construction. o All have the same service conditions. Ref. IST Evaluation 93-037. o Physical orientation is similar for all four valves in that they are horizontally mounted in similar configuration arrangements.

RELIEF REQUEST NO. VR-48-R1

G.L. 89-04, Item 2 Paragraph	Fermi Basis for Meeting the Position
o A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. If the disassembled valve is not capable of being full-stroke exercised or there is binding or failure of valve internals, the remaining valves in that group must also be disassembled, inspected, and manually full-stroke exercised during the same outage. Once this is completed, the sequence of disassembly must be repeated unless extension of the interval can be justified.	o The valves have been manually exercised to verify full-stroke capability in accordance with surveillance procedure 43.000.010 during the three prior refueling outages. The new frequency of one valve per outage, completing all four in four outages, meets these requirements.

RELIEF REQUEST NUMBER VR-49-R3

SYSTEM: RESIDUAL HEAT REMOVAL SYSTEM

COMPONENT: E1150F009 E1150F608

CATEGORY: A

FUNCTION: The subject valve isolates low pressure piping from adjacent high pressure piping.

TEST REQUIREMENT: Measure valve seat leakage and compare the measured leakage to a specific maximum leakage for each valve.

BASIS FOR RELIEF: Due to system configuration, the above pressure isolation valves cannot be individually leak tested. Both valves must be tested within the same test volume with pressure being applied in the accident direction for both valves.

According to EF-2 Technical Specification Paragraph 3.4.3.2.d, the leakage shall be limited to one gpm (3785 ml/min) at a reactor coolant pressure 1045 +/- 10 psig from any reactor coolant system pressure isolation valve.

ALTERNATE TESTING: Pressure isolation valves E1100F009 and E1100F608 will be leak tested together. The test leakage will be compared to a maximum leakage of one gpm (3785 ml/min).

If the test leakage exceeds the one gpm limit as specified by Technical Specification Paragraph 3.4.3.2.d, the valves will be evaluated consistent with the requirements of IWV-3427(a). The valve most likely to be the leaker will be repaired first and both valves retested. If the test leakage is within one gpm, no further testing will be performed. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-50-R1

SYSTEM: HIGH PRESSURE COOLANT INJECTION

COMPONENT: E4150F003

E4150F006

E4150F600

CATEGORY: A

FUNCTION: The subject valves perform a bypass leakage isolation function.

TEST REQUIREMENT: Measure valve seat leakage and compare the measured leakage to a specific maximum leakage for each valve (IWV-3426).

BASIS FOR RELIEF: Due to system configuration, the above listed valves cannot be individually leak tested. Bypass leakage valves E4150F003 and E4150F600 must be tested together, and bypass leakage valve E4150F006 must be tested with the non-bypass leakage valve B2100F076A.

Maximum allowable leakages have been assigned to the two groups of valves based on the requirement that the summed leakage from all bypass leakage paths is less than 0.04 La (Reference: EF2 Safety Evaluation Report NUREG-0798, Supplement 2, pg. 6-1).

ALTERNATE TESTING: Bypass leakage valves E4150F003 and E4150F600, and bypass leakage valve E4150F006 and containment isolation valve B2100F076A will be leak tested as groups. The test leakage will be compared to the maximum leakage assigned to each of the two groups.

If the test leakage exceeds the criteria given in IWV-3426, valves in the affected group will be evaluated on a valve by valve basis consistent with the requirements of IWV-3427(a). The valve most likely to be the leaker will be repaired first and the group retested. If the test leakage is within the criteria, no further testing will be performed. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).

RELIEF REQUEST NO. VR-51

SYSTEM: DIESEL GENERATOR

COMPONENTS:

R30FA04A	R30FA04B	R30FA04C	R30FA04D
R30FA05A	R30FA05B	R30FA05C	R30FA05D

CATEGORY: B

FUNCTION: Normally closed valves which must open to supply air to the Air Start System of the Diesel Generator.

TEST REQUIREMENTS: Per IWV-3413(b) exercise testing, verified by stroke time measurements, will be performed to confirm full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function.

The test frequency required is once every 92 days during power operation.

BASIS FOR RELIEF: It is impractical to apply the requirements of IWV-3413(b) to valves with very short stroke times (i.e. 2 seconds). Solenoid operated valves typically have full stroke times under one second. For these short stroke time valves, variances of 50 percent or more can occur in the measured times for reasons that are in no way related to valve performance; for example, operator reaction times. In this specific case verifying that the valve's stroke time satisfies system operating requirements is sufficient to evaluate valve performance.

To satisfy the test frequency requirements would require additional diesel starts which would be detrimental to overall diesel operation and reliability.

ALTERNATE TESTING: For the subject valves, a successful start of the diesel generator within the required Fermi 2 Technical Specification requirement of achieving speed and voltage level (Ref. Tech Spec. Paragraph 4.8.1.1.2.a.4) within (10) seconds, shall be sufficient to demonstrate that the 3-way solenoid valves have opened in the required time.

The test frequency shall be once every 6 months.

RELIEF REQUEST NO. VR-52-R1

SYSTEM: MSIV LEAKAGE CONTROL

COMPONENT: B2100F434 and B2100F437

CATEGORY: B2100F434 (Category - A) and B2100F437 (Category - R)

FUNCTION: Close for primary containment isolation and open to operate the MSIV LCS.

TEST REQUIREMENT: Exercise and time valves every three months to the open and closed position.

BASIS FOR RELIEF: Stroking the inboard isolation valves B2100F434 (Division 1) and B2100F437 (Division 2) during normal reactor operation causes the drain valve, and the air injector valve to cycle open. This evolution results in the potential release of radioactive steam to the atmosphere inside the steam tunnel and challenges the secondary isolation valve with a potential for primary reactor coolant release. It also allows steam to enter the control air system causing valve position indication problems in the control room. Also, this system is not designed to operate at pressures greater than 50 psig. System interlocks are designed to prevent the isolation valves from opening unless in the test mode and even then only one isolation valve at a time can be opened.

ALTERNATE TESTING: These valves will be full stroked, exercised and timed during cold shutdown.

RELIEF REQUEST NO. VR-53

SYSTEM: NITROGEN INERTING

COMPONENTS: T2300F400 A thru H

T2300F400 J thru M

CATEGORY: A/C

FUNCTION: These valves open to prevent a differential pressure buildup between the torus and the drywell and close when drywell pressure is greater than torus pressure to prevent bypass of drywell atmosphere directly to the torus air volume.

TEST REQUIREMENTS: For Category A valves, seat leakage shall be measured and compared to a specified maximum allowable leakage. (IWV-3426).

For valves 6 inches NPS and larger, individual valve leakrates shall be trended and evaluated per IWV-3427.

BASIS FOR RELIEF: These are exposed check valves bolted to open flanges on the downcomer header in the suppression chamber. There is no practical way of applying pressure behind the valves in the downcomer header and testing from the torus side using a vacuum fitting would require considerable disassembly of valve components.

The requirements for leaktesting these valves is derived from Fermi Technical Specifications, Section 4.6.2.1.h that establishes a limit for drywell to torus bypass leakage - that is leakage from the drywell to the torus that is not ducted through the torus downcomers into the torus water. In this section, only a limit for aggregate leakage from all sources is imposed and individual valve leakage is considered insignificant from quantitative perspective.

In consideration of the foregoing, analysis of test results per IWV-3427 is not considered applicable or meaningful.

ALTERNATE TESTING: Drywell - Torus bypass leakage will be measured in accordance with Fermi Technical Specification, Section 4.6.2.1.h. Individual seat leakage measurements of the subject valves will not be made nor will test results be analyzed in accordance with IWV-3427.

RELIEF REQUEST NUMBER VR-55

SYSTEM: RESIDUAL HEAT REMOVAL SYSTEM (RHR) DIVISION II

COMPONENT: E1100F408 and E1100F409

CATEGORY: A/C and C

FUNCTION: These valves function to provide thermal relief between E1150F009, E1150F608, and E1150F008.

TEST REQUIREMENT: Check Valves will be exercised fully open every three months.

BASIS FOR RELIEF: Both of these valves are non-testable check valves located inside primary containment and have no remote flow or position indication. Disassembly of these valves for inspection is impractical due to them having seal welded bonnets. Testing these valves inside the drywell with the reactor operating would result in significant radiation doses to test personnel inconsistent with the concept of ALARA in addition to imposing unacceptable personnel hazards associated with entering a nitrogen inerted containment/drywell. Additional problems associated with testing these valves during operations involve the potential exposure of test personnel to reactor pressure when the vent valves are opened and potentially decreasing RHR system reliability by taking the system out of service by closing a normally locked open maintenance valve, E1100F067, isolating that portion of the system.

It is proposed that these check valves be exercised while the penetration is isolated for the required 10 CFR Part 50, Appendix J leak rate tests. Testing these check valves at this time would accomplish the following:

1. Maximize RHR availability.
2. Minimize time spent in the drywell consistent with the concept of ALARA.
3. Existing leak rate test procedures would easily facilitate the air testing/exercising of these check valves.
4. Minimize personnel hazards associated with the test.
5. Provide a large pressure drop across the valves insuring the valves will perform their design function and virtually assuring the valves are exercised fully open.

RELIEF REQUEST NUMBER VR-55 (Continued)

ALTERNATE TESTING: These valves serve as a thermal relief path and as such have no design flow. All that is required is that they open to relieve the hydraulic pressure between E1150F009, E1150F008 and E1150F608 (approximate volume of 280 gallons) produced by the thermal expansion of water in an isolated volume.

Since these valves are designed such that they begin to unseat at approximately 1 psid and are fully open at 4 psid, the application of Type C pressure/flow across the valves (56.5 psig) provides assurance that the valves are exercised fully open and insures these valves are capable of performing their design function.

Specifically these valves will be tested by applying Type C pressure upstream of the check valves and verifying flow when their associated vent valves (E1100F425, E1100F091) are opened.

These valves will be tested open during reactor shutdown for refueling, or at other convenient intervals, but in no case at intervals greater than two years.

RELIEF REQUEST NUMBER VR-57

SYSTEM: PRIMARY CONTAINMENT, DRYWELL VACUUM BREAKERS

COMPONENT: T2300F400A through H
T2300F400J through M

CATEGORY: A/C

FUNCTION: These valves open to prevent a positive differential pressure buildup from the torus to the drywell and close when drywell pressure becomes greater than torus pressure to prevent bypass of drywell atmosphere directly to the torus air volume.

TEST REQUIREMENT: Per paragraphs IWV-3521 and IWV-3522 of the ASME B&PV Code, Section XI, these check valves require full stroke exercising every three months, unless exercising is impractical during power operations.

BASIS FOR RELIEF: Amendment 96 of Fermi Technical Specifications revised the surveillance frequency requirements for the suppression chamber to drywell vacuum breakers from monthly to cold shutdown (Ref. LCR 92-124-OPL). Recognizing a potential conflict between the Technical Specifications and the Inservice Testing Program for Pumps and Valves, it was noted that Section XI testing requirements were impractical for the same reasons that monthly testing is. Therefore, approval of relief from the code testing requirements was issued by the NRC with the approval of the amendment.

ALTERNATE TESTING: These valves will be full stroke exercised during cold shutdown (CS).

RELIEF REQUEST NUMBER VR-58

SYSTEM: NUCLEAR BOILER, RPV WATER LEVEL INSTRUMENTATION BACKFILL VALVES

COMPONENT: B2100F248A B2100F248B
B2100F249A B2100F249B

CATEGORY: A/C

FUNCTION: The backfill check valves function to provide continuous flow to the Reactor Pressure Vessel (RPV) Water Level Instrumentation from the Control Rod Drive (CRD) System. Since this cross connect provides a path from the containment to the CRD System, these check valves serve to isolate the non-Q (CRD) portion of the system from the Q portion of the system and thereby prevent flow from the reference legs in the event of a line break or leak.

TEST REQUIREMENT: Check Valves are to be exercised every three months, per ASME Section XI Code paragraphs IVW-3521 and IWV-3522. Category A valves are required to be seat leak tested every 2 years, per IWV-3422.

BASIS FOR RELIEF: These check valves cannot be tested for operability to the closed position during reactor operation because the flow is needed to prevent reactor water level indication errors during depressurization transients. The method of stroke testing is to conduct a seat leakage test, which complies with NRC Staff Position 3 of GL-89-04. IWV-3522 allows extension of the quarterly testing to cold shutdown. Current NRC policy as documented in Draft NUREG-1482, paragraph 4.1.3, further allows this testing to be extended to refueling outages and requires only that this position be documented in the IST Program. This relief request, therefore, does not require NRC approval but serves as documentation of this Code deviation in the IST Program.

The use of the leakage test at refueling outages to satisfy both the leakage requirements and closing stroke requirements has previously been approved by the NRC for valves with similar testing conditions in the EF-2 IST Pump and Valve Program.

These check valves were added to the RPV level instrumentation system in a flow path from the CRD hydraulic supply system to the level instrumentation reference legs in order to enhance the reliability of the water level instrumentation. This was required by NRC Bulletin 93-03. These are new components being added to an already approved IST Program and the testing requirements are consistent with those now approved in the program for check valves with similar operational requirements. GL 89-04, Question #62, also affirms that, in this case, no further NRC approval is necessary.

ALTERNATE TESTING: The bypass Leakage Valve Leak Test, AT-4, and the Check Valve Exercise Test to the CLOSE Position, will be conducted during refueling outages under the leak test procedure.

RELIEF REQUEST NUMBER VR-59

SYSTEM: RESIDUAL HEAT REMOVAL

COMPONENT: E1100F050A E1100F050B

CATEGORY: A/C

FUNCTION: These valves are designed as pressure isolation valves (PIVs). Pressure isolation valves are defined as valves which isolate the portions of a system designed for low pressure service from the portions of a system connected to the Reactor Coolant Pressure Boundary (RCPB) which are designed for high pressure service.

TEST REQUIREMENT: As stated in Relief Request VR-8, valves E1100F050A and E1100F050B will be full stroke tested in the open direction using a mechanical full stroke actuator during refueling outages. This test must meet the requirements of paragraph IWV-3522(b).

BASIS FOR RELIEF: Paragraph IWV-3522(b) states that "...The force or torque delivered to the disk by the exerciser must be limited to less than 10% of the equivalent force or torque represented by the minimum emergency condition pressure differential acting on the disk, or to 200% of the actual observed force or torqua required to perform the exercise on the valve when the valve is new and in good operating condition, whichever is less..." At the time the actuators were installed, the actual torque to perform the exercise was not observed. The valves were, however, exercised numerous times while new and in good operating condition. Subsequently, it was determined by calculation that the latter force is the lessor of the two and that this torque should have been observed. This calculation also demonstrated that the actuator provides 172.86% of the calculated force that would have been observed to exercise the valve when it was new. Thus, the actuator meets the intent of the code in that the valve will not be over stressed, and it does provide the margin to monitor for degradation. To remove the actuator and measure the actual torque to lift the disk would pose an undue hardship on Fermi. Excessive radiation exposure would result because the actuator is of the rack and pinion type and would require much time to remove and then reinstall and align, only to affirm the validity of the calculations.

ALTERNATE TESTING: The calculated torque to lift the disk will be used as the test basis in lieu of the actual observed force.

3.0 Inservice Testing Program - Valve Tables

The tables in Section 3.3 list all ISI Class 1, 2, 3 and non-ISI Class valves that have been assigned valve categories. Valves exempt per IWV-1200 are not listed. The following information is included for each valve:

3.1 Table Description

- **VALVE NUMBER:** The valve identification numbers. Two identification numbers are shown for each valve: the first number utilizes a Plant Identification System (PIS) prefix; the second has a Detroit Edison procurement prefix which is not controlled. In most cases, both identification numbers are shown on the P&ID's.

- **CLASS**: The ISI Classification of the valve. For valves located on lines with no ISI classification, an E1, E2, E3 or E4 is indicated where the number refers to design Class A, B, C or D taken from the P&ID's and the Central Component Data Base.

- **VALVE CATEGORY:** The category(s) assigned to the valve based on the definitions of IWV-2200. Four (4) separate categories are defined in the Code.

- **CATEGORY A** - Valves for which seat leakage is limited to a specific maximum amount in the closed position for fulfillment of their safety function.

- **CATEGORY B** - Valves for which a specific amount of leakage in the closed position is not measured but which require stroke testing to verify their ability to fulfill their safety function.

- **CATEGORY C** - Valves which are self-actuating in response to some system characteristic, such as pressure (relief valves) or flow direction (check valves).

- **CATEGORY D** - Valves which are actuated by an energy source capable of only one operation, such as explosive-actuated valves.

- **VALVE SIZE:** The nominal pipe size of the valve in inches.

- **VALVE TYPE:** The valve body design as indicated by the following abbreviations:

BALL	BAL
BUTTERFLY	BTF
CHECK	CK
EXCESS FLOW CHECK	XFC
GATE	GA
GLOBE	GL
RELIEF	RV
RUPTURE DISC	RD
SAFETY/RELIEF	SRV
SHEAR	SH
STOP CHECK	SCK
3-WAY	3WY

- **ACTUATOR TYPE:** The type of valve actuator as indicated by the following abbreviations:

AIR OPERATOR	AO
DIAPHRAGM OPERATOR	DO
EXPLOSIVE ACTUATOR	EXP
HYDRAULIC OPERATOR	HO
MANUAL	M
MOTOR OPERATOR	MO
SELF ACTUATED	SA
SELF ACTUATED & MOTOR OPERATED	SAM
SELF ACTUATED & PILOT OPERATED	SAP
SELF ACTUATED, SPRING ASSISTED, CHECK	SAS
SELF ACTUATED, TESTABLE CHECK	SAT
SOLENOID OPERATOR	SO

- **NORMAL POSITION:** The normal position of the valve during plant operation. This is specified as follows:

OPEN	O
CLOSED	C
FAIL CLOSED	FC
FAIL OPEN	FO
KEY LOCKED, FAIL CLOSED	KC
KEY LOCKED	KL
LOCKED OPEN	LO
LOCKED CLOSED	LC
SYSTEM DEPENDENT	S

- **STROKE DIRECTION:** The direction which an active valve must stroke to perform its safety function. This is the direction in which the valve will be stroked to satisfy the exercising requirements of IWV-3412 or IWV-3522. This may be specified as:

  C - Close

  O - Open

  O&C - Open & Close

  PAS - Passive (This valve does not have to change position to fulfill its safety function.)

- **TEST:** The test(s) that will be performed to fulfill the requirements of Subsection IWV. The test definitions and abbreviations used are identified in Section 3.2.

- **TEST FREQUENCY:** The frequency at which the above mentioned tests will be performed. Test frequencies are defined in Section 3.3.

- **MAXIMUM STROKE TIME:** The limiting full stroke time (in seconds) for power operated valves as required by IWV-3413. The Maximum Stroke Time represents the maximum full stroke time that is acceptable before corrective actions are required pursuant to IWV-3417. Maximum Stroke Times are established to represent a time which is indicative of a potentially degraded valve. Maximum stroke time changes are administratively controlled within site procedures. Maximum Stroke Times are always less than, or equal to, the stroke times which are required to satisfy plant Technical Specifications, safety analysis or system operability.

  NOTE: THIS FIELD IS NOT CONTROLLED.

- **RELIEF REQUEST:** The reference to a Relief Request as defined in Section 3.2 for valve testing that is considered impractical to implement. Relief requests are also provided to justify valve testing at a frequency other than that specified in Section XI.

- **REMARKS:** The remarks column provides the respective surveillance procedure numbers which implement required testing.

NOTE: THIS FIELD IS NOT CONTROLLED.

3.2 Inservice Valve Tests

The inservice test descriptions are given below along with corresponding test abbreviations:

TEST	TEST NAME	TEST DESCRIPTION
AT-1	Type C Air Leak Test	The containment isolation valves on lines which connect directly to containment atmosphere and on lines which enter primary containment in the drywell or torus airspace (except lines which terminate below the torus minimum water level) will be seat leak tested with air in accordance with Technical Specification 3.6.1.2.b and 10CFR50, Appendix J. In accordance with the guidance contained in Generic Letter 89-04 Paragraph D and Attachment 1, Position 10, exception will be taken to the requirements contained in Section IWV-3427(b).
AT-2	Type C Water Leak Test	The containment isolation valves on lines which connect directly to the torus below torus minimum water level and on lines which penetrate the torus in the airspace but terminate below the torus minimum water level will be seat leak tested with water in accordance with Technical Specification 3.6.1.2.d and 10CFR50, Appendix J.
AT-3	Gross Leakage Test	A leakage test performed on non Appendix J valves to ensure the valve can perform its intended safety function.
AT-4	Bypass Leakage Valve Leak Test	Bypass leakage valves will be tested to verify that the total potential bypass leakage does not exceed 4% of the design primary containment leakage. For further information, see UFSAR Section 6.2.1.2.2.3.

TEST	TEST NAME	TEST DESCRIPTION
AT-8	Purge/Vent Isolation Valve Leak Test	In addition to Type C tests for the purge/vent isolation valves, leakage integrity tests are required every 92 days by Branch Technical Position CSB 6-4 and the EF2 Safety Evaluation Report (NUREG-0798), Supplement 1, Page 6-3. For further information, see Technical Specifications Paragraph 4.6.1.8.2.
AT-9	MSIV Leak Test	The main steam isolation valves (MSIV) are exempted from Type C tests because EF2 has a pressurized seal system, MSIV Leakage Control (Refer to 10CFR50, Appendix J, Section III.C.3). The allowable combined leak rate for all four main steam lines shall be in accordance with Technical Specification 3.6.1.2.c. Test frequency shall be in accordance with Technical Specification 4.6.1.2.d.

TEST	TEST NAME	TEST DESCRIPTION
AT-10	Pressure Isolation Valve Leak Test	Pressure isolation valves (PIVs) will receive periodic leakage tests in accordance with Technical Specification requirements.
AT-11	Drywell to Suppression Chamber Bypass Leak Test	Drywell to Torus Vacuum Breakers will receive periodic leakage tests in accordance with Technical Specification 4.6.2.1.h requirements
BTC	Full Stroke Exercise Test to the CLOSE position	Exercise testing, verified by stroke time measurements, will be performed to confirm the full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function. Where this test is prescribed for stop/check valves, it is intended to be an exercise only of the operator and valve stem since the valve disk is presumed to be in its normally closed position prior to exercising.
BTC-1	Full Stroke Exercise Test to the CLOSED position	Exercise testing will be performed to measure the stroke time for the MSIVs and compared with the maximum and minimum Technical Specification requirements.
BTO	Full Stroke Exercise Test to the OPEN position	Exercise testing, verified by stroke time measurements, will be performed to confirm the full stroke capability of each valve. The stroke direction tested and timed will be based on the direction the valve disk must travel to fulfill its safety function.
BTP	Partial Stroke Exercise Test (IWV-3412)	Partial stroke exercise tests will be performed, when possible, for valves that cannot be full stroke exercised during normal operation.
CT-C	Check Valve Exercise Test to the CLOSE position	Check valves will be exercised closed based on the safety function of the valve. The disk movement shall be sufficient to prove that the disk moves freely to the seat from the open position.
CT-D	Check Valve Exercise by disassembly	Check valves will be disassembled and internals inspected to verify valve operability and to monitor for degradation in accordance with NRC Generic Letter 89-04.

TEST	TEST NAME	TEST DESCRIPTION
CT-EF	Excess Flow Check Valve Test	Excess flow check valves will be tested in accordance with Technical Specification Paragraph 4.6.3.4.
CT-F	Check Valve Exercise Force Measurement	Check valves will be checked for freedom of operation in the open and closed position by measurement of the force required to open the check valve (Ref Relief Request VR-17).
CT-O	Check Valve Exercise Test to the OPEN position	Check valves will be exercised open based on the safety function of the valve. The disk movement shall be sufficient to prove that the disk moves freely off the seat from the closed position. Verification of acceptable system flow through a check valve shall be adequate demonstration that the valve is full open.
CT-SP	Relief Valve Set Point	Relief and safety/relief valve set points will be verified in accordance with IWV-3510.
DT	Rupture Disk and Explosive Valve Test	Explosive valves will be tested in accordance with IWV-3610. Rupture disks will be replaced on a periodic cycle in accordance with manufacturer's instructions.
FST	Fail-Safe Test	All valves with fail-safe actuators will be tested to verify proper fail-safe operation upon loss of actuator power
GL 8910	Valve Diagnostic Test	Valves which have been tested per Generic Letter 89-10 and require periodic retests.
PIT	Position Indication Check (IWV-3300)	All valves with position indicators will be checked to verify that remote valve indicators accurately reflect valve operation.
PIT-RS	Position Indication for Remote Shutdown Valves	Valves with position indication on the Remote Shutdown Panel will be checked to verify that remote valve indicators accurately reflect valve operation.

3.3 Valve Test Frequency

The valve test frequency descriptions are given below along with the corresponding operational condition and frequency abbreviation used in the valve tables:

TEST FREQUENCY		TEST FREQUENCY DESCRIPTION
OP	-	At least once every calendar quarter (i.e., 92 days or 3 months) when valve operability is required.
CS	-	During periods of plant cold shutdowns. See Note (1).
RR	-	At least once every reactor refueling outage.
2R	-	All valves tested in 2 refueling outages.
SP	-	Special test frequency as described in applicable Relief Requests.
2Y	-	At least once every 2 years (See Articles IWV-3300 and IWV-3422).
5Y	-	At least once every 5 years (See Articles IWV-3610, IWV-3511 and NRC Generic Letter 89-10).
6Q	-	At least once every 6 calendar quarters (i.e., once every 18 months).

NOTE (1): Inservice valve testing at cold shutdown is valve testing which commences within 48 hours after cold shutdown is reached. This testing continues until all valves are tested or the unit is ready for start-up. Completion of all testing is not a prerequisite to plant start-up. Valve testing which is not completed during a cold shutdown shall be completed during subsequent cold shutdowns that may occur before refueling to meet the specified testing frequency. In the case of frequent cold shutdowns, valve testing need not be performed more often than once every three months for category A, B, and C valve.

In the case of longer planned cold shutdowns, the testing need not be started within the 48 hour limitation. However, in these instances, all valve testing must be completed prior to start-up.

It should be noted that the NRC differentiates, for valve testing purposes, between the cold shutdown mode and the refueling mode. That is, for valves identified for testing during cold shutdowns, it is expected that the tests will be performed both during cold shutdown and each refueling outage. However, when relief is granted to perform tests on a refueling outage frequency, testing is expected only during each refueling outage. In addition, for extended refueling outages, tests being performed are expected to be maintained as closely as practical to the Code-specified frequencies.

NOTE: It is expected that the required testing will normally be completed in 96 hours following cold shutdown. However, completion of all valve testing during cold shutdown is not required if plant operating conditions will not permit the testing of specific valves.

INSERVICE TEST PROGRAM

VALVE TABLES

PIS No: 821

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2100F010A (V12-2008)	1	A/C	20.000	CK	SAT	S	O&C	AT-1	2Y			43.401.303
								AT-4	RR			43.401.511
								CT-C	RR		VR-002	43.401.303
								CT-O	CS		VR-002	24.107.01
B2100F010B (V12-2007)	1	A/C	20.000	CK	SAT	S	C	AT-1	2Y			43.401.304
								AT-4	RR			43.401.511
								CT-C	RR		VR-002	43.401.304
B2100F029A (V5-2056)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
B2100F029B (V5-2057)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
B2100F029C (V5-2058)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
B2100F029D (V5-2059)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
B2100F031A (V22-2125)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031B (V22-2132)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031C (V22-2139)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F031D (V22-2141)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
B2100F037A (V22-2111)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037B (V22-2100)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037C (V22-2101)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2100F037D (V22-2104)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037E (V22-2105)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037F (V22-2107)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037G (V22-2099)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037H (V22-2098)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037J (V22-2102)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037K (V22-2103)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037L (V22-2106)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037M (V22-2097)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037N (V22-2108)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037P (V22-2110)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F037R (V22-2109)	2	C	8.000	CK	SA	S	O&C	CT-F	CS		VR-017	24.201.01
B2100F076A (V12-2002)	1	A/C	20.000	CK	SAS	S	C	AT-1	2Y		VR-046	43.401.303
								CT-C	RR		VR-002	43.401.303
								PIT	2Y			24.107.01
B2100F076B (V12-2001)	1	A/C	20.000	CK	SAS	S	C	AT-1	2Y		VR-046	43.401.304
								CT-C	RR		VR-002	43.401.304
								PIT	2Y			24.107.01

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2100F248A	E4	A/C	0.400	CK	SA	O	C	AT-4	RR			43.401.511
(V30-0271)								CT-C	RR		VR-58	43.401.511
B2100F248B	E4	A/C	0.400	CK	SA	O	C	AT-4	RR			43.401.511
(V30-0272)								CT-C	RR		VR-58	43.401.511
B2100F249A	E4	A/C	0.400	CK	SA	O	C	AT-4	RR			43.401.511
(V30-0273)								CT-C	RR		VR-58	43.401.511
B2100F249B	E4	A/C	0.400	CK	SA	O	C	AT-4	RR			43.401.511
(V30-0274)								CT-C	RR		VR-58	43.401.511
B2100F433	E3	B	1.000	GA	AO	C/FC	O&C	BTC	OP	7.00		24.137.16
(V30-0003)								BTO	OP	7.00		24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B2100F434	1	A	1.000	GA	AO	C/FC	O&C	AT-1	2Y			43.401.388
(V30-0006)								BTC	CS	9.00	VR-052	24.137.03
								BTO	CS	6.00	VR-052	24.137.03
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.20
B2100F437	2	B	1.000	GA	AO	C/FC	O&C	BTC	CS	12.00	VR-052	24.137.03
(V30-0005)								BTO	CS	6.00	VR-052	24.137.03
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.20
B2100F438	E3	B	1.000	GA	AO	C/FC	O&C	BTC	OP	9.00		24.137.16
(V30-0004)								BTO	OP	6.00		24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B2103F016	1	A	3.000	GL	MO	C	O	AT-1	2Y			43.401.302
(V17-2009)								AT-4	RR			43.401.511
								BTC	OP	21.00		24.137.18
								PIT	2Y			24.137.18
B2103F019	1	A	3.000	GL	MO	C	C	AT-1	2Y			43.401.302
(V17-2010)								AT-4	RR			43.401.511
								BTC	OP	15.00		24.137.18
								PIT	2Y			24.137.18

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2103F022A (VR-02003)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F022B (V17-2001)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F022C (V17-2002)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F022D (V17-2004)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F028A (V17-2007)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F028B (V17-2005)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F028C (V17-2006)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2103F028D (V17-2008)	1	A	26.000	GL	AO	O	C	AT-9	6Q		VR-046	43.401.500
								BTC-1	CS		VR-015	24.137.03
								BTP	OP			24.137.01
								FST	CS		VR-023	24.137.03
								PIT	2Y			24.137.03
B2103F600 (V10-2010)	2	B	3.000	GL	MO	O	C	BTC	OP	35.00		24.137.16
								PIT	2Y			24.137.20
B2104F013A (V22-2071)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013B (V22-2060)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013C (V22-2592)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013D (V22-2050)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013E (V22-2064)	1	B/C	6.000	SRV	SAP	C	O	BTO	SP	2.00	VR-014	24.137.11
								CT-SP	2R			43.137.01
B2104F013F (V22-2595)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013G (V22-2591)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013H (V22-2058)	1	B/C	6.000	SRV	SAP	C	O	BTO	SP	2.00	VR-014	24.137.11
								CT-SP	2R			43.137.01
B2104F013J (V22-2052)	1	B/C	6.000	SRV	SAP	C	O	BTO	SP	2.00	VR-014	24.137.11
								CT-SP	2R			43.137.01
B2104F013K (V22-2062)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013L (V22-2056)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B2104F013M (V22-2046)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013N (V22-2054)	1	C	6.000	SRV	SAP	C	O	CT-SP	2R			43.137.01
B2104F013P (V22-2070)	1	B/C	6.000	SRV	SAP	C	O	BTO	SP	2.00	VR-014	24.137.11
								CT-SP	2R			43.137.01
B2104F013R (V22-2597)	1	B/C	6.000	SRV	SAP	C	O	BTO	SP	2.00	VR-014	24.137.11
								CT-SP	2R			43.137.01
B21F431 (V5-2291)	E3	B	1.000	GL	SO	C/FC	O&C	BTC	OP	2.00	VR-006	24.137.16
								BTO	OP	2.00	VR-006	24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B21F432 (V5-2292)	E3	B	1.000	GL	SO	O/FO	C	BTC	OP	2.00	VR-006	24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B21F435 (V5-2263)	E3	B	1.000	GL	SO	O/FO	C	BTC	OP	2.00	VR-006	24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B21F436 (V5-2264)	E3	B	1.000	GL	SO	C/FC	O&C	BTC	OP	2.00	VR-006	24.137.16
								BTO	OP	2.00	VR-006	24.137.16
								FST	OP		VR-023	24.137.16
								PIT	2Y			24.137.20
B21F501A (V13-2301)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F501B (V13-2302)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F501C (V13-2303)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F501D (V13-2304)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F502A (V13-2305)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F502B (V13-2306)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F502C (V13-2307)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F502D (V13-2308)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F503A (V13-2309)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F503B (V13-2310)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F503C (V13-2311)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F503D (V13-2312)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F504A (V13-2313)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F504B (V13-2314)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F504C (V13-2315)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F504D (V13-2316)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.101
B21F506 (V13-2317)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F507 (V13-2318)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F508 (V13-2397)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F509 (V13-2320)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F510 (V13-2321)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F511 (V13-2396)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F512 (V13-2323)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F513A (V13-2324)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B21F513B (V13-2325)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B21F513C (V13-2326)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F513D (V13-2327)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F514A (V13-2328)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F514B (V13-2329)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F514C (V13-2330)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F514D (V13-2331)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515A (V13-2332)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515B (V13-2333)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515C (V13-2334)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515D (V13-2335)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F515E (V13-2336)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515F (V13-2337)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515G (V13-2338)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515H (V13-2339)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515L (V13-2340)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515M (V13-2341)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515N (V13-2342)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515P (V13-2343)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515R (V13-2344)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515S (V13-2345)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515T (V13-2346)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F515U (V13-2347)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F516A (V13-2348)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F516B (V13-2349)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.102
B21F516C (V13-2388)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103

PIS No: B21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B21F517A (V13-2350)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B21F517B (V13-2389)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.105
B21F517C (V13-2390)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
B21F517D (V13-2391)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104

PIS No: B31

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B3100F014A	E2	A	0.750	GL	AO	O	C	AT-1	2Y			43.401.361
(V8-3710)								BTC	CS	5.00	VR-018	24.138.02
								PIT	2Y			24.138.02
B3100F014B	E2	A	0.750	GL	AO	O	C	AT-1	2Y			43.401.360
(V8-3590)								BTC	CS	5.00	VR-018	24.138.02
								PIT	2Y			24.138.02
B3100F016A	E2	A	0.750	GL	AO	O	C	AT-1	2Y			43.401.361
(V8-3767)								BTC	CS	5.00	VR-018	24.138.02
								PIT	2Y			24.138.02
B3100F016B	E2	A	0.750	GL	AO	O	C	AT-1	2Y			43.401.360
(V8-3768)								BTC	CS	5.00	VR-018	24.138.02
								PIT	2Y			24.138.02
B3100F019	1	A	0.750	GL	AO	C/KL	C	AT-1	2Y			43.401.330
(V17-2077)								BTC	OP	7.00		24.138.04 / 24.138.02
								PIT	2Y			24.138.02
B3100F020	1	A	0.750	GL	AO	C/KL	C	AT-1	2Y			43.401.330
(V17-2078)								BTC	OP	6.00		24.138.04 / 24.138.02
								PIT	2Y			24.138.02
B3105F031A	1	B	28.000	GA	MO	O	C	BTC	CS	32.00	VR-021	24.138.02
(V8-2003)								PIT	2Y			24.138.02
								PIT-RS	2Y			24.321.04
B3105F031B	1	B	28.000	GA	MO	O	C	BTC	CS	32.00	VR-021	24.138.02
(V8-2004)								PIT	2Y			24.138.02
B31F501A	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
(V13-2351)												
B31F501B	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
(V13-2353)												
B31F501C	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
(V13-2352)												
B31F501D	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
(V13-2354)												

PIS No: B31 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B31F502A (V13-2355)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F502B (V13-2356)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F502C (V13-2357)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F502D (V13-2358)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F503A (V13-2359)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F503B (V13-2360)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F504A (V13-2361)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F504B (V13-2362)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F505A (V13-2363)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F505B (V13-2364)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F506A (V13-2365)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F506B (V13-2366)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F510A (V13-2367)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F510B (V13-2368)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F511A (V13-2369)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103

PIS No: B31 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
B31F511B (V13-2370)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F512A (V13-2371)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F512B (V13-2372)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F515A (V13-2373)	E1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F515B (V13-2374)	E1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F516A (V13-2375)	E1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
B31F516B (V13-2376)	E1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103

PIS No: C11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
C1100F010	2	A	1.000	GL	DO	O/FC	C	AT-1	2Y			43.401.355
(V8-2073)								BTC	OP	15.00		24.106.04
								FST	OP		VR-023	24.106.04
								PIT	2Y			24.106.04
C1100F011	2	A	2.000	GL	DO	O/FC	C	AT-1	2Y			43.401.355
(V30-0012)								BTC	OP	6.00		24.106.04
								FST	OP		VR-023	24.106.04
								PIT	2Y			24.106.04
C1100F180	2	A	1.000	GL	DO	O/FC	C	AT-1	2Y			43.401.355
(V8-3876)								BTC	OP	84.00		24.106.04
								FST	OP		VR-023	24.106.04
								PIT	2Y			24.106.04
C1100F181	2	A	2.000	GL	DO	O/FC	C	AT-1	2Y			43.401.355
(V30-0011)								BTC	OP	25.00		24.106.04
								FST	OP		VR-023	24.106.04
								PIT	2Y			24.106.04
C1103F114	C	C	0.750	CK	SA	S	O	CT-O	SP		VR-012	54.000.03
(V-1***)												
C1103F115	2	C	0.500	CK	SA	S	C	CT-C	SP		VR-043	44.010.201
(V-2***)												
C1103F126	2	B	0.500	GL	DO	C/FO	O	BTO	SP	7.00	VR-012	54.000.03
(V-9***)								FST	SP		VR-023	54.000.03
C1103F127	2	B	0.750	GL	DO	C/FO	O	BTO	SP	7.00	VR-012	54.000.03
(V-10**)								FST	SP		VR-023	54.000.03
C1103F138	2	C	0.500	CK	SA	S	C	CT-C	SP		VR-044	24.106.01
(V-11**)												

PIS No: C41

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
C4100F006	1	A/C	1.500	CK	SA	S	O&C	AT-1	2Y			43.401.347
(VR4-2036)								CT-C	2Y		VR-020	43.401.347
								CT-O	6Q		VR-020	24.139.03
								PIT	6Q			24.139.03
C4100F007	1	A/C	1.500	CK	SA	S	O&C	AT-1	2Y			43.401.347
(VR4-2037)								CT-C	2Y		VR-020	43.401.347
								CT-O	6Q		VR-020	24.139.03
C4100F029A	2	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
(V22-2625)												
C4100F029B	2	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
(V22-2030)												
C4100F033A	2	C	2.000	CK	SA	S	O	CT-O	OP			24.139.02
(VR4-2004)												
C4100F033B	2	C	2.000	CK	SA	S	O	CT-O	OP			24.139.02
(VR4-2005)												
C4104F004A	2	D	1.500	GA	EXP	C/KL	O	DT	3Y			24.139.03
(VR4-2008)												
C4104F004B	2	D	1.500	GA	EXP	C/KL	O	DT	3Y			24.139.03
(VR4-2009)												

PIS No: C51

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
C5100F001A (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001B (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001C (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001D (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F001E (SHEAR)	E2	D	0.380	SH	EXP	O	C	DT	5Y			43.606.01
C5100F002A (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1	2Y			43.401.338
								BTC	OP	2.00	VR-006	24.606.01
								PIT	2Y			43.401.338
C5100F002B (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1	2Y			43.401.337
								BTC	OP	2.00	VR-006	24.606.01
								PIT	2Y			43.401.337
C5100F002C (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1	2Y			43.401.339
								BTC	OP	2.00	VR-006	24.606.01
								PIT	2Y			43.401.339
C5100F002D (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1	2Y			43.401.341
								BTC	OP	2.00	VR-006	24.606.01
								PIT	2Y			43.401.341
C5100F002E (BALL)	E2	A	0.380	BAL	SO	C	C	AT-1	2Y			43.401.340
								BTC	OP	2.00	VR-006	24.606.01
								PIT	2Y			43.401.340

PIS No: E11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1100F001A (V22-2643)	2	A/C	0.500	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.405 43.000.02
E1100F001B (V22-2642)	2	A/C	0.500	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.404 43.000.02
E1100F020A (V15-2021)	3	C	24.000	CK	SA	S	O	CT-O	OP			24.205.05
E1100F020B (V15-2020)	3	C	24.000	CK	SA	S	O	CT-O	OP			24.205.06
E1100F025A (V22-2041)	2	A/C	1.500	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.405 43.000.02
E1100F025B (V22-2041)	2	A/C	1.500	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.404 43.000.02
E1100F029 (V22-2033)	2	A/C	1.000	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.405 43.000.02
E1100F030A (V8-2034)	2	A/C	1.000	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.415 43.000.02
E1100F030B (V22-2037)	2	A/C	1.000	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.413 43.000.02
E1100F030C (V22-2036)	2	A/C	1.000	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.414 43.000.02
E1100F030D (V22-2035)	2	A/C	1.000	RV	SA	C	O&C	AT-2 CT-SP	6Q 5Y			43.401.412 43.000.02
E1100F031A (V8-2103)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.01 24.204.01
E1100F031B (V8-2104)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.06 24.204.06
E1100F031C (V8-2105)	2	C	20.000	CK	SA	S	O&C	CT-C CT-O	OP OP			24.204.01 24.204.01

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1100F031D (V8-2106)	2	C	20.000	CK	SA	S	O&C	CT-C	OP			24.204.06
								CT-O	OP			24.204.06
E1100F046A (V8-2125)	2	C	3.000	CK	SA	S	O&C	CT-C	OP			24.204.01
								CT-D	RR			43.000.010
								CT-O	OP			24.204.01
E1100F046B (V8-2126)	2	C	3.000	CK	SA	S	O&C	CT-C	OP			24.204.06
								CT-D	RR			43.000.010
								CT-O	OP			24.204.06
E1100F046C (V8-2127)	2	C	3.000	CK	SA	S	O&C	CT-C	OP			24.204.01
								CT-D	RR			43.000.010
								CT-O	OP			24.204.01
E1100F046D (V8-2128)	2	C	3.000	CK	SA	S	O&C	CT-C	OP			24.204.06
								CT-D	RR			43.000.010
								CT-O	OP			24.204.06
E1100F050A (V8-2163)	1	A/C	24.000	CK	SAT	S	O&C	AT-10	6Q			43.401.512
								CT-C	CS		VR-008	24.204.04
								CT-O	CS		VR-059	24.204.04
								PIT	2Y			24.204.05
E1100F050B (V8-2164)	1	A/C	24.000	CK	SAT	S	O&C	AT-10	6Q			43.401.512
								CT-C	CS		VR-008	24.204.04
								CT-O	CS		VR-059	24.204.04
								PIT	2Y			24.204.05
E1100F079A (V8-3206)	2	B	0.750	GL	AO	C	C	BTC	OP	8.00		24.204.01
								PIT	2Y			24.204.05
E1100F079B (V8-3193)	2	B	0.750	GL	AO	C	C	BTC	OP	5.00		24.204.06
								PIT	2Y			24.204.05
E1100F089 (V8-2179)	E2	C	4.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.06
E1100F090 (V8-2180)	2	C	4.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.06
E1100F148A (V15-2004)	3	C	16.000	CK	SA	S	O&C	CT-C	OP			24.205.05
								CT-O	OP			24.205.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1100F148B	3	C	16.000	CK	SA	S	O&C	CT-C	OP			24.205.06
(V15-2001)								CT-O	OP			24.205.06
E1100F148C	3	C	16.000	CK	SA	S	O&C	CT-C	OP			24.205.05
(V15-2003)								CT-O	OP			24.205.05
E1100F148D	3	C	16.000	CK	SA	S	O&C	CT-C	OP			24.205.06
(V15-2002)								CT-O	OP			24.205.06
E1100F184	E2	C	2.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.01
(V8-2491)												
E1100F185	2	C	2.000	CK	SA	S	C	CT-C	OP		VR-041	24.204.01
(V8-2492)												
E1100F408	1	A/C	0.750	CK	SA	S	PAS	AT-1	2Y			43.401.307
(V8-3874)								CT-O	2Y		VR-055	43.401.307
E1100F409	1	C	0.750	CK	SA	S	PAS	CT-O	2Y		VR-055	43.401.307
(V8-3875)												
E1150F003A	2	B	20.000	GA	MO	O/KL	O	BTO	OP	117.00		24.204.01
(V8-2141)								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02
E1150F003B	2	B	20.000	GA	MO	O/KL	O	BTO	OP	119.00		24.204.06
(V8-2142)								PIT	2Y			24.204.05
E1150F004A	2	A	24.000	GA	MO	O/KL	O&C	AT-2	6Q			43.401.415
(V8-2099)								BTC	OP	75.00		24.204.01
								BTO	OP	75.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.03 / 24.630.01
E1150F004B	2	A	24.000	GA	MO	O/KL	O&C	AT-2	6Q			43.401.413
(V8-2102)								BTC	OP	75.00		24.204.06
								BTO	OP	75.00		24.204.06
								PIT	2Y			24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F004C	2	A	24.000	GA	MO	O/KL	O&C	AT-2	6Q			43.401.414
(V8-2101)								BTC	OP	75.00		24.204.01
								BTO	OP	75.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02
E1150F004D	2	A	24.000	GA	MO	O/KL	O&C	AT-2	6Q			43.401.412
(V8-2100)								BTC	OP	75.00		24.204.06
								BTO	OP	75.00		24.204.06
								PIT	2Y			24.204.05
E1150F006A	2	B	20.000	GA	MO	C	C	BTC	OP	63.00		24.204.01
(V8-2095)								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.630.01
E1150F006B	2	B	20.000	GA	MO	C	C	BTC	OP	63.00		24.204.06
(V8-2098)								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F006C	2	B	20.000	GA	MO	C	C	BTC	OP	63.00		24.204.01
(V8-2097)								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02
E1150F006D	2	B	20.000	GA	MO	C	C	BTC	OP	63.00		24.204.06
(V8-2096)								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F007A	2	A	4.000	GA	MO	O	O&C	AT-2	6Q			43.401.405
(V8-2154)								BTC	OP	21.00		24.204.01
								BTO	OP	21.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F007B	2	A	4.000	GA	MO	O	O&C	AT-2	6Q			43.401.404
(V8-2134)								BTC	OP	21.00		24.204.06
								BTO	OP	21.00		24.204.06
								PIT	2Y			24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F008	1	A	20.000	GA	MO	C	C	AT-1	2Y			43.401.307
(VB-2092)								AT-10	6Q			43.401.512
								BTC	CS	27.00	VR-007	24.204.04
								PIT	2Y			24.204.08
								PIT-RS	2Y			24.630.01
E1150F009	1	A	20.000	GA	MO	C	C	AT-1	2Y		VR-046	43.401.307
(VB-2091)								AT-10	6Q		VR-049	43.401.512
								BTC	CS	40.00	VR-007	24.204.04
								PIT	2Y			24.204.08
								PIT-RS	2Y			24.321.02 / 24.630.01
E1150F010	2	B	24.000	GA	MO	O/KL	O&C	PIT	2Y			24.204.08
(VB-2187)								PIT-RS	2Y			24.321.04
E1150F015A	1	A	24.000	GA	MO	C	O&C	AT-10	6Q			43.401.512
(VB-2161)								BTC	CS	24.00	VR-007	24.204.04
								BTO	CS	24.00	VR-007	24.204.04
								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.04 / 24.630.01
E1150F015B	1	A	24.000	GA	MO	C	O&C	AT-10	6Q			43.401.512
(VB-2162)								BTC	CS	24.00	VR-007	24.204.04
								BTO	CS	24.00	VR-007	24.204.04
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F016A	2	A	12.000	GL	MO	C/KL	C	AT-1	2Y			43.401.344
(VB-2167)								BTC	OP	121.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02
E1150F016B	2	A	12.000	GL	MO	C/KL	C	AT-1	2Y			43.401.345
(VB-2168)								BTC	OP	123.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F017A	2	B	24.000	GL	MO	O	O	BTO	OP	24.00		24.204.01
(VB-2159)								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.04 / 24.630.01

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F017B	2	B	24.000	GL	MO	O	O	BTO	OP	24.00		24.204.06
(VB-2160)								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F021A	E2	A	12.000	GA	MO	C	C	AT-1	2Y			43.401.344
(VB-2169)								BTC	OP	21.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F021B	E2	A	12.000	GA	MO	C	C	AT-1	2Y			43.401.345
(VB-2170)								BTC	OP	19.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F022	1	A	6.000	GA	MO	C	C	AT-1	2Y			43.401.313
(VB-2172)								BTC	OP	33.00		24.204.06
								PIT	2Y			24.204.05
E1150F023	1	A	6.000	GL	MO	C	C	AT-1	2Y			43.401.313
(VB-2171)								BTC	OP	74.00		24.204.06
								PIT	2Y			24.204.05
E1150F024A	2	A	18.000	GL	MO	C	O&C	AT-1	2Y		VR-046	43.401.381
(VB-2135)								BTC	OP	28.00		24.204.0[illegible]
								BTO	OP	29.00		24.204.0[illegible]
								GL8910	5Y			
								PIT	2Y			24.[illegible]04.05
								PIT-RS	2Y			24.[illegible]21.03 / 24.630.01
E1150F024B	2	A	18.000	GL	MO	C	O&C	AT-1	2Y		VR-046	43.401.380
(VB-2136)								BTC	OP	29.00		24.204.06
								BTO	OP	29.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F026B	2	A	4.000	GA	MO	C	C	AT-2	6Q			43.401.404
(VB-2152)								BTC	OP	36.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F027A	2	A	6.000	GL	MO	C	C	AT-1	2Y		VR-046	43.401.381
(V8-2157)								BTC	OP	45.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F027B	2	A	6.000	GL	MO	C	C	AT-1	2Y		VR-046	43.401.380
(V8-2158)								BTC	OP	45.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F028A	2	A	18.000	GA	MO	C/KL	O&C	AT-1	2Y		VR-046	43.401.381
(V8-2155)								BTC	OP	28.00		24.204.01
								BTO	OP	28.00		24.204.01
								GL8910	5Y			
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.03 / 24.630.01
E1150F028B	2	A	18.000	GA	MO	C/KL	O&C	AT-1	2Y		VR-046	43.401.380
(V8-2156)								BTC	OP	28.00		24.204.06
								BTO	OP	28.00		24.204.06
								GL8910	5Y			
								PIT	2Y			24.204.05
E1150F047A	2	B	20.000	GA	MO	O/KL	O&C	BTC	OP	119.00		24.204.01
(V8-2137)								BTO	OP	119.00		24.204.01
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02
E1150F047B	2	B	20.000	GA	MO	O/KL	O&C	BTC	OP	118.00		24.204.06
(V8-2138)								BTO	OP	118.00		24.204.06
								PIT	2Y			24.204.05
E1150F048A	2	B	24.000	GL	MO	O	O&C	BTC	OP	207.00		24.204.01
(V8-2139)								BTO	OP	207.00		24.204.01
								PIT	2Y			24.204.05
								PIT-RS	2Y			24.321.02 / 24.630.01
E1150F048B	2	B	24.000	GL	MO	O	O&C	BTC	OP	207.00		24.204.06
(V8-2140)								BTO	OP	207.00		24.204.06
								PIT	2Y			24.204.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F068A (V15-2018)	3	B	24.000	GL	MO	C	O&C	BTC	OP	131.00		24.205.05
								BTO	OP	131.00		24.205.05
								PIT	2Y			24.205.05
								PIT-RS	2Y			24.321.02 / 24.630.01
E1150F068B (V15-2019)	3	B	24.000	GL	MO	C	O&C	BTC	OP	131.00		24.205.06
								BTO	OP	131.00		24.205.06
								PIT	2Y			24.205.06
E1150F073 (V15-2015)	3	NA	12.000	GA	MO	C	O&C	GLB910	5Y			
E1150F601A (V15-2127)	3	B	10.000	BAL	MO	O	O&C	BTC	OP	24.00		24.205.05
								BTO	OP	24.00		24.205.05
								PIT	2Y			24.205.05
E1150F601B (V15-2125)	3	B	10.000	BAL	MO	C	O&C	BTC	OP	24.00		24.205.05
								BTO	OP	24.00		24.205.05
								PIT	2Y			24.205.05
E1150F602A (V15-2128)	3	B	10.000	BAL	MO	C	O&C	BTC	OP	24.00		24.205.05
								BTO	OP	24.00		24.205.05
								PIT	2Y			24.205.05
E1150F602B (V15-2126)	3	B	10.000	BAL	MO	O	O&C	BTC	OP	24.00		24.205.05
								BTO	OP	24.00		24.205.05
								PIT	2Y			24.205.05
E1150F603A (V15-2108)	3	B	16.000	GA	MO	C	O&C	BTC	OP	100.00		24.205.05
								BTO	OP	100.00		24.205.05
								GLB910	5Y			
								PIT	2Y			24.205.05
E1150F603B (V15-2083)	3	B	16.000	GA	MO	C	O&C	BTC	OP	100.00		24.205.06
								BTO	OP	100.00		24.205.06
								GLB910	5Y			
								PIT	2Y			24.205.06
E1150F604A (V15-2109)	3	B	18.000	GA	MO	O	O&C	BTC	OP	113.00		24.205.05
								BTO	OP	113.00		24.205.05
								GLB910	5Y			
								PIT	2Y			24.205.05

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E1150F604B	3	B	18.000	GA	MO	O	O&C	BTC	OP	113.00		24.205.06
(V15-2084)								BTO	OP	113.00		24.205.06
								GL8910	5Y			
								PIT	2Y			24.205.06
E1150F605A	3	B	18.000	GA	MO	O	O&C	BTC	OP	113.00		24.205.05
(V15-2110)								BTO	OP	113.00		24.205.05
								GL8910	5Y			
								PIT	2Y			24.205.05
E1150F605B	3	B	18.000	GA	MO	O	O&C	BTC	OP	113.00		24.205.06
(V15-2085)								BTO	OP	113.00		24.205.06
								GL8910	5Y			
								PIT	2Y			24.205.06
E1150F608	1	A	20.000	GA	MO	C/KL	C	AT-1	2Y		VR-046	43.401.307
(V8-3407)								AT-10	6Q		VR-049	43.401.512
								BTC	CS	36.00	VR-007	24.204.04
								PIT	2Y			24.204.08
E1150F611A	3	NA	20.000	GA	MO	C	O&C	GL8910	5Y			
(V8-4613)												
E1150F611B	2	NA	20.000	GA	MO	C	O&C	GL8910	5Y			
(V8-4614)												
E11F412	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.331
(V5-2546)								BTC	CS	2.00	VR-035	24.204.04
								PIT	2Y			43.401.331
E11F413	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.332
(V5-2547)								BTC	CS	2.00	VR-035	24.204.04
								PIT	2Y			43.401.332
E11F414	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.350
(V5-2548)								BTC	CS	2.00	VR-035	24.204.04
								PIT	2Y			43.401.350
E11F415	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.351
(V5-2549)								BTC	CS	2.00	VR-035	24.204.04
								PIT	2Y			43.401.351

PIS No: E11 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E11F610A (V13-7687)	1	A	1.000	GL	SO	C	PAS	BTC PIT	CS 2Y	2.00	VR-006	24.204.04 43.401.512
E11F610B (V13-7688)	1	A	1.000	GL	SO	C	PAS	BTC PIT	CS 2Y	2.00	VR-006	24.204.04 43.401.512

PIS No: E21

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E2100F003A (V8-2015)	2	C	12.000	CK	SA	S	O&C	CT-C	OP			24.203.02
								CT-O	OP			24.203.02
E2100F003B (V8-2018)	2	C	12.000	CK	SA	S	O&C	CT-C	OP			24.203.03
								CT-O	OP			24.203.03
E2100F003C (V8-2017)	2	C	12.000	CK	SA	S	O&C	CT-C	OP			24.203.02
								CT-O	OP			24.203.02
E2100F003D (V8-2016)	2	C	12.000	CK	SA	S	O&C	CT-C	OP			24.203.03
								CT-O	OP			24.203.03
E2100F006A (V8-2023)	1	A/C	12.000	CK	SAT	S	O&C	AT-1	2Y			43.401.312
								AT-10	6Q			43.401.513
								CT-C	CS		VR-008	24.203.04
								CT-D	RR			43.000.010
								CT-O	CS		VR-008	24.203.04
								PIT	2Y			24.203.04
E2100F006B (V8-2024)	1	A/C	12.000	CK	SAT	S	O&C	AT-1	2Y			43.401.311
								AT-10	6Q			43.401.513
								CT-C	CS		VR-008	24.203.04
								CT-D	RR			43.000.010
								CT-O	CS		VR-008	24.203.04
								PIT	2Y			24.203.04
E2100F011A (V22-2120)	2	A/C	2.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.421
								CT-SP	5Y			43.000.02
E2100F011B (V22-2119)	2	A/C	2.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.420
								CT-SP	5Y			43.000.02
E2100F012A (V22-2016)	2	A/C	2.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.421
								CT-SP	5Y			43.000.02
E2100F012B (V22-2017)	2	A/C	2.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.420
								CT-SP	5Y			43.000.02
E2100F029A (V8-2053)	E2	C	3.000	CK	SA	S	C	CT-C	OP		VR-040	24.203.02
E2100F029B (V8-2057)	E2	C	3.000	CK	SA	S	C	CT-C	OP		VR-040	24.203.03

PIS No: E21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E2100F030A (V8-2051)	2	C	3.000	CK	SA	S	C	CT-C	OP		VR-040	24.203.02
E2100F030B (V8-2055)	2	C	3.000	CK	SA	S	C	CT-C	OP		VR-040	24.203.03
E2100F032A (V8-2019)	2	A/C	1.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.421
								CT-SP	5Y			43.000.02
E2100F032B (V8-2004)	2	A/C	1.000	RV	SA	C	O&C	AT-2	6Q		VR-047	43.401.420
								CT-SP	5Y			43.000.02
E2100F038A (V8-2044)	2	C	3.000	CK	SA	S	O&C	CT-D	RR		VR-045	43.000.010
E2100F038B (V8-2041)	2	C	3.000	CK	SA	S	O&C	CT-D	RR		VR-045	43.000.010
E2100F038C (V8-2045)	2	C	3.000	CK	SA	S	O&C	CT-D	RR		VR-045	43.000.010
E2100F038D (V8-2040)	2	C	3.000	CK	SA	S	O&C	CT-D	RR		VR-045	43.000.010
E2150F004A (V8-2019)	2	B	12.000	GA	MO	O	O	BTO	OP	13.00		24.203.02
								PIT	2Y			24.203.04
E2150F004B (V8-2020)	2	B	12.000	GA	MO	O	O	BTO	OP	13.00		24.203.03
								PIT	2Y			24.203.04
E2150F005A (V8-2021)	1	A	12.000	GA	MO	C	O&C	AT-1	2Y			43.401.312
								AT-10	6Q			43.401.513
								BTC	CS	12.00	VR-007	24.203.04
								BTO	CS	12.00	VR-007	24.203.04 / 24.203.02
								PIT	2Y			24.203.04
E2150F005B (V8-2022)	1	A	12.000	GA	MO	C	O&C	AT-1	2Y			43.401.311
								AT-10	6Q			43.401.513
								BTC	CS	12.00	VR-007	24.203.04
								BTO	CS	12.00	VR-007	24.203.04 / 24.203.03
								PIT	2Y			24.203.04

PIS No: E21 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E2150F015A	2	A	10.000	GL	MO	C	C	AT-2	6Q		VR-047	43.401.421
(V8-2033)								BTC	OP	17.00		24.203.02
								PIT	2Y			24.203.04
E2150F015B	2	A	10.000	GL	MO	C	C	AT-2	6Q		VR-047	43.401.420
(V8-2034)								BTC	OP	25.00		24.203.03
								PIT	2Y			24.203.04
E2150F031A	2	A	3.000	GA	MO	O	O&C	AT-2	6Q		VR-047	43.401.421
(V8-4683)								BTC	OP	19.00		24.203.02
								BTO	OP	19.00		24.203.02
								PIT	2Y			24.203.04
E2150F031B	2	A	3.000	GA	MO	O	O&C	AT-2	6Q		VR-047	43.401.420
(V8-2032)								BTC	OP	19.00		24.203.03
								BTO	OP	19.00		24.203.03
								PIT	2Y			24.203.04
E2150F036A	2	A	20.000	GA	MO	O/KL	C	AT-2	6Q			43.401.417
(V8-2007)								BTC	OP	63.00		24.203.02
								PIT	6Q			24.203.04
E2150F036B	2	A	20.000	GA	MO	O/KL	C	AT-2	6Q			43.401.416
(V8-2008)								BTC	OP	63.00		24.203.03
								PIT	2Y			24.203.04
E21F500A	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2377)												
E21F500B	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2378)												

PIS No: E41

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4100F005 (V8-4656)	2	C	14.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F019 (V8-2192)	2	C	16.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F020 (V22-2044)	2	C	1.500	RV	SA	C	O	CT-SP	5Y			43.000.02
E4100F026 (V8-2214)	2	B	1.000	GL	DO	C/FC	C	BTC	OP	10.00		24.202.01
								FST	OP		VR-023	24.202.01
								PIT	2Y			24.202.05
E4100F040 (V11-2007)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F045 (V8-2203)	2	C	16.000	CK	SA	S	O	CT-D	RR		VR-010	43.000.010
E4100F048 (V8-2208)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F049 (V11-2538)	2	C	20.000	CK	SA	S	O	CT-O	OP			24.202.01
E4100F050 (V22-2586)	2	C	3.000	RV	SA	C	O	CT-SP	5Y			43.000.02
E4100F052 (V8-2238)	2	C	2.000	CK	SA	S	C	CT-C	OP			24.202.01
E4100F053 (V8-2212)	2	B	1.000	GL	AO	C/FC	C	BTC	OP	13.00		24.202.01
								FST	OP		VR-023	24.202.01
								PIT	2Y			24.202.05
E4100F054 (V17-2033)	2	B	1.000	GL	DO	C/FC	C	BTC	OP	11.00		24.202.01
								FST	OP		VR-023	24.202.01
								PIT	2Y			24.202.05
E4100F057 (V8-2236)	2	C	2.000	CK	SA	S	O	CT-O	OP			24.202.01

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4100F067	2	B	10.000	GA	MO	C	O	BTO	OP	21.00		24.202.01
(V17-2026)								PIT	2Y			24.202.05
E4100F076	2	C	4.000	CK	SA	S	O&C	CT-C	OP			24.202.07
(V11-2015)								CT-O	OP			24.202.07
E4100F077	2	C	4.000	CK	SA	S	O&C	CT-C	OP			24.202.07
(V11-2016)								CT-O	OP			24.202.07
E41500003	2	D	16.000	RD	SA	C		DT	5Y			E316
(N/A)												
E41500004	E2	D	16.000	RD	SA	C		DT	5Y			E316
(N/A)												
E4150F001	2	B	10.000	GA	MO	C	O	BTO	OP	19.00		24.202.01
(V17-2022)								PIT	2Y			24.202.05
E4150F002	1	A	10.000	GA	MO	O/KL	O&C	AT-1	2Y			43.401.306
(V17-2020)								AT-4	RR			43.401.511
								BTC	CS	15.00	VR-036	24.202.05
								BTO	CS	15.00	VR-036	24.202.05
								GL8910	5Y			
								PIT	2Y			24.202.05
E4150F003	1	A	10.000	GA	MO	C	O&C	AT-1	2Y		VR-046	43.401.306
(V17-2021)								AT-4	RR		VR-050	43.401.511
								BTC	OP	15.00		4.202.01 /24.202.05
								BTO	OP	15.00		24.202.01
								PIT	2Y			24.202.05
E4150F004	2	B	16.000	GA	MO	O	C	BTC	OP	21.00		24.202.01
(V8-2191)								PIT	2Y			24.202.05
E4150F006	1	A	14.000	GA	MO	C	O&C	AT-1	2Y		VR-046	43.401.303
(V8-2194)								AT-10	6Q			43.401.514
								AT-4	RR		VR-050	43.401.511
								BTC	CS	17.00	VR-007	24.202.05
								BTO	CS	17.00	VR-007	24.202.05
								PIT	2Y			24.202.05

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4150F007	2	A	14.000	GA	MO	O	O&C	AT-10	6Q			43.401.514
(V8-2193)								BTC	OP	20.00		24.202.01
								BTO	OP	20.00		24.202.01
								PIT	2Y			24.202.05
E4150F008	2	B	10.000	GL	MO	C	C	BTC	OP	130.00		24.202.01
(V8-2198)								PIT	2Y			24.202.05
E4150F012	2	A	4.000	GL	MO	C	O&C	AT-2	6Q		VR-047	43.401.420
(V8-2196)								BTC	OP	10.00		24.202.01
								BTO	OP	10.00		24.202.01
								PIT	2Y			24.202.05
E4150F021	2	A/C	16.000	SCK	SAM	C/LO	O&C	AT-2	6Q			43.401.409
(V11-2006)								BTC	OP	104.00		24.202.01
								CT-O	OP			24.202.01
								PIT	2Y			24.202.05
E4150F022	2	A/C	2.000	SCK	SAM	C/LO	O&C	AT-2	6Q			43.401.410
(V11-2008)								BTC	OP	30.00		24.202.01
								CT-O	OP			24.202.01
								PIT	2Y			24.202.05
E4150F041	2	B	16.000	GA	MO	C	O	BTO	OP	18.00		24.202.01
(V8-2204)								PIT	2Y			24.202.05
E4150F042	2	A	16.000	GA	MO	C	O&C	AT-2	6Q			43.401.418
(V8-2202)								BTC	OP	19.00		24.202.01 / 24.202.05
								BTO	OP	19.00		24.202.01
								PIT	2Y			24.202.05
E4150F059	2	B	2.000	GL	MO	C	O	BTO	OP	30.00		24.202.01
(V8-2218)								PIT	2Y			24.202.05
E4150F075	2	A	4.000	GA	MO	O	C	AT-1	2Y			43.401.382
(V11-2013)								BTC	OP	29.00		24.202.01 / 24.202.05
								GL8910	5Y			
								PIT	2Y			24.202.05
E4150F079	2	A	4.000	GA	MO	O	C	AT-1	2Y			43.401.382
(V11-2019)								BTC	OP	25.00		24.202.01 / 24.202.05
								GL8910	5Y			
								PIT	2Y			24.202.05

PIS No: E41 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E4150F600	1	A	1.000	GL	MO	O/KL	C	AT-1	2Y		VR-046	43.401.306
(V17-2088)								AT-4	RR		VR-050	43.401.511
								BTC	OP	13.00		24.202.01 / 24.202.05
								PIT	2Y			24.202.05
E41F011	E2	A	8.000	GL	AO	C	C	BTC	OP	8.00		24.202.01
(V30-0253)								PIT	2Y			24.202.05
E41F400	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.379
(V5-2550)								BTC	OP	2.00	VR-006	24.408.01
								PIT	2Y			43.401.379
								PIT-RS	2Y			24.321.02
E41F401	E2	A	1.000	GL	SO	O	C	AT-2	6Q			43.401.401
(V5-2551)								BTC	OP	2.00	VR-006	24.408.01
								PIT	6Q			43.401.401
E41F402	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.378
(V5-2552)								BTC	OP	2.00	VR-006	24.408.01
								PIT	2Y			43.401.378
E41F403	E2	A	1.000	GL	SO	O	C	AT-2	6Q			43.401.400
(V5-2553)								BTC	OP	2.00	VR-006	24.408.01
								PIT	6Q			43.401.400
E41F500	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2379)												
E41F501	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2380)												
E41F502	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2381)												
E41F503	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
(V13-2382)												

PIS No: E51

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E5100F017 (V22-2002)	E2	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
E5150F001 (V11-2002)	E2	A/C	10.000	SCK	SAM	C/LO	C	AT-2	6Q			43.401.406
								BTC	OP	99.00		24.206.01
								PIT	2Y			24.206.02
E5150F002 (V8-2235)	E2	A/C	2.000	SCK	SAM	C/LO	C	AT-2	6Q			43.401.411
								BTC	OP	33.00		24.206.01
								PIT	2Y			24.206.02
E5150F007 (V17-2030)	1	A	4.000	GA	MO	O/KL	C	AT-1	2Y			43.401.305
								AT-4	RR			43.401.511
								BTC	CS	15.00	VR-036	24.206.02
								GL8910	5Y			
								PIT	2Y			24.206.02
E5150F008 (V17-2031)	1	A	4.000	GA	MO	O/KL	C	AT-1	2Y			43.401.305
								AT-4	RR			43.401.511
								BTC	OP	15.00		24.206.01 / 24.206.02
								PIT	2Y			24.206.02
E5150F012 (V8-2227)	E2	A	6.000	GA	MO	O	C	AT-10	6Q			43.401.515
								BTC	OP	15.00		24.206.01
								GL8910	5Y			
								PIT	2Y			24.206.02
E5150F013 (V8-2228)	1	A	6.000	GA	MO	C	C	AT-1	2Y		VR-046	43.401.304
								AT-10	6Q			43.401.515
								AT-4	RR			43.401.511
								BTC	CS	15.00	VR-007	24.206.02
								PIT	2Y			24.206.02
E5150F019 (V8-2230)	2	A	2.000	GL	MO	C	C	AT-2	6Q		VR-047	43.401.421
								BTC	OP	25.00		24.206.01
								PIT	2Y			24.206.02
E5150F022 (V8-2232)	2	B	4.000	GL	MO	C	C	BTC	OP	61.00		24.206.01
								PIT	2Y			24.206.02
E5150F031 (V8-2225)	E2	A	6.000	GA	MO	C	C	AT-2	6Q			43.401.419
								BTC	OP	25.00		24.206.01
								PIT	2Y			24.206.02

PIS No: E51 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
E5150F062 (V11-2020)	E2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.382
								BTC	OP	23.00		24.206.01 / 24.206.02
								PIT	2Y			24.206.02
E5150F084 (V11-2026)	2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.382
								BTC	OP	23.00		24.206.01 / 24.206.02
								PIT	2Y			24.206.02
E51F503 (V13-2383)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
E51F504 (V13-2384)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
E51F505 (V13-2385)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
E51F506 (V13-2386)	1	C	0.750	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104

PIS No: G11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
G1100F003	E2	A	3.000	GA	AO	C	C	AT-1	2Y			43.401.314
(V9-2005)								AT-4	RR			43.401.511
								BTC	OP	36.00		24.702.01
								FST	OP		VR-023	24.702.01
								PIT	2Y			24.702.01
G1100F019	E2	A	3.000	GA	AO	C	C	AT-1	2Y			43.401.315
(V9-2023)								AT-4	RR			43.401.511
								BTC	OP	38.00		24.702.01
								FST	OP		VR-023	24.702.01
								PIT	2Y			24.702.01
G1154F018	E2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.315
(V9-2022)								AT-4	RR			43.401.511
								BTC	CS	27.00	VR-036	24.702.01
								PIT	2Y			24.702.01
G1154F600	E2	A	3.000	GA	MO	O	C	AT-1	2Y			43.401.314
(V9-2044)								AT-4	RR			43.401.511
								BTC	CS	17.00	VR-036	24.702.01
								PIT	2Y			24.702.01

PIS No: G33

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
G3352F001	1	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.348
(VB-2252)								BTC	CS	10.00	VR-036	24.702.01
								PIT	2Y			24.702.01
G3352F004	1	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.348
(VB-2253)								BTC	OP	10.00		24.707.01
								GL8910	5Y			
								PIT	2Y			24.707.01
G3352F220	1	A	4.000	GA	MO	O	C	AT-1	2Y			43.401.304
(V30-0322)								BTC	OP	20.00		24.707.01
								GL8910	5Y			
								PIT	2Y			24.707.01
G33F583	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.103
(V13-2387)												

PIS No: G51

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
G5100F600	E2	A	6.000	GA	MO	O	C	AT-2	6Q			43.401.407
(V8-3832)								BTC	OP	38.00		24.144.01
								PIT	2Y			24.144.01
G5100F601	E2	A	6.000	GA	MO	O	C	AT-2	6Q			43.401.407
(V8-3834)								BTC	OP	38.00		24.144.01
								PIT	2Y			24.144.01
G5100F602	E2	A	6.000	GA	MO	O	C	AT-2	6Q			43.401.408
(V8-3831)								BTC	OP	38.00		24.144.01
								PIT	2Y			24.144.01
G5100F603	E2	A	6.000	GA	MO	O	C	AT-2	6Q			43.401.408
(V8-3833)								BTC	OP	38.00		24.144.01
								PIT	2Y			24.144.01
G5100F604	2	A	4.000	GA	MO	O	C	AT-2	6Q			43.401.405
(V8-3849)								BTC	OP	29.00		24.144.01
								PIT	2Y			24.144.01
G5100F605	E2	A	4.000	GA	MO	O	C	AT-2	6Q			43.401.405
(V8-4680)								BTC	OP	29.00		24.144.01
								GL8910	5Y			
								PIT	2Y			24.144.01
G5100F606	2	A	4.000	GA	MO	O	C	AT-2	6Q			43.401.420
(V8-3850)								BTC	OP	29.00		24.144.01
								PIT	2Y			24.144.01
G5100F607	E2	A	4.000	GA	MO	O	C	AT-2	6Q			43.401.420
(V8-4682)								BTC	OP	29.00		24.144.01
								PIT	2Y			24.144.01

PIS No: N11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
N1100F607	2	B	24.000	GA	MO	O	C	BTC	CS	127.00	VR-001	24.137.03
(V17-2099)								PIT	2Y			24.137.03
N1100F608	2	B	24.000	GA	MO	O	C	BTC	CS	127.00	VR-001	24.137.03
(V17-2100)								PIT	2Y			24.137.03
N1100F609	2	B	24.000	GA	MO	O	C	BTC	CS	127.00	VR-001	24.137.03
(V17-2101)								PIT	2Y			24.137.03
N1100F610	2	B	24.000	GA	MO	O	C	BTC	CS	127.00	VR-001	24.137.03
(V17-2102)								PIT	2Y			24.137.03

PIS No: N21

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
N21F539A (V13-2392)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104
N21F539B (V13-2393)	1	C	1.000	XFC	SA	O	C	CT-EF	6Q		VR-009	44.220.104

PIS No: P11

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P1100F126 (VB-3120)	E2	A	6.000	GA	M	C/KL	PAS	AT-1	2Y			43.401.316

PIS No: P34

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P34F401A	1	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.329
(V13-7360)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.329
P34F401B	1	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.346
(V13-7361)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.346
P34F402A	2	B	0.750	GL	SO	C	C	BTC	OP	2.00	VR-006	24.714.01
(V13-7363)								PIT	2Y			78.000.17
P34F402B	2	B	0.750	GL	SO	C	C	BTC	OP	2.00	VR-006	24.714.01
(V13-7362)								PIT	2Y			78.000.14
P34F403A	E2	A	0.750	GL	SO	C	C	AT-1	2Y		VR-046	43.401.324
(V13-7364)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.324
P34F403B	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.359
(V13-7365)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.359
P34F404A	E2	A	0.750	GL	SO	C	C	AT-1	2Y		VR-046	43.401.324
(V13-7374)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.324
P34F404B	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.359
(V13-7375)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.359
P34F405A	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.387
(V13-7366)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.387
P34F4053	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.386
(V13-7367)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.386
P34F406A	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.387
(V13-7376)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.387

PIS No: P34 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P34F406B	E2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.386
(V13-7377)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.386
P34F407	2	A	0.750	GL	SO	C	C	AT-2	6Q			43.401.405
(V13-7368)								BTC	OP	2.00	VR-006	24.714.01
								PIT	6Q			43.401.405
P34F408	2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.383
(V13-7369)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.383
P34F409	2	A	0.750	GL	SO	C	C	AT-2	6Q			43.401.405
(V13-7378)								BTC	OP	2.00	VR-006	24.714.01
								PIT	6Q			43.401.405
P34F410	2	A	0.750	GL	SO	C	C	AT-1	2Y			43.401.383
(V13-7379)								BTC	OP	2.00	VR-006	24.714.01
								PIT	2Y			43.401.383

PIS No: P44

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F003A (V8-2335)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F003B (V8-2333)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F038 (V8-3055)	3	C	1.500	CK	SA	S	C	CT-C	OP			24.207.08
P4400F051 (V8-2431)	3	C	6.000	CK	SA	S	O	CT-D	SP		VR-048	43.000.010
P4400F077A (V8-2336)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F077B (V8-2334)	3	C	8.000	CK	SA	S	O	CT-O	OP			24.207.08
P4400F111A (V8-2433)	3	C	2.000	CK	SA	S	C	CT-C	OP			24.207.08
P4400F111B (V8-2430)	3	C	1.500	CK	SA	S	C	CT-C	OP			24.207.08
P4400F116A (V8-2432)	3	C	6.000	CK	SA	S	O	CT-D	SP		VR-048	43.000.010
P4400F116B (V8-2332)	3	C	8.000	CK	SA	S	O	CT-D	SP		VR-048	43.000.010
P4400F125A (V22-2589)	3	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
P4400F125B (V22-2077)	3	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
P4400F126A (V22-2075)	3	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02
P4400F126B (V22-2076)	3	C	1.000	RV	SA	C	O	CT-SP	5Y			43.000.02

PIS No: P44 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F165	3	C	6.000	CK	SA	S	O	CT-D	SP		VR-048	43.000.010
(V8-2428)												
P4400F182	3	C	2.000	CK	SA	S	C	CT-C	CS		VR-004	24.207.04
(V8-2429)												
P4400F246	3	C	2.000	CK	SA	S	C	CT-C	RR		VR-032	24.207.04
(V8-3056)												
P4400F274	3	C	2.500	CK	SA	S	C	CT-C	RR		VR-032	24.207.04
(V8-2488)												
P4400F282A	3	A/C	6.000	CK	SA	S	C	AT-1	2Y			43.401.319
(V8-4617)								CT-C	2Y		VR-005	43.401.319
P4400F282B	3	A/C	6.000	CK	SA	S	C	AT-1	2Y			43.401.335
(V8-4616)								CT-C	2Y		VR-005	43.401.335
P4400F601A	3	B	8.000	GA	MO	O	C	BTC	OP	60.00		24.207.05
(V8-2323)								PIT	2Y			24.207.05
P4400F601B	3	B	10.000	GA	MO	O	C	BTC	OP	58.00		24.207.05
(V8-2314)								PIT	2Y			24.207.05
P4400F602A	3	B	4.000	GA	MO	C	O	BTO	OP	28.00		24.207.05
(V8-2407)								PIT	2Y			24.207.05
								PIT-RS	2Y			24.321.02
P4400F602B	3	B	4.000	GA	MO	C	O	BTO	OP	28.00		24.207.05
(V8-2374)								PIT	2Y			24.207.05
P4400F603A	3	B	8.000	GA	MO	O	C	BTC	OP	45.00		24.207.05
(V8-2324)								PIT	2Y			24.207.05
P4400F603B	3	B	10.000	GA	MO	O	C	BTC	OP	57.00		24.207.05
(V8-2315)								PIT	2Y			24.207.05
P4400F604	3	B	2.000	GL	MO	O	C	BTC	CS	38.00	VR-004	24.207.04
(V8-2425)								PIT	2Y			24.207.04
P4400F605A	3	B	2.000	GL	MO	O	C	BTC	OP	38.00		24.207.05
(V8-2427)								PIT	2Y			24.207.05

PIS No: P44 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4400F605B (VB-2426)	3	S	1.500	GL	MO	O	C	BTC	OP	38.00		24.207.05
								PIT	2Y			24.207.05
P4400F606A (VB-4677)	3	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.319
								BTC	CS	34.00	VR-005	24.207.04
								PIT	2Y			24.207.04
								PIT-RS	2Y			24.321.02
P4400F606B (VB-4678)	3	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.335
								BTC	CS	34.00	VR-005	24.207.04
								PIT	2Y			24.207.04
P4400F607A (VB-2486)	3	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.320
								BTC	CS	35.00	VR-005	24.207.04
								PIT	2Y			24.207.04
								PIT-RS	2Y			24.321.02
P4400F607B (VB-2483)	3	A	6.000	GA	MO	O	C	AT-1	2Y			43.401.336
								BTC	CS	33.00	VR-005	24.207.04
								PIT	2Y			24.207.04
P4400F608 (VB-2487)	3	B	2.500	GA	MO	O	C	BTC	CS	10.00	VR-036	24.207.04
								PIT	2Y			24.207.04
P4400F613 (VB-3057)	3	B	1.500	GL	MO	O	C	BTC	OP	38.00		24.207.05
								PIT	2Y			24.207.05
P4400F614 (VB-3058)	3	B	2.000	GL	MO	O	C	BTC	CS	38.00	VR-036	24.207.04
								PIT	2Y			24.207.04
P4400F615 (VB-3889)	3	A	6.000	GA	MO	O/KL	C	AT-1	2Y			43.401.336
								BTC	CS	38.00	VR-005	24.207.04
								PIT	2Y			24.207.04
P4400F616 (VB-3882)	3	A	6.000	GA	MO	O/KL	C	AT-1	2Y			43.401.320
								BTC	CS	36.00	VR-005	24.207.04
								PIT	2Y			24.207.04
								PIT-RS	2Y			24.321.04

PIS No: P45

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P4500F002A (V15-2092)	3	C	10.000	CK	SA	S	O	CT-O	OP			24.208.02
P4500F002B (V15-2067)	3	C	10.000	CK	SA	S	O	CT-O	OP			24.208.03

PI$ No: P50

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P5000F207A (V22-2561)	E4	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F207B (V22-2610)	E4	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F208A (V5-2537)	E3	C	3.000	CK	SA	S	O	CT-O	OP			24.129.01
P5000F208B (V5-2536)	E3	C	3.000	CK	SA	S	O	CT-O	OP			24.129.01
P5000F219A (V5-2528)	E3	C	3.000	CK	SA	S	O	CT-C	OP			24.129.01
								CT-O	OP			24.129.01
P5000F219B (V5-2527)	E3	C	3.000	CK	SA	S	O	CT-C	OP			24.129.01
								CT-O	OP			24.129.01
P5000F223A (V22-2517)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F223B (V22-2516)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
P5000F402 (V5-2523)	E3	B	3.000	GL	AO	O/FO	O&C	BTC	OP	18.00		24.129.01
								FST	OP		VR-023	24.129.01
								PIT	2Y			24.129.01
P5000F403 (V5-2055)	E3	B	2.000	GL	AO	C/FC	C	BTC	OP	16.00		24.129.01
								FST	OP		VR-023	24.129.01
								PIT	2Y			24.129.01
P5000F440 (V5-2540)	E3	A	3.000	GA	AO	O/FC	C	AT-3	6Q			24.129.04
								BTC	OP	37.00		24.129.01
								FST	OP		VR-023	24.129.01
								PIT	2Y			24.129.01
P5000F441 (V5-2541)	E3	A	3.000	GA	AO	O/FC	C	AT-3	6Q			24.129.04
								BTC	OP	43.00		24.129.01
								FST	OP		VR-023	24.129.01
								PIT	2Y			24.129.01
P5000F603 (V5-2006)	E2	A	1.000	GA	MO	C/KC	PAS	AT-1	2Y			43.401.317

PIS No: P50 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
P5000F604 (V5-2007)	E2	A	1.000	GA	NO	C/KC	PAS	AT-1	2Y			43.401.317

PIS No: R30

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
R3000F031A (V5-2086)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.34
R3000F031B (V5-2062)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.36
R3000F031C (V5-2098)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.35
R3000F031D (V5-2074)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.37
R3000F032A (V5-2090)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.34
R3000F032B (V5-2066)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.36
R3000F032C (V5-2102)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.35
R3000F032D (V5-2078)	E3	C	0.750	CK	SA	S	C	CT-C	OP			24.307.37
R3000F035A (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035B (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035C (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F035D (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036A (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036B (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F036C (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02

PIS No: R30 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
R3000F036D (N/A)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
R3000F083A (V14-2026)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.34
								CT-O	OP			24.307.34
R3000F083B (V14-2004)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.36
								CT-O	OP			24.307.36
R3000F083C (V14-2037)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.35
								CT-O	OP			24.307.35
R3000F083D (V14-2015)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.37
								CT-O	OP			24.307.37
R3000F084A (V14-2029)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.34
								CT-O	OP			24.307.34
R3000F084B (V14-2007)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.36
								CT-O	OP			24.307.36
R3000F084C (V14-2040)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.35
								CT-O	OP			24.307.35
R3000F084D (V14-2018)	E3	C	1.500	CK	SA	S	O&C	CT-C	OP			24.307.37
								CT-O	OP			24.307.37
R3000F142A (V15-2096)	3	C	8.000	CK	SA	S	O	CT-C	OP			24.307.34
								CT-O	OP			24.307.34
R3000F142B (V15-2071)	3	C	8.000	CK	SA	S	O	CT-C	OP			24.307.36
								CT-O	OP			24.307.36
R3000F142C (V15-2102)	3	C	8.000	CK	SA	S	O	CT-C	OP			24.307.34
								CT-O	OP			24.307.35
R3000F142D (V15-2078)	3	C	8.000	CK	SA	S	O	CT-C	OP			24.307.36
								CT-O	OP			24.307.37
R30FA04A (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.14 / 24.307.10
R30FA04B (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.16 / 24.307.12

PIS No: R30 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
R30FA04C (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.15 / 24.307.11
R30FA04D (AS1)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.17 / 24.307.13
R30FA05A (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.14 / 24.307.10
R30FA05B (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.16 / 24.307.12
R30FA05C (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.15 / 24.307.11
R30FA05D (AS2)	E3	B	1.500	3WY	SO	C	O	BTO	SP	10.00	VR-051	24.307.17 / 24.307.13

PIS No: T23

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F400A	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2001)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400B	E3	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2002)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400C	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2003)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400D	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2004)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400E	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2005)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400F	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2006)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400G	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2007)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203

PIS No: T23 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F400H	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2008)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400J	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2009)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400K	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2010)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400L	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2011)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F400M	E2	A/C	18.000	CK	SAT	S	O&C	AT-11	6Q		VR-053	24.402.06
(V21-2012)								CT-C	CS		VR-057	24.402.01
								CT-F	RR			44.220.203
								CT-O	CS		VR-057	24.402.01
								PIT	2Y			44.220.203
T2300F409	E2	A	20.000	BTF	AO	C/FO	O&C	AT-1	2Y		VR-046	43.401.375
(V21-2015)								BTC	OP	15.00		24.402.01
								BTO	OP	36.00		24.402.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T2300F410	E2	A	20.000	BTF	AO	C/FO	O&C	AT-1	2Y		VR-046	43.401.374
(V21-2016)								BTC	OP	17.00		24.402.01
								BTO	OP	39.00		24.402.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02

PIS No: T23 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T2300F450A	E2	A/C	20.000	CK	SAT	S	O&C	AT-1	2Y		VR-046	43.401.375
(V21-2013)								CT-C	OP			24.402.01
								CT-F	RR			44.220.204
								CT-O	OP			24.402.01
								PIT	2Y			44.220.204
T2300F450B	E2	A/C	20.000	CK	SAT	S	O&C	AT-1	2Y		VR-046	43.401.374
(V21-2014)								CT-C	OP			24.402.01
								CT-F	RR			44.220.204
								CT-O	OP			24.402.01
								PIT	2Y			44.220.204

PIS No: T41

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4100F008	E4	B	72.000	BTF	AO	O/FC	C	BTC	OP	5.00		24.404.04
(VR3-3027)								FST	OP		VR-023	24.404.04
								PIT	2Y			24.404.04
T4100F009	E4	B	72.000	BTF	AO	O/FC	C	BTC	OP	5.00		24.404.02
(VR3-3028)								FST	OP		VR-023	24.404.02
								PIT	2Y			24.404.02
T4100F010	E4	B	72.000	BTF	AO	O/FC	C	BTC	OP	5.00		24.404.04
(VR3-3029)								FST	OP		VR-023	24.404.04
								PIT	2Y			24.404.04
T4100F011	E4	B	72.000	BTF	AO	O/FC	C	BTC	OP	5.00		24.404.02
(VR3-3030)								FST	OP		VR-023	24.404.02
								PIT	2Y			24.404.02
T4100F352A	E4	C	4.000	CK	SA	S	O	CT-O	OP			24.413.01
(VB9-2594)												
T4100F352B	E4	C	4.000	CK	SA	S	O	CT-O	OP			24.413.01
(VB9-2597)												

PIS No: T46

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4600F400 (VR3-3015)	E2	A	20.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.377
								AT-8	OP			43.401.510
								BTC	OP	3.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F401 (VR3-3016)	E2	A	20.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.377
								AT-8	OP			43.401.510
								BTC	OP	3.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F402 (VR3-3023)	E2	A	24.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.321
								AT-8	OP			43.401.510
								BTC	OP	3.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F407 (VR3-3022)	E4	B	24.000	BTF	AO	C/FO	O	BTO	OP	100.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F408 (VR3-3002)	E4	B	24.000	BTF	AO	C/FC	O&C	BTC	OP	30.00		24.404.03
								BTO	OP	14.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F409 (VR3-3001)	E4	B	24.000	BTF	AO	C/FC	O&C	BTC	OP	29.00		24.404.03
								BTO	OP	15.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F410 (VR3-3003)	E4	B	24.000	BTF	AO	O/FO	O	BTO	OP	97.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03
T4600F411 (VR3-3026)	E2	A	6.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.321
								AT-8	OP			43.401.510
								BTC	OP	3.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03

PIS No: T46 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4600F412	E2	A	6.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.377
(VR3-3019)								AT-B	OP			43.401.510
								BTC	OP	3.00		24.404.03
								FST	OP		VR-023	24.404.03
								PIT	2Y			24.404.03

PIS No: T48

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4800F404	E2	A	20.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.376
(VR3-3013)								AT-8	OP			43.401.510
								BTC	OP	3.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F405	E2	A	20.000	BTF	AO	C/KC	C	AT-1	2Y		VR-046	43.401.376
(VR3-3014)								AT-8	SP			43.401.510
								BTC	OP	3.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F407	E2	A	24.000	BTF	AO	C/KC	C	AT-1	2Y		VR-046	43.401.322
(VR3-3012)								AT-8	OP			43.401.510
								BTC	OP	4.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F408	E2	A	10.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.322
(V4-2060)								AT-8	OP			43.401.510
								BTC	OP	3.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F409	E2	A	6.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.376
(V4-2061)								AT-8	OP			43.401.510
								BTC	OP	3.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F410	E2	A	6.000	BTF	AO	C/FC	C	AT-1	2Y		VR-046	43.401.377
(V4-2063)								AT-8	OP			43.401.510
								BTC	OP	3.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F416	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.362
(V4-2036)								BTC	OP	16.00		24.406.01
								PIT	2Y			24.406.02
T4800F417	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.363
(V4-2065)								BTC	OP	16.00		24.406.01
								PIT	2Y			24.406.02

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4800F418	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.364
(V4-2075)								BTC	OP	16.00		24.406.01
								PIT	2Y			24.406.02
T4800F419	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.365
(V4-2077)								BTC	OP	14.00		24.406.01
								PIT	2Y			24.406.02
T4800F420	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.366
(V4-2082)								BTC	OP	10.00		24.406.01
								PIT	2Y			24.406.02
T4800F421	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.367
(V4-2084)								BTC	OP	9.00		24.406.01
								PIT	2Y			24.406.02
T4800F422	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.368
(V4-2086)								BTC	OP	17.00		24.406.01
								PIT	2Y			24.406.02
T4800F423	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.369
(V4-2088)								BTC	OP	22.00		24.406.01
								PIT	2Y			24.406.02
T4800F424	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.370
(V4-2090)								BTC	OP	16.00		24.406.01
								PIT	2Y			24.406.02
T4800F425	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.371
(V4-2092)								BTC	OP	16.00		24.406.01
								PIT	2Y			24.406.02
T4800F426	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.372
(V4-2094)								BTC	OP	8.00		24.406.01
								PIT	2Y			24.406.02
T4800F427	E2	A	1.000	GL	AO	C	C	AT-1	2Y			43.401.373
(V4-2096)								BTC	OP	13.00		24.406.01
								PIT	2Y			24.406.02

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4800F451	E2	A	1.000	GL	AO	O/FC	C	AT-1	2Y			43.401.352
(V4-2185)								BTC	OP	5.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4800F453	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.334
(VR3-2823)								BTC	OP	4.00		24.406.01
								PIT	2Y			24.406.02
T4800F454	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.334
(VR3-2824)								BTC	OP	3.00		24.406.01
								PIT	2Y			24.406.02
T4800F455	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.334
(VR3-2825)								BTC	OP	6.00		24.406.01
								PIT	2Y			24.406.02
T4800F456	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.377
(VR3-2826)								BTC	OP	4.00		24.406.01
								PIT	2Y			24.406.02
T4800F457	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.377
(VR3-2827)								BTC	OP	4.00		24.406.01
								PIT	2Y			24.406.02
T4800F458	E2	A	1.000	GL	AO	O	C	AT-1	2Y		VR-046	43.401.377
(VR3-2828)								BTC	OP	4.00		24.406.01
								PIT	2Y			24.406.02
T4803F601	E2	A	24.000	BTF	MO	C	C	AT-1	2Y		VR-046	43.401.322
(VR3-3011)								AT-8	OP			43.401.510
								BTC	OP	5.00		24.406.01
								PIT	2Y			24.406.02
T4803F602	E2	A	24.000	BTF	MO	C	C	AT-1	2Y		VR-046	43.401.321
(VR3-3024)								AT-8	OP			43.401.510
								BTC	OP	5.00		24.404.03
								PIT	2Y			24.404.03
T4804F001A	2	B	0.750	GA	MO	C	O&C	BTC	OP	35.00		24.409.02
(V8-2002)								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4804F001B	2	B	0.750	GA	MO	C	O&C	BTC	OP	38.00		24.409.03
(VB-2001)								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03
T4804F016A	2	A/C	2.000	RV	SA	C	O&C	AT-1	2Y			43.401.384
(V22-2122)								CT-SP	5Y			43.000.02
T4804F016B	2	A/C	2.000	RV	SA	C	O&C	AT-1	2Y			43.401.384
(V22-2121)								CT-SP	5Y			43.000.02
T4804F601A	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
(V4-2140)								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F601B	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
(V4-2139)								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03
T4804F602A	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.383
(V4-2142)								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F602B	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.385
(V4-2141)								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03
T4804F603A	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.310
(V4-2144)								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F603B	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.349
(V4-2143)								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03

PIS No: T48 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4804F604A (V4-2148)	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F604B (V4-2149)	2	A	8.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.384
								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03
T4804F605A (V4-2154)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.310
								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F605B (V4-2153)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.349
								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03
T4804F606A (V4-2156)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.383
								BTC	OP	38.00		24.409.02
								BTO	OP	38.00		24.409.02
								PIT	2Y			24.409.02
T4804F606B (V4-2155)	2	A	4.000	BTF	MO	C	O&C	AT-1	2Y		VR-046	43.401.385
								BTC	OP	38.00		24.409.03
								BTO	OP	38.00		24.409.03
								PIT	2Y			24.409.03

PIS No: T49

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4901F006 (V4-2228)	E3	C	1.000	CK	SA	S	C	CT-C	OP			24.406.01
T4901F007 (V4-2172)	E2	A	1.500	GL	M	C/LC	PAS	AT-1	2Y		VR-046	43.401.318
T4901F016 (V8-4140)	E2	A	1.500	GL	M	C/LC	PAS	AT-1	2Y		VR-046	43.401.343
T4901F019 (V4-2238)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F021 (V22-2123)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F022 (V4-2241)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F024 (V22-2129)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F025 (V4-2240)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F027 (V22-2128)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F028 (V4-2239)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F030 (V22-2126)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F031 (V4-2242)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F033 (V22-2127)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F034A (V4-2097)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02

PIS No: T49 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4901F034B (V4-2099)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
T4901F034C (V4-2110)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
T4901F034D (V4-2111)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	24.137.02
								CT-O	RR		VR-016	24.137.02
T4901F036A (V22-2138)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036B (V22-2140)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036C (V22-2124)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F036D (V22-2131)	E3	C	0.750	RV	SA	C	O	CT-SP	5Y			43.000.02
T4901F039 (V4-2260)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F040 (V4-2261)	E3	A/C	1.000	CK	SA	S	O&C	CT-C	RR		VR-016	43.137.02
								CT-O	RR		VR-016	24.137.11
T4901F465 (V4-2079)	E2	A	1.500	GL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.318
								BTC	OP	13.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4901F466 (V9-2081)	E3	B	1.500	GL	AO	O/FC	C	BTC	OP	13.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4901F467 (V5-2610)	E3	B	1.500	GL	AO	C/FC	O&C	BTC	OP	10.00		24.406.01
								BTO	OP	6.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02

PIS No: T49 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T4901F468	E2	A	1.500	GL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.343
(V4-2187)								BTC	OP	15.00		24.406.01
								FST	OP		VR-023	24.406.01
								PIT	2Y			24.406.02
T4901F601	E2	A	1.500	GL	MO	O	C	AT-1	2Y		VR-046	43.401.318
(V4-2080)								BTC	OP	36.00		24.406.01
								PIT	2Y			24.406.02
T4901F602	E2	A	1.500	GL	MO	O	C	AT-1	2Y		VR-046	43.401.343
(V4-2188)								BTC	OP	21.00		24.406.01
								PIT	2Y			24.406.02

PIS No: T50

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T5000F401A	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.354
(V5-2151)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F401B	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y		VR-046	43.401.323
(V5-2159)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F402A	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.354
(V5-2152)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F402B	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y		VR-046	43.401.324
(V5-2160)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F403A	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.354
(V5-2153)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F403B	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y		VR-046	43.401.323
(V5-2161)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F404A	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.354
(V5-2154)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F404B	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y		VR-046	43.401.323
(V5-2162)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01

PIS No: T50 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T5000F405A (V5-2155)	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y		VR-046	43.401.354
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F405B (V5-2163)	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y		VR-046	43.401.323
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F407A (V5-2157)	E2	A	1.000	BAL	AO	C/FC	C	AT-1	2Y			43.401.386
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F407B (V5-2165)	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y			43.401.387
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F408A (V5-2158)	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y			43.401.383
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F408B (V5-2166)	E2	A	1.000	BAL	AO	O/FC	C	AT-1	2Y			43.401.385
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F420A (V5-2230)	E2	A	1.000	BAL	AO	O	C	AT-1	2Y			43.401.353
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F420B (V5-2231)	E2	A	1.000	BAL	AO	O	C	AT-1	2Y			43.401.333
								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01

PIS No: T50 (cont)

VALVE NUMBER	CLASS	VALVE CATEGORY	VALVE SIZE	VALVE TYPE	ACTUATOR TYPE	NORMAL POS.	STROKE DIR.	TEST	TEST FREQ	MAX. STROKE	RELIEF REQ.	REMARKS
T5000F455	E2	A	1.000	BAL	AO	O	C	AT-1	2Y			43.401.383
(V5-2239)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T5000F456	E2	A	1.000	BAL	AO	O	C	AT-1	2Y			43.401.354
(V5-2239)								BTC	OP	3.00		24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			24.408.01
T50F412A	E2	A	1.000	GL	SO	O	C	AT-2	6Q			43.401.402
(V5-2555)								BTC	OP	2.00	VR-006	24.408.01
								PIT	2Y			43.401.402
								PIT-RS	2Y			24.321.02
T50F4128	E2	A	1.000	GL	SO	O	C	AT-2	6Q			43.401.403
(V5-2556)								BTC	OP	2.00	VR-006	24.408.01
								PIT	2Y			43.401.403
T50F450	E2	A	0.750	GL	SO	O	C	AT-1	2Y			43.401.354
(V5-3083)								BTC	OP	2.00	VR-006	24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			43.401.354
T50F451	E2	A	0.750	GL	SO	O	C	AT-1	2Y			43.401.383
(V5-3084)								BTC	OP	2.00	VR-006	24.408.01
								FST	OP		VR-023	24.408.01
								PIT	2Y			43.401.383
T50F458	E2	A	1.000	GL	SO	O	C	AT-1	2Y			43.401.389
(N/A)								BTC	OP	2.00	VR-006	24.408.01
								PIT	2Y			43.401.389

PART - C

INSERVICE TESTING PROGRAM
BOUNDARY DRAWINGS INDEX

1.0 Inservice Testing Program Boundary Drawings Index

FERMI-2 ISI CLASSIFICATION BOUNDARY DRAWINGS

Drawing Title	Dwg. No.	PIS No's Associated with Dwg.
Nuclear Boiler System (NB)	6M721-5808-1 6M721-5808-2	B21
Main Steam Isolation Valve Leakage Control System (MSLCS)	6M721-5808-1	B21
Main and Reheat Steam Systems (MS)	6M721-5808-1 6M721-5822	B21 N11
Reactor Recirculation System-Nuclear Boiler System (RR)	6M721-5809	B31
Control Rod Drive System (CRD)	6M721-5810-1	C11
CRD Scram Discharge System	6M721-5810-2	C11
Stand-By-Liquid Control System (SLC)	6M721-5811	C41
Traversing In-Core Probe (TIP)	6M721-5812	C51
Residual Heat Removal (RHR) Division I	6M721-5813-2	E11
Residual Heat Removal (RHR) Division II	6M721-5813-1	E11
RHR Service Water Make Up Decant and Overflow Systems	6M721-5813-3	E11 P45 R30
Core Spray System (CS)	6M721-5814	E21
High Pressure Coolant Injection System (HPCI)	6M721-5815	E41
Reactor Core Isolation Cooling System (RCIC)	6M721-5816	E51
Sump Pump/Radwaste	6M721-5817	G11

FERMI-2 ISI CLASSIFICATION BOUNDARY DRAWINGS (Continued)

Drawing Title	Dwg. No.	PIS No's Associated with Dwg.
Reactor Water Clean-Up (RWCU)	6M721-5818	G33
Fuel Pool Cooling and Cleanup System	6M721-5819	G41
Torus Water Management System (TWMS)	6M721-5820	G51
Feedwater System (FW)	6M721-5821	N21
Demineralized Service Water Risers	6M721-5823	P11
Sample Line Tie-In And Return Post Accident Sampling System	6M721-5824	P34
Emergency Equipment Cooling Water (EECW) Division I	6M721-5825-1	P44
Emergency Equipment Cooling Water (EECW) Division II	6M721-5825-2	P44
Station Air (SA)	6M721-5826-1	P50
Non-interruptable Control Air (NIAS) Div I and II	6M721-5826-2	P50
Emergency Diesel Generator (EDG)	6M721-5827	R30
Control-Center A/C Water (CCHVAC)	6M721-5828	T41
Standby Gas Treatment (SGTS)	6M721-5829	T46
Nitrogen Inerting	6M721-5830-1	T48 T23
Hydrogen Recombiner	6M721-5830-2	T48
(Post LOCA) Combustible Gas Control System	6M721-5830-2	T48
Primary Containment Pneumatic Supply	6M721-5856	T49
Primary Containment Monitoring (PCM)	6M721-5831	T50

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INDEX

ISI DRAWING NUMBER	SYSTEM NUMBER	DESCRIPTION	F DRAW
6M721-5808	NA	LEGEND & SYMBOLS	N
-5808-1	B21-1	NUCLEAR BOILER	6M721-5
-5808-2	B21-2	NUCLEAR BOILER	-5
-5809	B31-1	NUCLEAR BOILER - REACTOR RECIRCULATION	-5
-5810-1	C11-1	CONTROL ROD DRIVE	-5
-5810-2	C11-2	CRD-SCRAM DISCHARGE VOLUME	-5
-5811	C41-1	STAND BY LIQUID CONTROL	-5
-5812	C51-1	TRAVERSING IN-CORE PROBE	-5
-5813-1	E11-1	RESIDUAL HEAT REMOVAL DIV. II	-5
-5813-2	E11-2	RESIDUAL HEAT REMOVAL DIV. I	-5
-5813-3	E11-3	RHR S.W. MAKE UP DECANT. & OVER FLOW	-5
-5814	E21-1	CORE SPRAY	-5
-5815	E41-1	HIGH PRESSURE COOLANT INJECTION	-5
-5816	E51-1	REACTOR CORE ISOLATION COOLING	-5
-5817	G11-2	SUMP PUMP SKETCH #2 RADWASTE	-5
-5818	G33-1	REACTOR WATER CLEAN UP	-5
-5819	G41-1	FUEL POOL COOLING & CLEAN UP	-5
-5820	G51-1	TORUS WATER MANAGEMENT	-5
-5821	N21-1	FEEDWATER	-5
-5822	N30-1	MAIN AND REHEAT STEAM	-5
-5823	P11-2	DEMINERALIZED SERVICE WATER RISERS	-5
-5824	P34-1	POST ACCIDENT SAMPLING	-5
-5825-1	P44-1	CLOSED & EMERGENCY EQUIPMENT COOLING WATER	-5
-5825-2	P44-2	CLOSED & EMERGENCY EQUIPMENT COOLING WATER	-5
-5826-1	P50-1B	STATION AIR	-5
-5826-2	P50-2A	NON-INTERUPTABLE CONTROL AIR DIV. I & II	-5
-5827	R30-1	EMERGENCY DIESEL GENERATOR	-5
-5828	T41-2	CONTROL - CENTER A/C WATER	-5
-5829	T46-1	STAND BY GAS TREATMENT	-5
-5830-1	T48-1	NITROGEN INERTING	-5
-5830-2	T48-2	HYDROGEN RECOMBINER	-5
-5831	T50-1	PRIMARY CONTAINMENT MONITORING	-5
-5856	T49-1	PRIMARY CONTAINMENT PNEUMATIC SUPPLY	-5

EXEMPTION TABLE

AS SHOWN IN DRAWING	SYMBOL	DESCRIPTION
		COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION IN REACTOR COOLANT PRESSURE BOUNDARY NORMAL MAKE-UP EXCLUSION CALCULATION NO 50.4016.4101
		COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION IN REACTOR COOLANT PRESSURE BOUNDARY NORMAL MAKE-UP EXCLUSION CULATION NO 50.4016.4101
		COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION IN REACTOR VESSEL HEAD CONNECTIONS AND ASSOCIATED PIPING, 2 INCH PIP INACCESSIBLE BY CONTROL ROD DRIVE HOUSING.

S NG NO.	ISI CLASSES SHOWN
	NA
201-1	1,2,3, AND EX
201-2	1
202-1	1,3, AND EX
203-1	2 AND EX
203-2	2
204	1 AND 2
205	EX
206-1	1,2,3, AND EX
206-2	1,2,3, AND EX
206-3	3
207	1,2, AND EX
208-1	1,2, AND EX
209-1	1,2, AND EX
210-2	EX
211-1	1
212-1	EX
213	2 AND EX
215-1	1
217-1	2
221-2	EX
225	
229-1	3
229-2	3
230-2	EX
230-3	EX
234	EX
236-2	EX
237	EX
239-1	EX
239-2	2
241	2 AND EX
240	EX

CCORDANCE WITH IWB-1220(d), OR CONDENSATE LINES. SEE

ACCORDANCE WITH IWB-1220(e), OR STEAM LINES. SEE CAL-

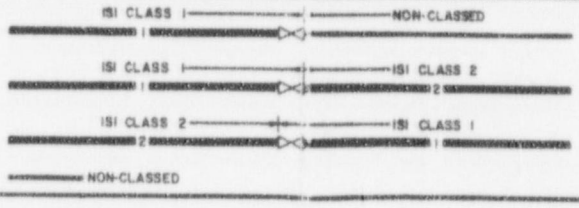
CCORDANCE WITH IWB-1220(c), SIZE AND SMALLER, MADE

INSERVICE INSPECTION CLASSIFICATION

LEGEND AND SYMBOLS

CLASS 1	DESCRIPTION
[redacted]	CLASS 1 COMPONENTS SUBJECT TO VOLUMETRIC, SURFACE, AND/OR VISUAL EXAMINATION AND SYSTEM PRESSURE TESTS.
[redacted]	CLASS 1 COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION IN ACCORDANCE WITH IWB-1220(b)(2); COMPONENTS AND THEIR CONNECTIONS IN PIPING OF 1 IN. NOMINAL PIPE SIZE AND SMALLER.
CLASS 2	**DESCRIPTION**
[redacted]	CLASS 2 COMPONENTS SUBJECT TO VOLUMETRIC, SURFACE, AND/OR VISUAL EXAMINATION AND SYSTEM PRESSURE TESTS.
[redacted]	CLASS 2 COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION IN ACCORDANCE WITH IWC-1220(c); COMPONENT CONNECTIONS (INCLUDING NOZZLES IN VESSELS AND PUMPS), PIPING AND ASSOCIATED VALVES, AND VESSELS AND THEIR ATTACHMENTS THAT ARE 4 IN. NOMINAL PIPE SIZE AND SMALLER.
****2****2****	CLASS 2 COMPONENTS EXEMPT FROM SYSTEM HYDROSTATIC TESTS IN ACCORDANCE WITH IWC-5222(d); FOR OPEN-ENDED PORTIONS OF DISCHARGE LINES BEYOND THE LAST SHUTOFF VALVE IN NONCLOSED SYSTEMS (e.g., CONTAINMENT SPRAY HEADER), DEMONSTRATION OF AN OPEN FLOW PATH TEST SHALL BE PEFORMED IN LIEU OF THE SYSTEM HYDROSTATIC TEST.
22***	CLASS 2 COMPONENTS EXEMPT FROM VOLUMETRIC AND SURFACE EXAMINATION AND SYSTEM HYDROSTATIC TESTS IN ACCORDANCE WITH IWC-1220(b OR c) AND IWC-5222(d), RESPECTIVELY.
CLASS 3	**DESCRIPTION**
[redacted]	CLASS 3 COMPONENTS SUBJECT TO VISUAL EXAMINATION AND SYSTEM PRESSURE TESTS.
##### 3###3###	INTEGRAL ATTACHMENTS OF SUPPORTS AND RESTRAINTS TO CLASS 3 COMPONENTS THAT ARE 4 IN. NOMINAL PIPE SIZE AND SMALLER EXEMPT FROM VISUAL EXAMINATION IN ACCORDANCE WITH IWD-1220.1 OR INTEGRAL ATTACHMENTS OF SUPPORTS AND RESTRAINTS TO CLASS 3 COMPONENTS EXCEEDING 4 IN. NOMINAL PIPE SIZE EXEMPT FROM VISUAL EXAMINATION IN ACCORDANCE WITH IWD-1220.2.
****3****3****	CLASS 3 COMPONENTS EXEMPT FROM HYDROSTATIC PRESSURE TEST IN ACCORDANCE WITH IWD-5223(d) AND (e); (d) FOR OPEN ENDED PORTIONS OF DISCHARGE LINES BEYOND THE LAST SHUTOFF VALVE IN NONCLOSED SYSTEMS (e.g., SERVICE WATER SYSTEMS), CONFIRMATION OF ADEQUATE FLOW DURING SYSTEM OPERATION SHALL BE ACCEPTABLE IN LIEU OF SYSTEM HYDROSTATIC TEST. (e) OPEN ENDED VENT AND DRAIN LINES FROM COMPONENTS EXTENDING BEYOND THE LAST SHUTOFF VALVE AND OPEN ENDED SAFETY OR RELIEF VALVE DISCHARGE LINES SHALL BE EXEMPT FROM HYDROSTATIC TEST.
33***	CLASS 3 INTEGRAL ATTACHMENTS EXEMPT FROM VISUAL EXAMINATION AND CLASS 3 COMPONENTS EXEMPT FROM SYSTEM HYDROSTATIC TESTS IN ACCORDANCE WITH IWD-2220 AND IWD-5223, RESPECTIVELY.
IWF CLASS 1,2 & 3	**DESCRIPTION**
[redacted]	CLASS 1,2,OR 3 COMPONENT SUPPORT SUBJECT TO VISUAL EXAMINATION
[redacted]	CLASS 1,2,OR 3 COMPONENT SUPPORT EXEMPT FROM VISUAL EXAMINATION IN ACCORDANCE WITH THE ISI PROGRAM PLAN RELIEF REQUEST
**********	CLASS 1,2,OR 3 COMPONENT SUPPORT EXEMPT FROM VISUAL EXAMINATION IN ACCORDANCE WITH THE ISI PROGRAM PLAN RELIEF REQUEST
**********	CLASS 1,2,OR 3 COMPONENT SUPPORT EXEMPT FROM VISUAL EXAMINATION IN ACCORDANCE WITH THE ISI PROGRAM PLAN RELIEF REQUEST

TYPICAL CODE CLASSIFICATION CHANGE



6M721-5808
LATEST REVISION 0

Also Available on APERTURE CARD

Also Available on Aperture Card

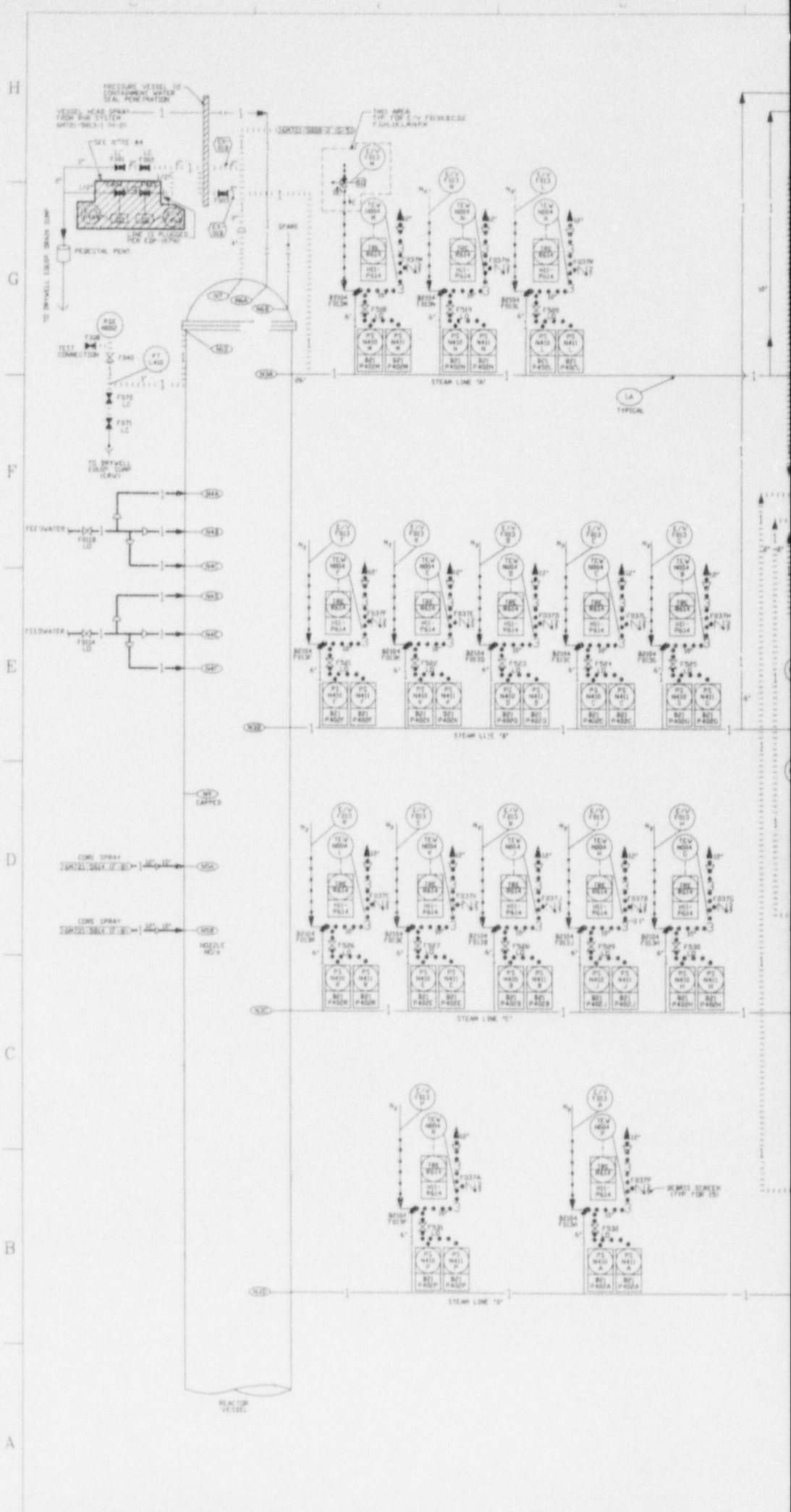
9412300121-01

160

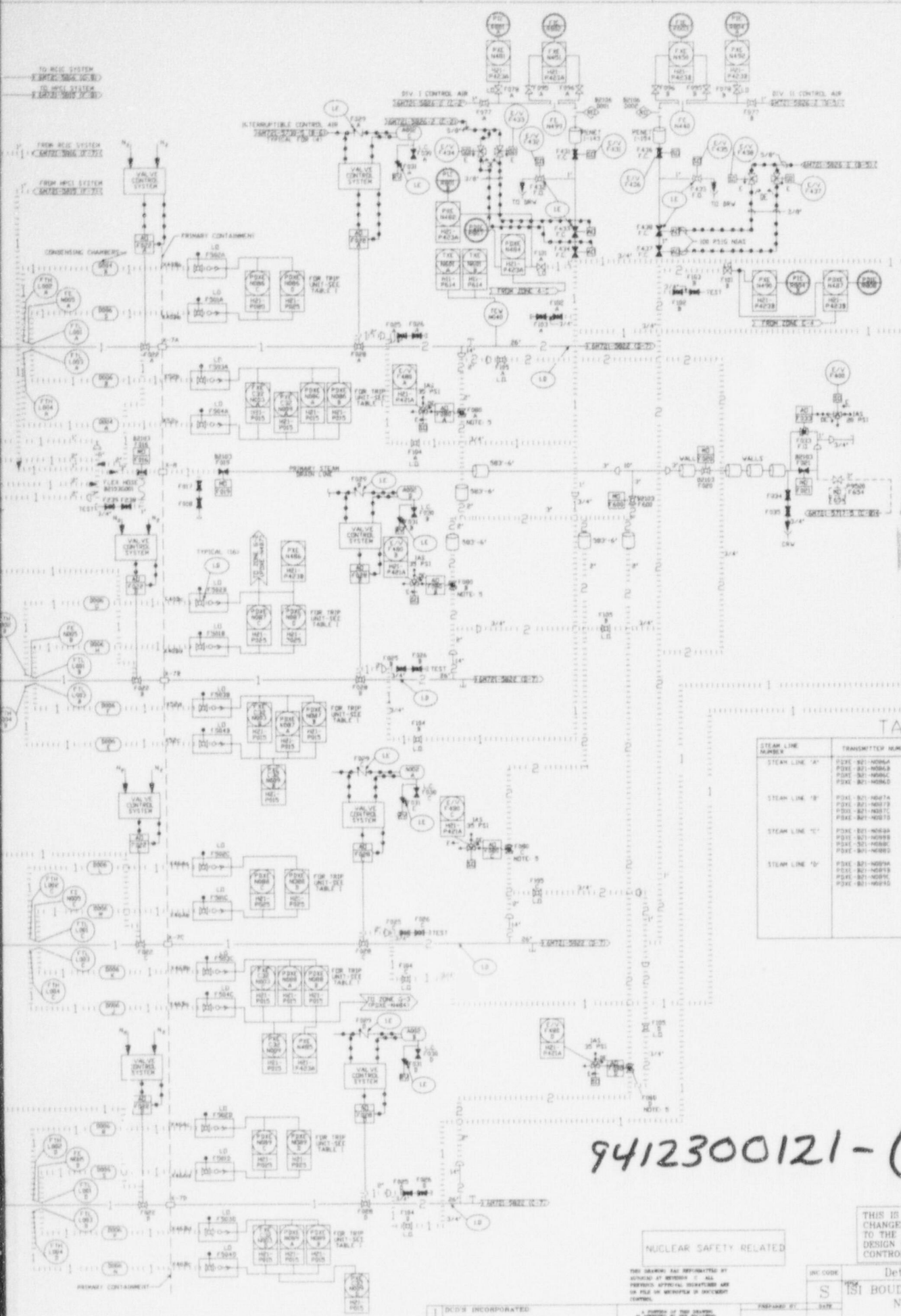
NON-NUCLEAR SAFETY RELATED

NUC CODE	W
Detroit Edison	Fermi 2
ISI CLASSIFICATION BOUNDARY DRAWING LEGEND & SYMBOLS	
A30-00	
DDDMEC	
6M721-5808	0

5 4 3 2 1



PRESSURE VESSEL TO CONTAINMENT WATER SEAL PENETRATION
VESSEL HEAD SPRAY FROM RHR SYSTEM
SEE NOTE #4
LINE IS PLUGGED PER EDP-10742
PEDESTAL PENT.
TO DRYWELL EQUIP. DRAIN SUMP
SPARE
TEST CONNECTION
TO DRYWELL EQUIP. SUMP (CRW)
FEEDWATER
FEEDWATER
CORE SPRAY
CORE SPRAY
NOZZLE
CAPPED
REACTOR VESSEL
STEAM LINE "A"
STEAM LINE "B"
STEAM LINE "C"
STEAM LINE "D"
TYPICAL
DEBRIS SCREEN (TYP FOR 15)



NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808.
2. THE CODE INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5701.
4. VALVES B22F403 AND F404, ASSOCIATED COMPONENTS, VARIES & CABLES MAY BE DE-ENERGIZED, SPARES AND ABANDONED IN PLACE.
5. VALVES B22F380A-E FAIL OPEN (FO) ON LOSS OF AIR AND FAIL CLOSE (FC) ON LOSS OF ELECTRICAL POWER.

ANSTEC APERTURE CARD

Also Available on Aperture Card

TABLE I

STEAM LINE NUMBER	TRANSMITTER NUMBER	TRIP UNIT NUMBER	TRIP UNIT LOCATION
STEAM LINE "A"	PSXE-B21-N086A	PSXS-B21-N086A	H21-P084
	PSXE-B21-N086B	-N086B	H21-P086
	PSXE-B21-N086C	-N086C	H21-P085
	PSXE-B21-N086D	-N086D	H21-P087
STEAM LINE "B"	PSXE-B21-N087A	-N087A	H21-P084
	PSXE-B21-N087B	-N087B	H21-P086
	PSXE-B21-N087C	-N087C	H21-P085
	PSXE-B21-N087D	-N087D	H21-P087
STEAM LINE "C"	PSXE-B21-N088A	-N088A	H21-P084
	PSXE-B21-N088B	-N088B	H21-P086
	PSXE-B21-N088C	-N088C	H21-P085
	PSXE-B21-N088D	-N088D	H21-P087
STEAM LINE "D"	PSXE-B21-N089A	-N089A	H21-P084
	PSXE-B21-N089B	-N089B	H21-P086
	PSXE-B21-N089C	-N089C	H21-P085
	PSXE-B21-N089D	-N089D	H21-P087

6M721-5808-1
LATEST REVISION 1

9412300121-02

THIS IS AN AUTOCAD PRODUCED DRAWING. CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED.

NUCLEAR SAFETY RELATED

DCD'S INCORPORATED
ABN-26373-1, REV. 0

OTHER REVISIONS

INC CODE: S

Detroit Edison — Fermi 2

ISI BOUDARY CLASSIFICATION DRAWING
NUCEAR BOILER SYSTEM
ISI-B21-1

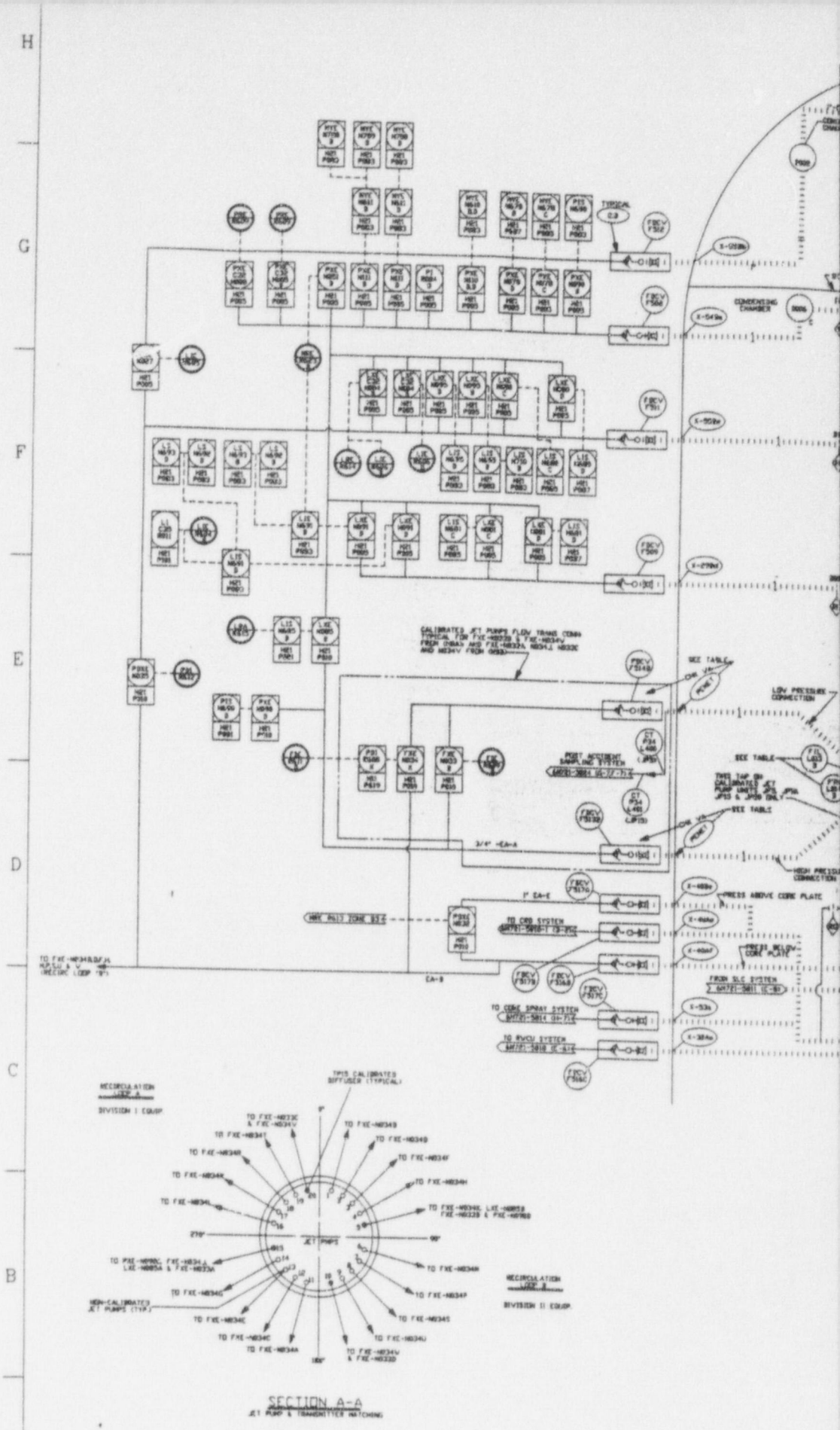
NUCLEAR BOILER SYSTEM ISI

B21100

DOCUMENT TYPE CODE: DODMEC

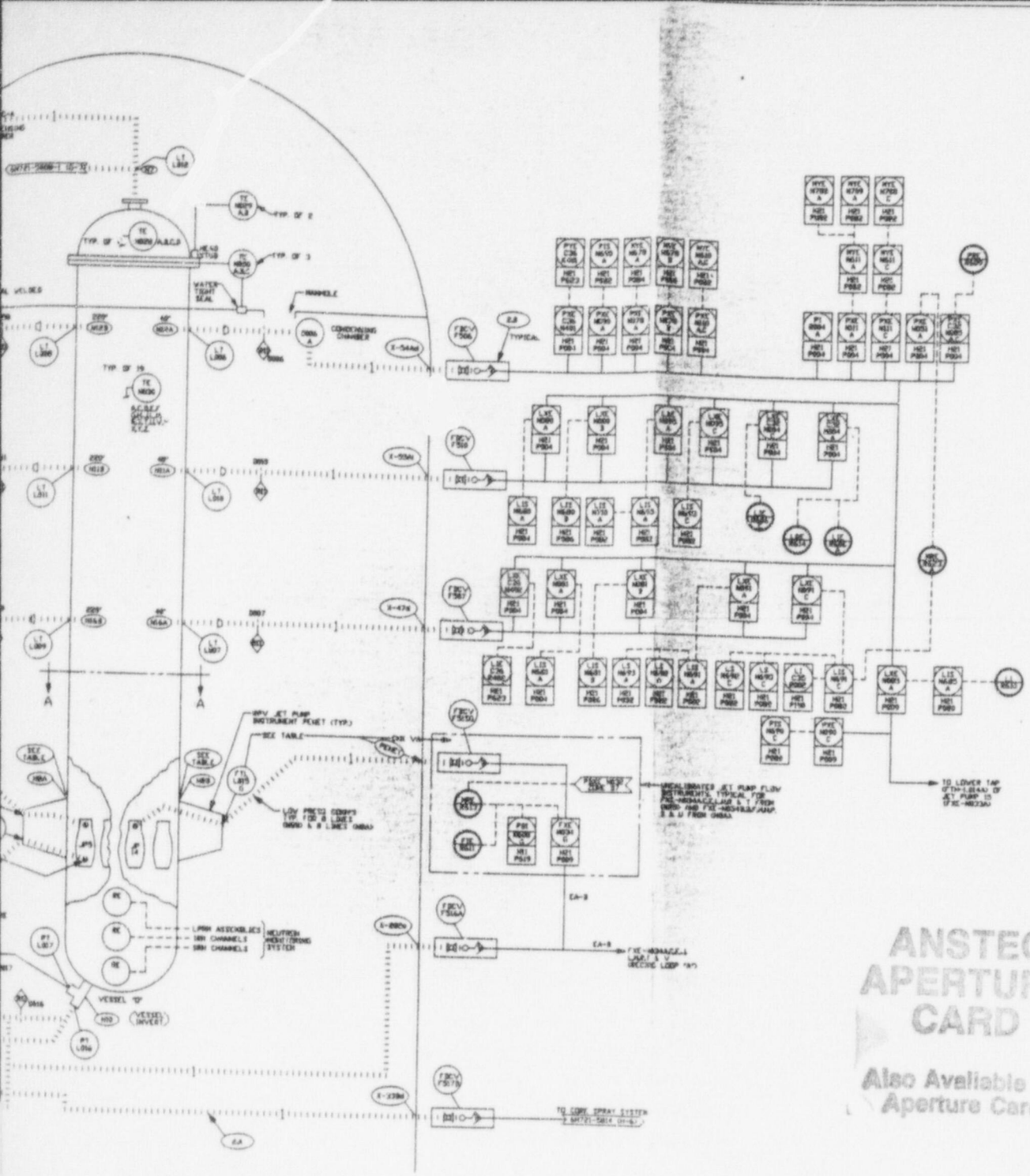
DRAWING NUMBER: 6M721-5808-1

REV: 1


CONDENSING CHAMBER
CALIBRATES JET PUMPS FLOW TRANS CONN TYPICAL FOR FXE-N033B & FXE-N034V FROM (N0A3) AND FXE-N033A N034J, N033C AND N034V FROM (N0B3)
SEE TABLE
LOW PRESSURE CONNECTION
POST ACCIDENT SAMPLING SYSTEM
HIGH PRESSURE CONNECTION
PRESS ABOVE CORE PLATE
PRESS BELOW CORE PLATE
TO CRD SYSTEM
TO CORE SPRAY SYSTEM
TO RWCU SYSTEM
FROM SLC SYSTEM
TO FXE-N034B/D/A N034J & V (RECIRC LOOP "B")
TYPICAL
RECIRCULATION LOOP A
DIVISION I EQUIP
TPIS CALIBRATES DIFFUSER (TYPICAL)
JET PUMPS
RECIRCULATION LOOP B
DIVISION II EQUIP
NON-CALIBRATED JET PUMPS (TYP)
SECTION A-A
JET PUMP & TRANSMITTER MATCHING

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5701-2.



ANSTEC APERTURE CARD

Also Available on Aperture Card

JET PUMP INFORMATION

LOOP "B"

JET PUMP	NOZZLE SIZE	FLOW TAP	PENET.	EXCESS FLOW CHECK VA
JP1	NB8K	FIX-LB5B	X-48C6	FS13B
JP2	NB8K	FIX-LB5D	X-48C8	FS13D
JP3	NB8K	FIX-LB5F	X-48A	FS13F
JP4	NB8K	FIX-LB5H	X-48C	FS13H
JP5	NB8K	FIX-LB3B	X-48C7	FS14B
JP6	NB8K	FIX-LB4B	X-48C9	FS13B
JP7	NB8K	FIX-LB5J	X-48A	FS13J
JP8	NB8K	FIX-LB5L	X-48C	FS13L
JP9	NB8K	FIX-LB5N	X-48C2	FS13N
JP10	NB8K	FIX-LB5P	X-48C4	FS13P
JP11	NB8K	FIX-LB5R	X-48C6	FS13R
JP12	NB8K	FIX-LB5T	X-48C8	FS13T
JP13	NB8K	FIX-LB4C	X-48C	FS14C
JP14	NB8K	FIX-LB3C	X-48C4	FS13C

LOOP "A"

JET PUMP	NOZZLE SIZE	FLOW TAP	PENET.	EXCESS FLOW CHECK VA
JP11	NB8K	FIX-LB5A	X-48C9	FS13A
JP12	NB8K	FIX-LB5C	X-48B	FS13C
JP13	NB8K	FIX-LB5E	X-48C	FS13E
JP14	NB8K	FIX-LB5G	X-48C2	FS13G
JP15	NB8K	FIX-LB4A	X-48C7	FS14A
JP16	NB8K	FIX-LB4A	X-48C7	FS13A
JP15	NB8K	FIX-LB3A	X-48C7	FS14A
JP16	NB8K	FIX-LB3A	X-48C9	FS13A
JP15	NB8K	FIX-LB5K	X-48C	FS13K
JP16	NB8K	FIX-LB5M	X-48C2	FS13M
JP17	NB8K	FIX-LB5O	X-48C4	FS13O
JP18	NB8K	FIX-LB5Q	X-48C6	FS13Q
JP19	NB8K	FIX-LB5S	X-48C8	FS13S
JP20	NB8K	FIX-LB4C	X-48C	FS14C
JP20	NB8K	FIX-LB3C	X-48C4	FS13C

6M721-5808-2
LATEST REVISION A

9412300121-03

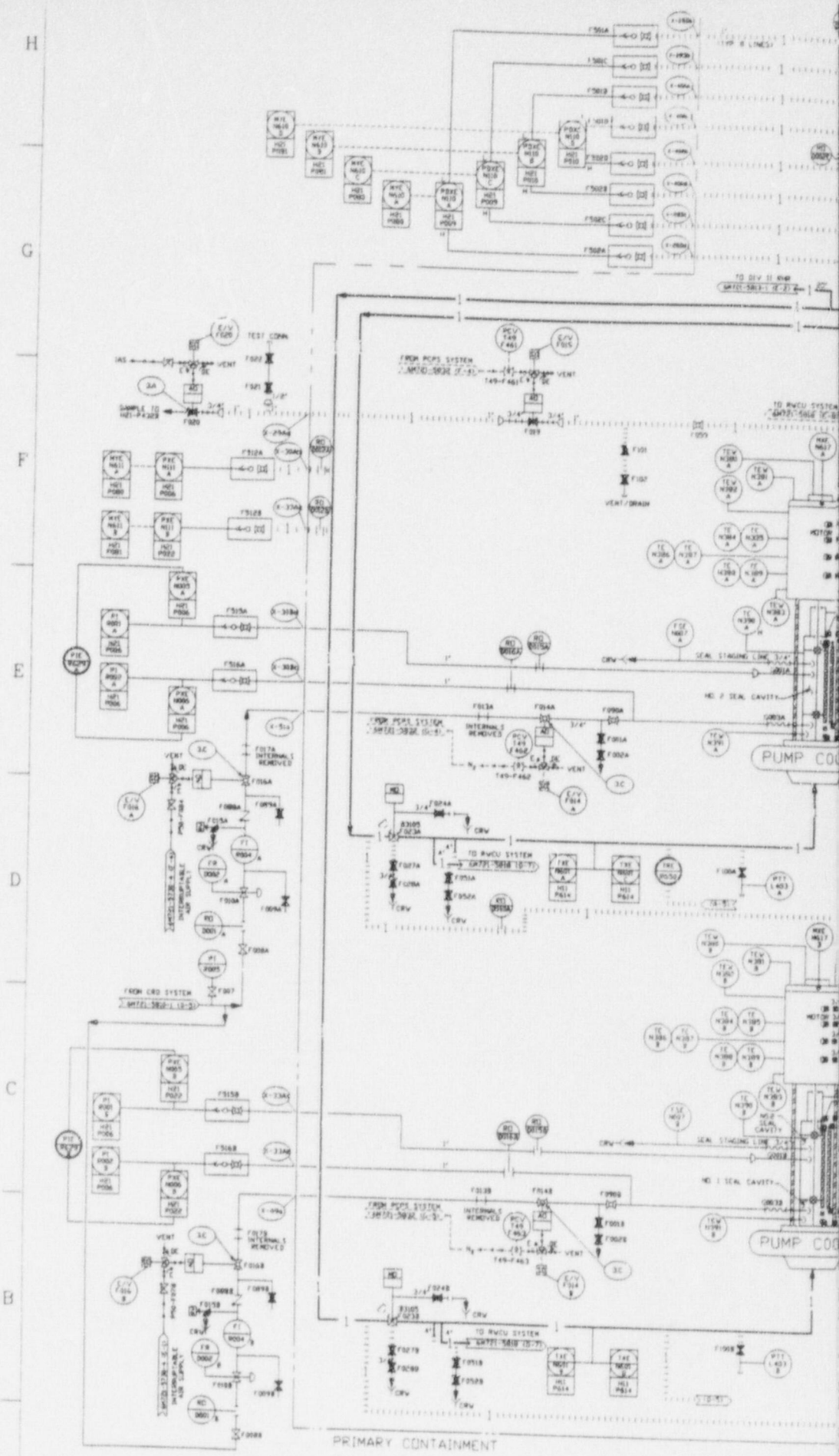
THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

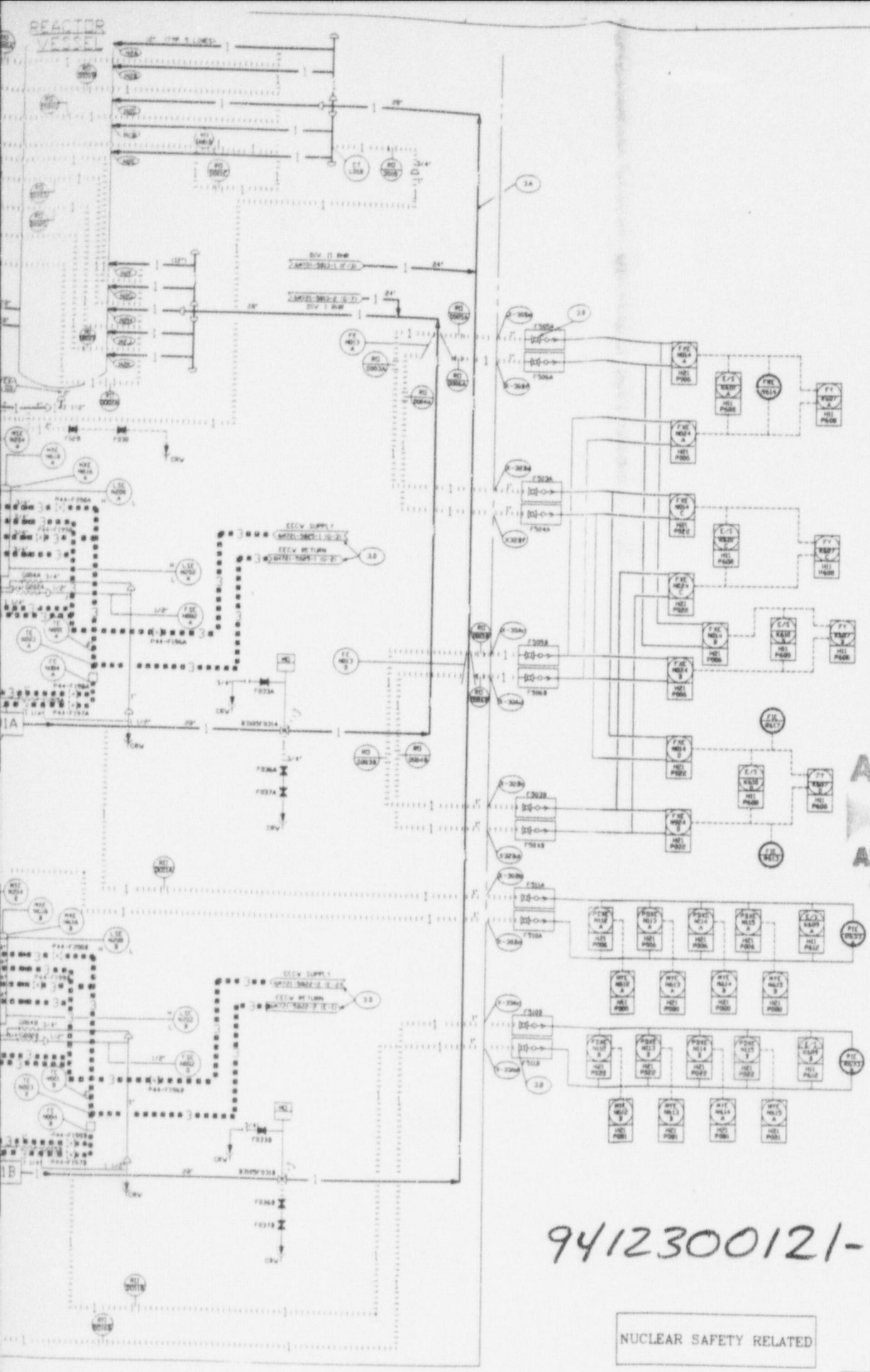
NUCLEAR SAFETY RELATED

DWG. CODE	S
	Detroit Edison Fermi 2
	ISI CLASSIFICATION BOUNDARY DRAWING NUCLEAR BOILER SYSTEM ISI-B21-2
	NUCLEAR BOILER SYSTEM ISI B21-00
	DDDMEC
	6M721-5808-2

A REVISE PER ABN-13204-1 REV.

5 4 3 2 1


PUMP COO
PUMP COO
PRIMARY CONTAINMENT



NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODE'S INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5807

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5809
LATEST REVISION D

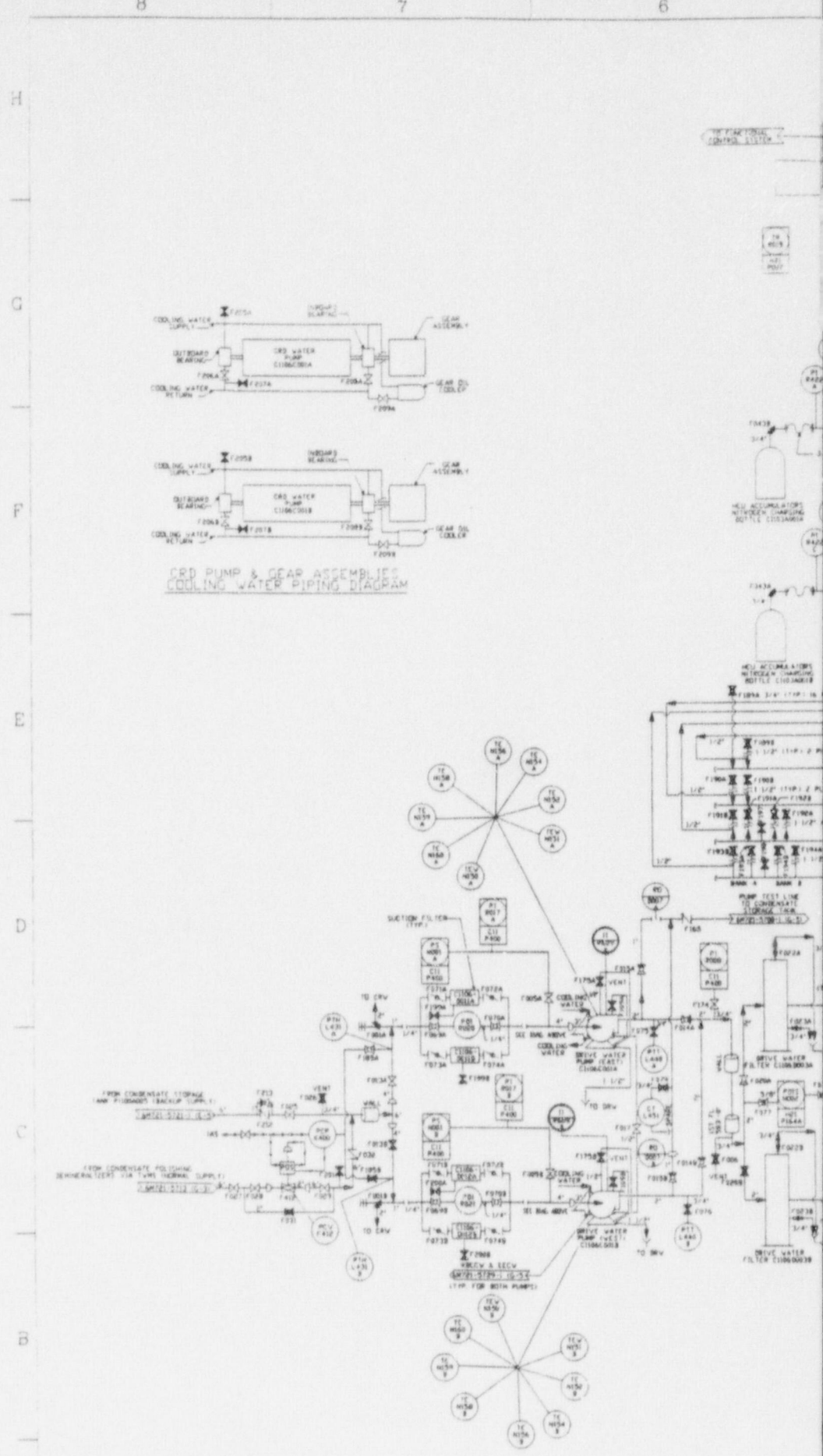
9412300121-04

NUCLEAR SAFETY RELATED

THIS IS AN AUTOCAD PRODUCED DRAWING. CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED.

D	DCD'S INCORPORATED EDP-13609 REV 0 NO ECR'S WRITTEN
	OTHER REVISIONS CORRECTED THE RESTRICTING ORIFICES SYMBOL (0) ALL OVER DWG TO MATCH M-2001
PREPARED BY	DATE
APPROVED BY	DATE
	DATE

INC. CODE	Detroit Edison Fermi 2
S	ISI CLASSIFICATION BOUNDARY DRAWING REACTOR RECIRCULATION SYSTEM NUCLEAR BOILER SYSTEM ISI-B31-1
	APERTURE CARD TITLE: REACTOR RECIRC/NUC BLR SYS ISI
	PLANT IDENTIFICATION SYSTEM NUMBER: B31-00
	DOCUMENT TYPE CODE: DDDMEC
	DATE: 11-15-93
	DRAWING NUMBER: 6M721-5809
	REV: D


8
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G
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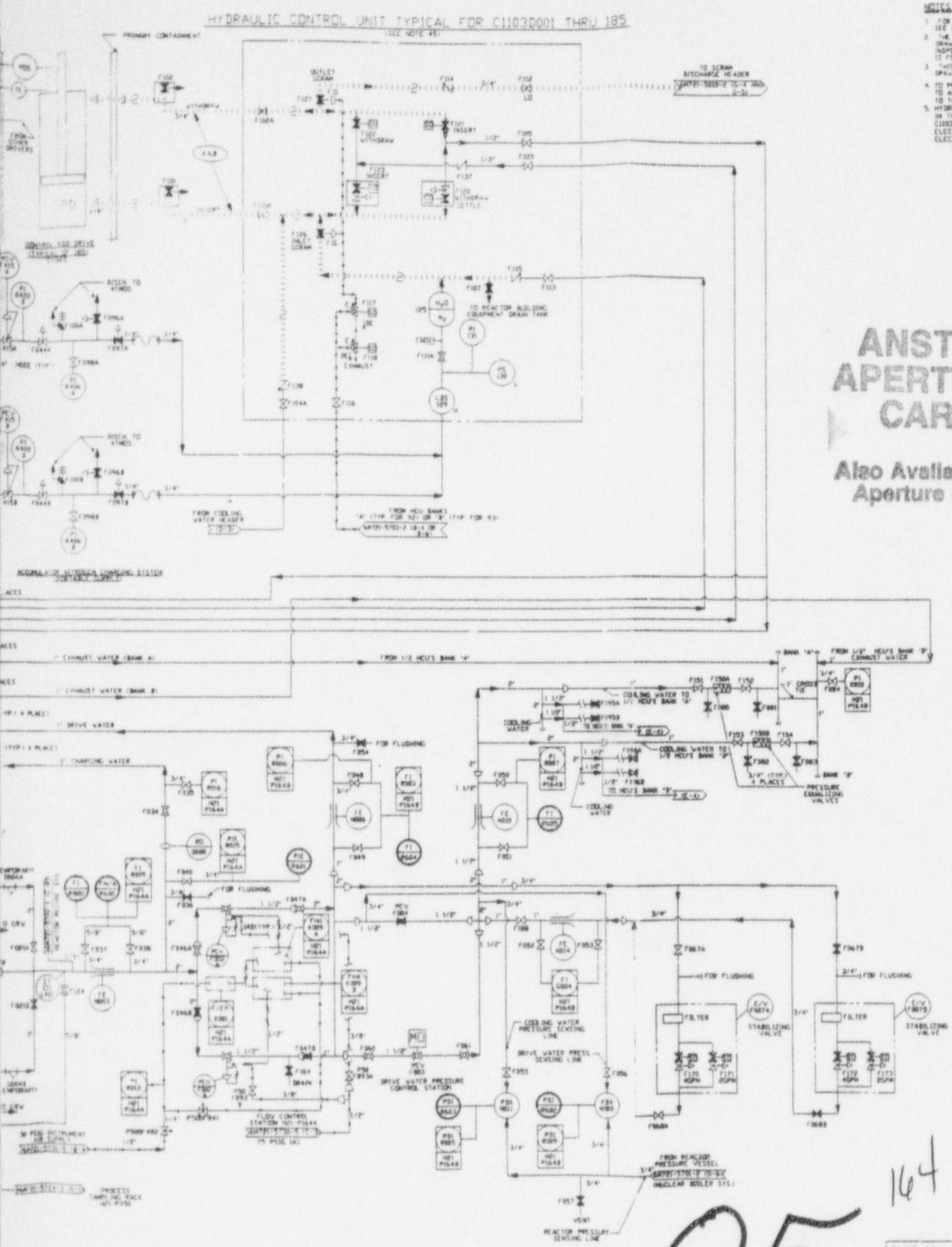
E
D
C
B
COOLING WATER SUPPLY
INBOARD BEARING
GEAR ASSEMBLY
OUTBOARD BEARING
CRD WATER PUMP C1106C001A
COOLING WATER RETURN
GEAR OIL COOLER
CRD WATER PUMP C1106C001B
CRD PUMP & GEAR ASSEMBLIES
COOLING WATER PIPING DIAGRAM
HCU ACCUMULATORS NITROGEN CHARGING BOTTLE C1103A001A
HCU ACCUMULATORS NITROGEN CHARGING BOTTLE C1103A001B
PUMP TEST LINE TO CONDENSATE STORAGE TANK
SUCTION FILTER (TYP.)
TO CRW
COOLING WATER
DRIVE WATER PUMP (EAST) C1106C001A
DRIVE WATER FILTER C1106C003A
FROM CONDENSATE STORAGE TANK P1100A005 (BACKUP SUPPLY)
FROM CONDENSATE POLISHING DEMINERALIZERS VIA TWMS (NORMAL SUPPLY)
DRIVE WATER PUMP (WEST) C1106C001B
DRIVE WATER FILTER C1106C003B
TO DRW
RBCCW & EECW
(TYP. FOR BOTH PUMPS)



NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5703-1
4. TO PREVENT WATER STAGNATION, VALVE F213 WILL BE OPENED TO ALLOW A BY-PASS FLOW OF APPROXIMATELY 20 GPM BACK TO THE CST
5. HYDRAULIC CONTROL UNIT VALVES ARE TAGGED C11-F4XX IN THE FIELD BUT EXIST IN CECO AS SUBCOMPONENTS OF C1103D001 THRU 185 AND ARE IDENTIFIED BY GENERAL ELECTRIC "EP" NUMBERS. SEE P & ID M-2081 FOR GENERAL ELECTRIC "EP" NUMBERS

ANSTEC APERTURE CARD

Also Available on Aperture Card

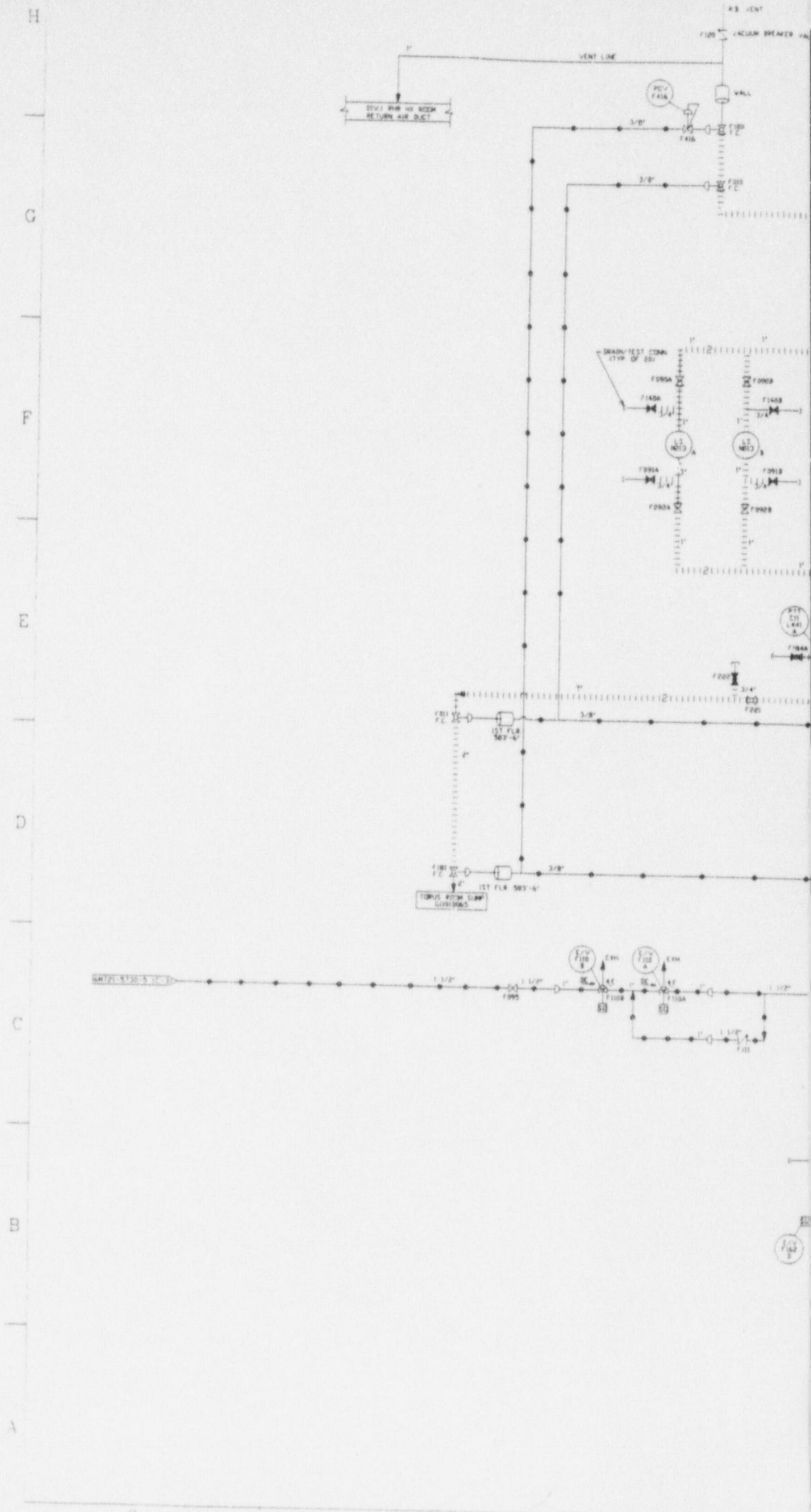
6M721-5810-1
D

164

9412300121-05

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

DIC CODE S	Detroit Edison Fermi 2
	ISI CLASSIFICATION BOUNDARY DRAWING CONTROL ROD DRIVE ISI-C11-1
	CONTROL ROD DRIVE SYSTEM ISI
	C11-50
	DDDMEC
	6M721-5810-1



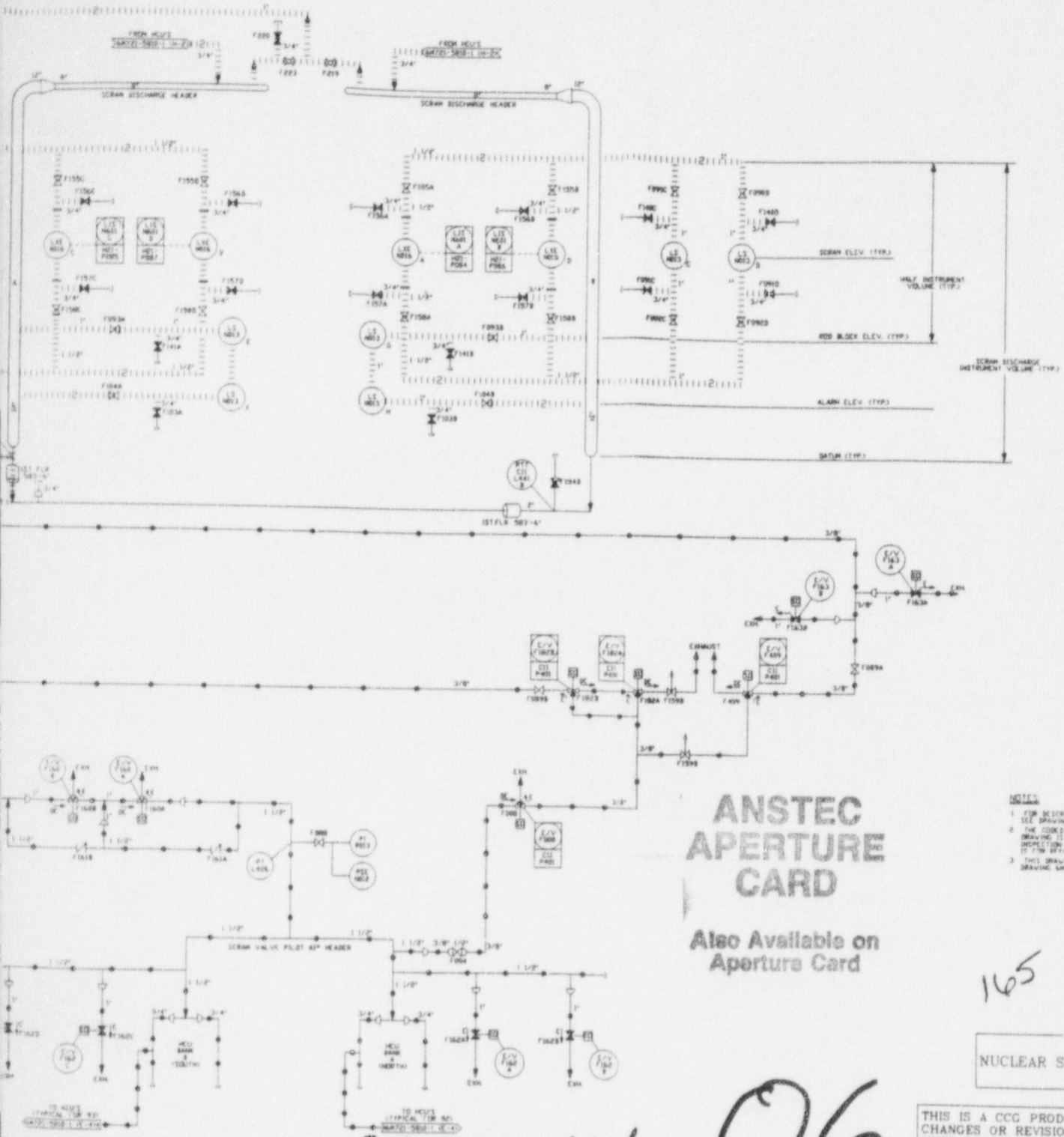
H
G
F
E
D
C
B
A
VENT LINE
WALL
DIV.1 RHR HX ROOM
RETURN AIR DUCT
DRAIN/TEST CONN
(TYP OF 20)
1ST FLR
583'-6"
TORUS ROOM SUMP

OPEN CHANGE PAPER

DTC: DDDMEC DSN: M-5810-2 REV: C

DTC	DSN	REV	STAT	ASB/ISS	DAT
TCEDP	13368	0	AFC	93/02/24	

1 TC's Against M-5810-2



ANSTEC APERTURE CARD

Also Available on Aperture Card

NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5800
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5703-2

165

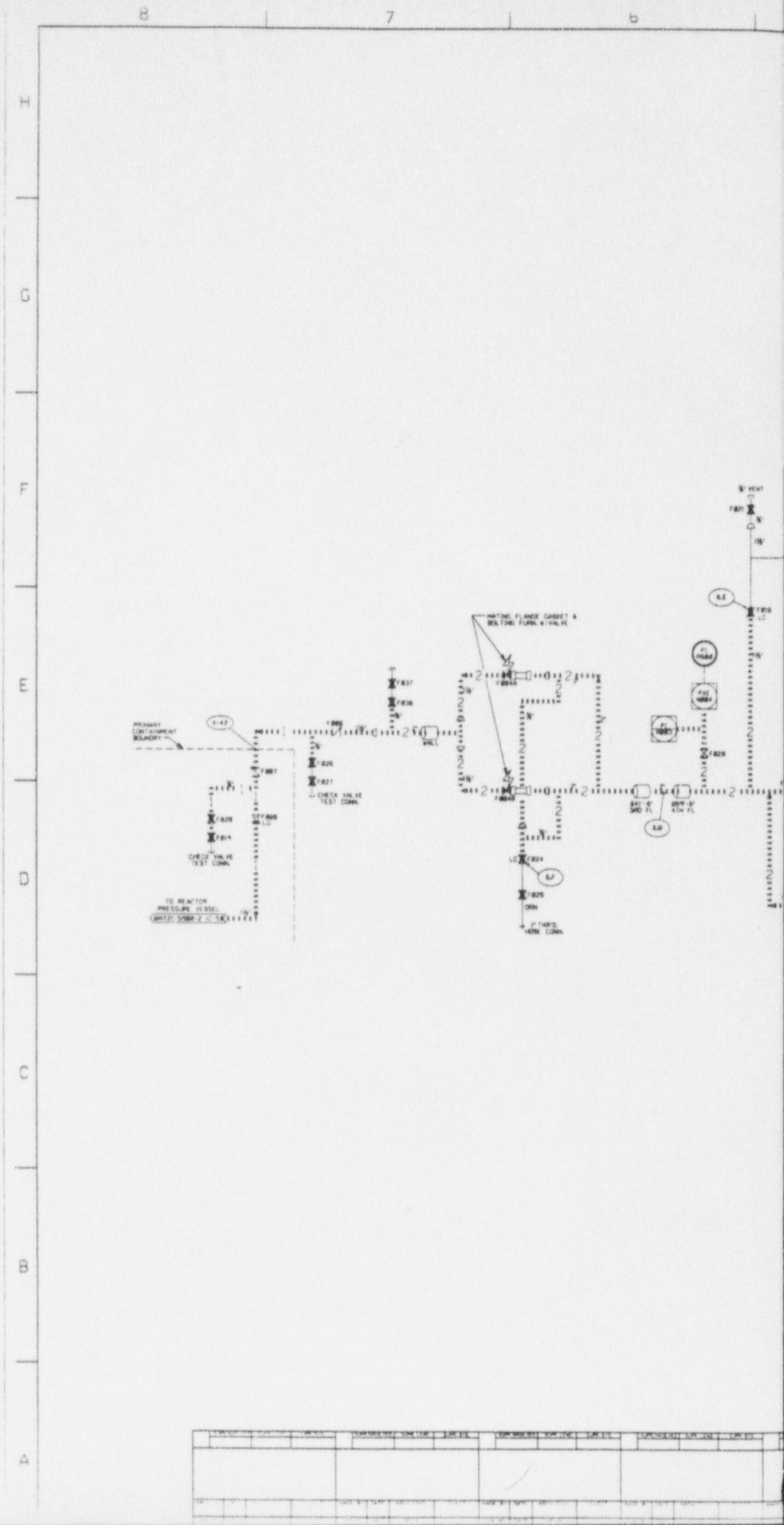
6M721-5810-2
LATEST REVISION C

NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

9412300121-06

DWG CODE	S
Detroit Edison	Fermi 2
ISI CLASSIFICATION BOUNDARY DRAWING CRD SCRAM DISCHARGE SYSTEM ISI-C11-2	
CRD SCRAM DISCHARGE SYS ISI	
C11-00	
DDDMEC	
6M721-5810-2	



8
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H
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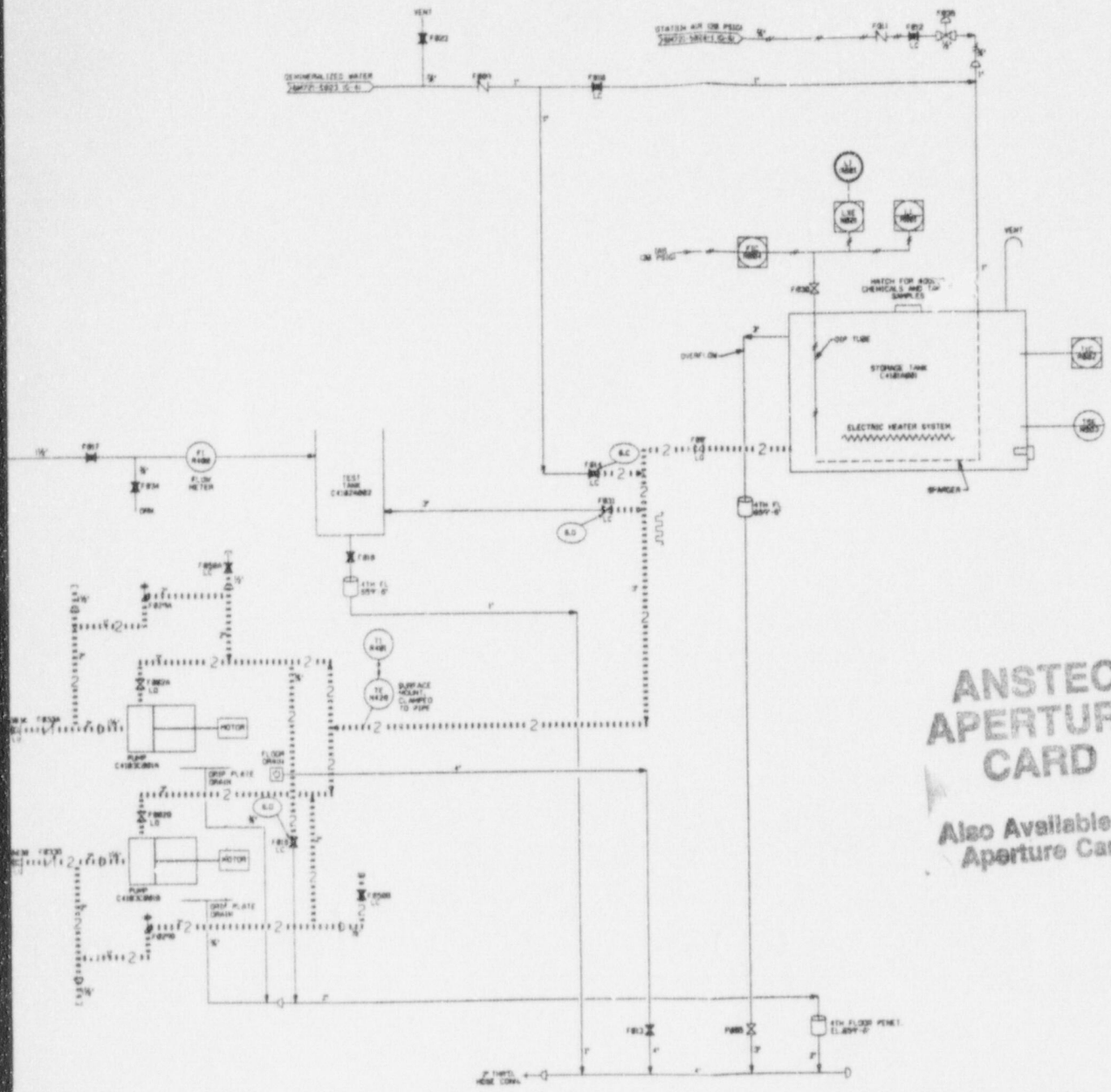
D
C
B
A
PRIMARY CONTAINMENT BOUNDRY
X-42
F807
F820
F819
CHECK VALVE TEST CONN.
TO REACTOR PRESSURE VESSEL
F826
F827
CHECK VALVE TEST CONN.
F837
F836
WALL
MATING FLANGE GASKET & BOLTING FURN. W/VALVE
F824
F825
DRN
1" THRD. HOSE CONN.
F828
F821
VENT

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5881.
2. THE CODES INFORMATION SHOWN ON THIS DRAWING IS OFFERED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5784.



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5811
LATEST REVISION "0"

9412300121-07 166

THIS IS AN IGDS PRODUCED DRAWING. ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE IGDS COORDINATOR TO ENSURE THAT THE IGDS FILE IS UPDATED

NUCLEAR SAFETY RELATED

THE FOLLOWING CHANGE PAPERS ARE STATUSED NFC AND MUST BE INCORPORATED ON THIS DRAWING WHEN THEY BECOME "NSR STATUS: EOP 082".

A PORTION OF THIS DRAWING IS AFFECTED BY THE FOLLOWING

TO	CHANGE DOCUMENT	TO	CHANGE DOCUMENT

WORK CHANGES	DATE	DISCIPLINE	APPROVAL	DATE
		MECH. STRUC.		
		ELECTRICAL		
		MECH.		

PREPARED BY		DATE
DESIGN BY		DATE
CHECKED BY		DATE
REVIEWED BY		DATE
PROJECT ENGINEER		DATE
PROJECT SUPERVISOR		DATE

INC. LOGS: S

Detroit Edison — Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
STANDBY LIQUID CONTROL SYSTEM
ISI-C41-1

STANDBY LIQUID CONTR SYS. ISI-2
C41-00

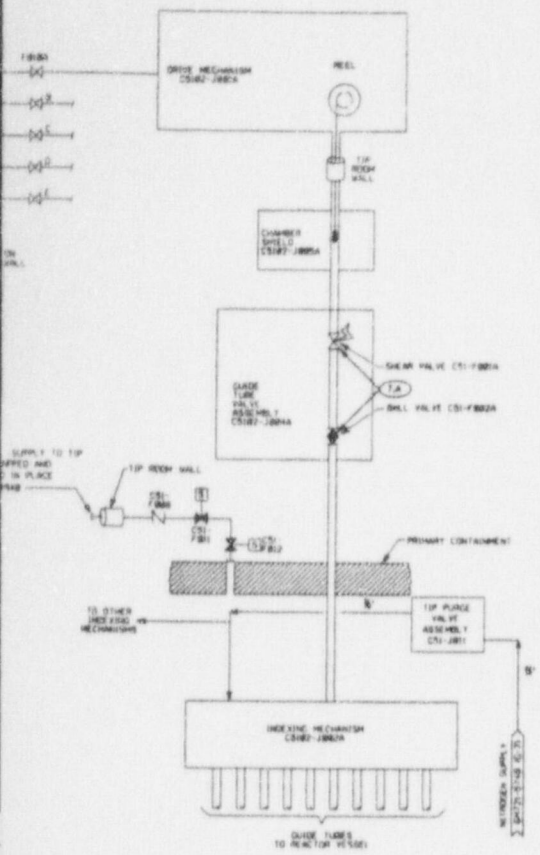
GOOMEC

GAS HEADER AND BRANCH ROUTING
HEADER
TIP ROUT
FORMER
SYSTEM
ABANDON
PER EOP

5 4 3 2 1

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5800.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5785.



TIP CHANNEL A

(TYPICAL FOR CHANNELS B THRU E)

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5812
LATEST REVISION "A"

9412300121-08 167

THIS IS AN IGDS PRODUCED DRAWING. ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE IGDS COORDINATOR TO ENSURE THAT THE IGDS FILE IS UPDATED.

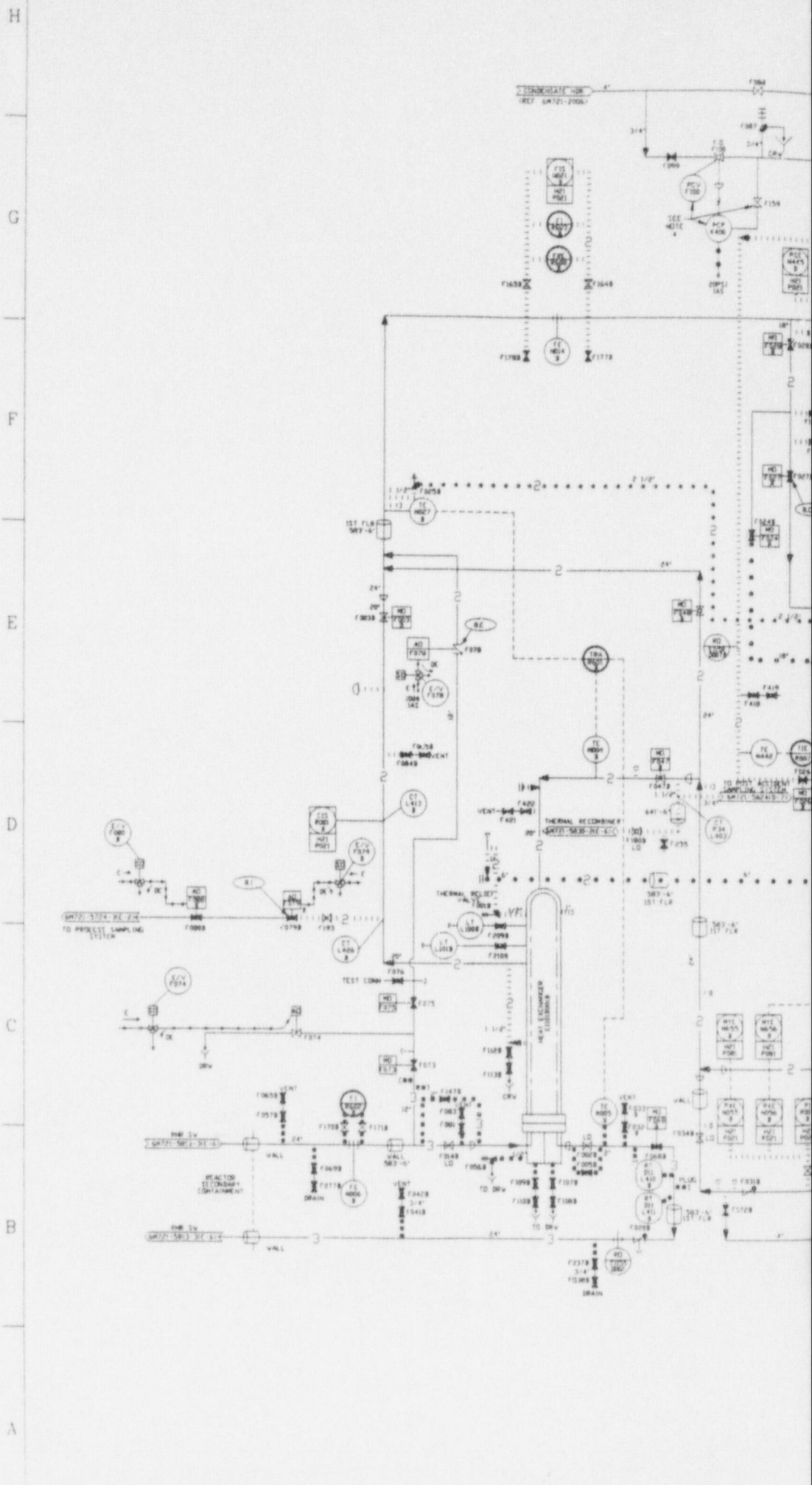
NUCLEAR SAFETY RELATED

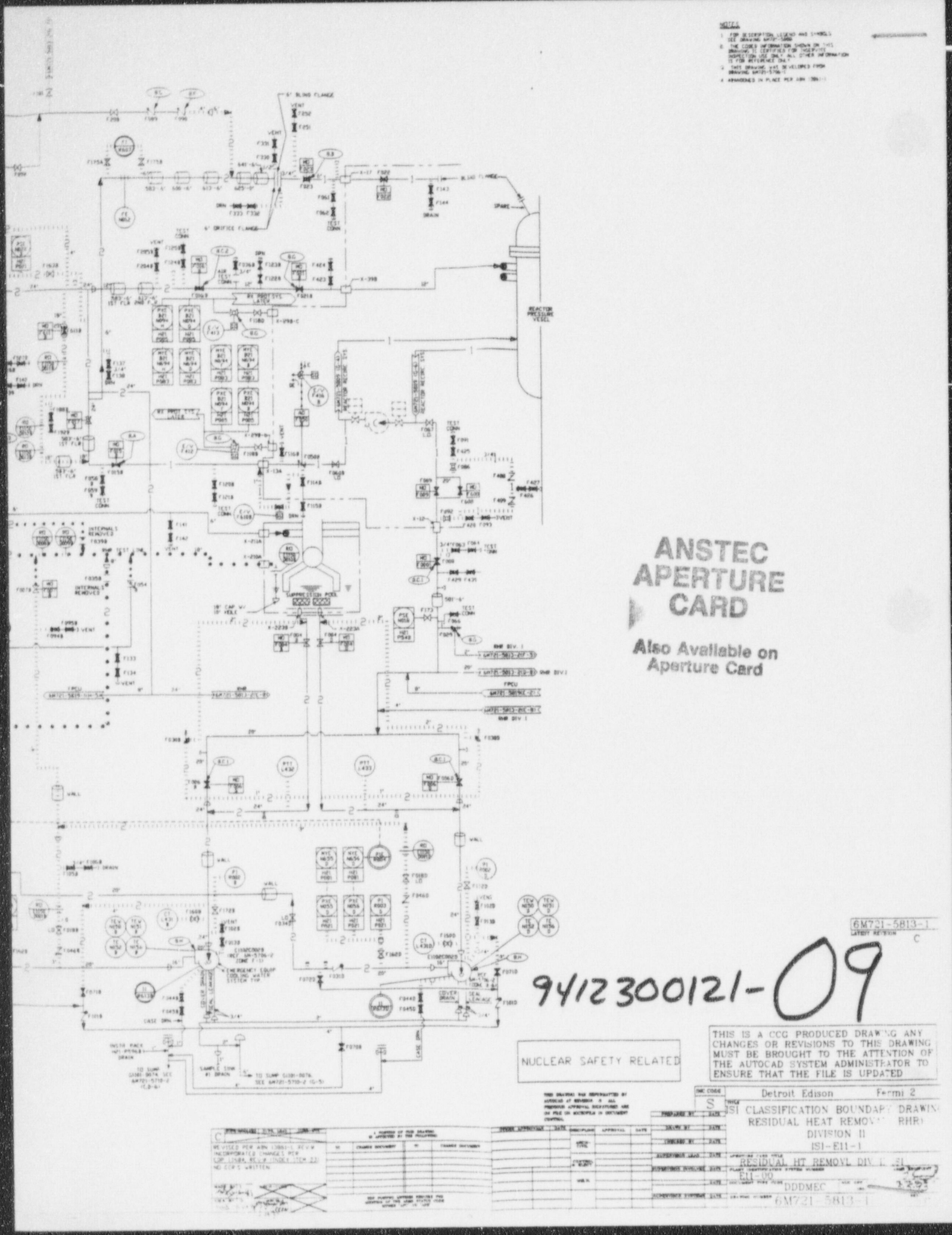
"THE FOLLOWING CHANGE PAPERS ARE STATUSED 'AFC' AND MUST BE INCORPORATED ON THIS DRAWING WHEN THEY BECOME 'ASB' STATUS: EDP-4948.

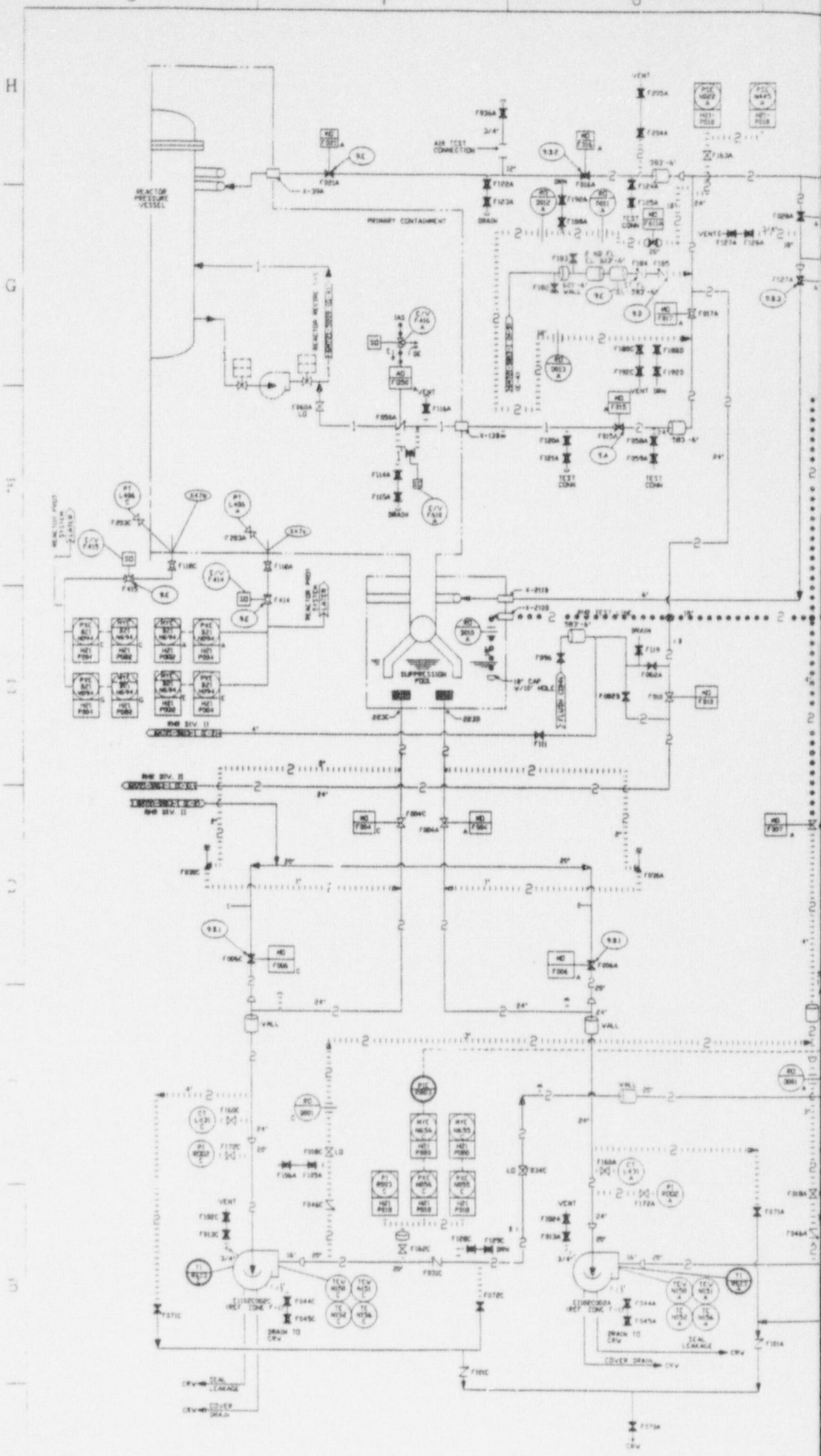
INC. CODE	S
	Detroit Edison Fermi 2
TITLE	ISI CLASSIFICATION BOUNDARY DRAWING TRAVERSING INCORE PROBE SYSTEM ISI-C51-1
	TRAVERS INCOR PROBE SYS. ISI
PLANT IDENTIFICATION SYSTEM NUMBER	C51-01
DOCUMENT TYPE CODE	DOOMEC
DRAWING NUMBER	6M721-5812
	A

A — INCORPORATED EDP 4948 REV & ECR DOES NOT APPLY.

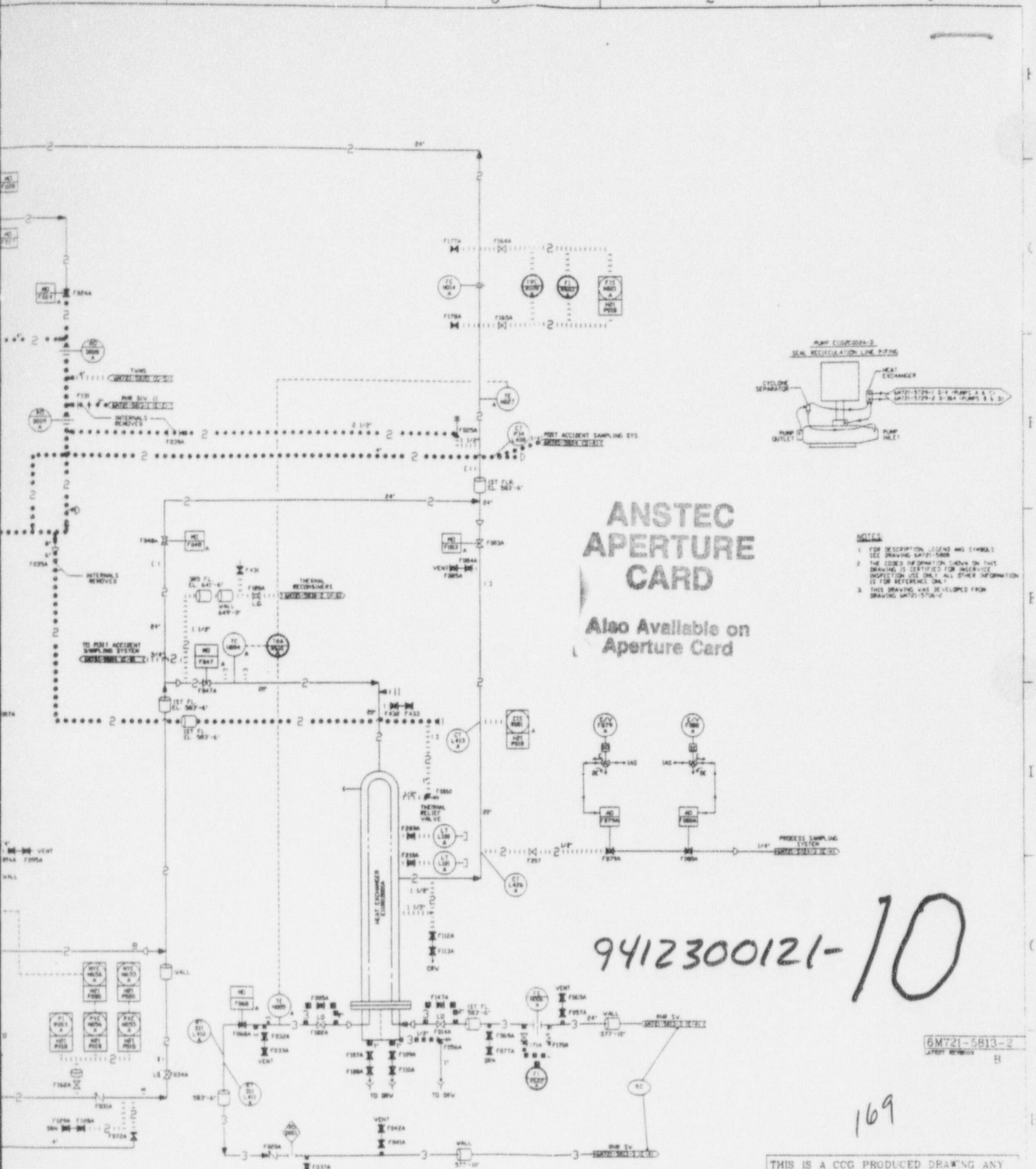
K. KRYNOCK
L. MITCHELL
R. MCMORLAND


H
G
F
E
D
C
B
A
CONDENSATE HDR
THERMAL RECOMBINER
HEAT EXCHANGER
TO PROCESS SAMPLING SYSTEM
TEST CONN
REACTOR SECONDARY CONTAINMENT
WALL
DRAIN
TO DRW
VENT
1ST FLR
SEE NOTE 4
20PSI IAS


NOTES
1 FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5800
2 THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY
3 THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5706-1
4 ABANDONED IN PLACE PER ABN 13861-1
REACTOR PRESSURE VESSEL
SUPPRESSION POOL
ANSTEC APERTURE CARD
Also Available on Aperture Card
6M721-5813-1
LATEST REVISION C
9412300121-09
NUCLEAR SAFETY RELATED
THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED
Detroit Edison
Fermi 2
ISI CLASSIFICATION BOUNDARY DRAWING
RESIDUAL HEAT REMOVAL (RHR)
DIVISION II
ISI-E11-1
RESIDUAL HT REMOVL DIV II ISI
E11-00
DDDMEC
6M721-5813-1



REACTOR PRESSURE VESSEL
PRIMARY CONTAINMENT
SUPPRESSION POOL
AIR TEST CONNECTION
DRAIN
VENT
TEST CONN
WALL
RHR DIV. II
DRAIN TO CRW
SEAL LEAKAGE
COVER DRAIN
CRW



ANSTEC APERTURE CARD

Also Available on Aperture Card

9412300121-10

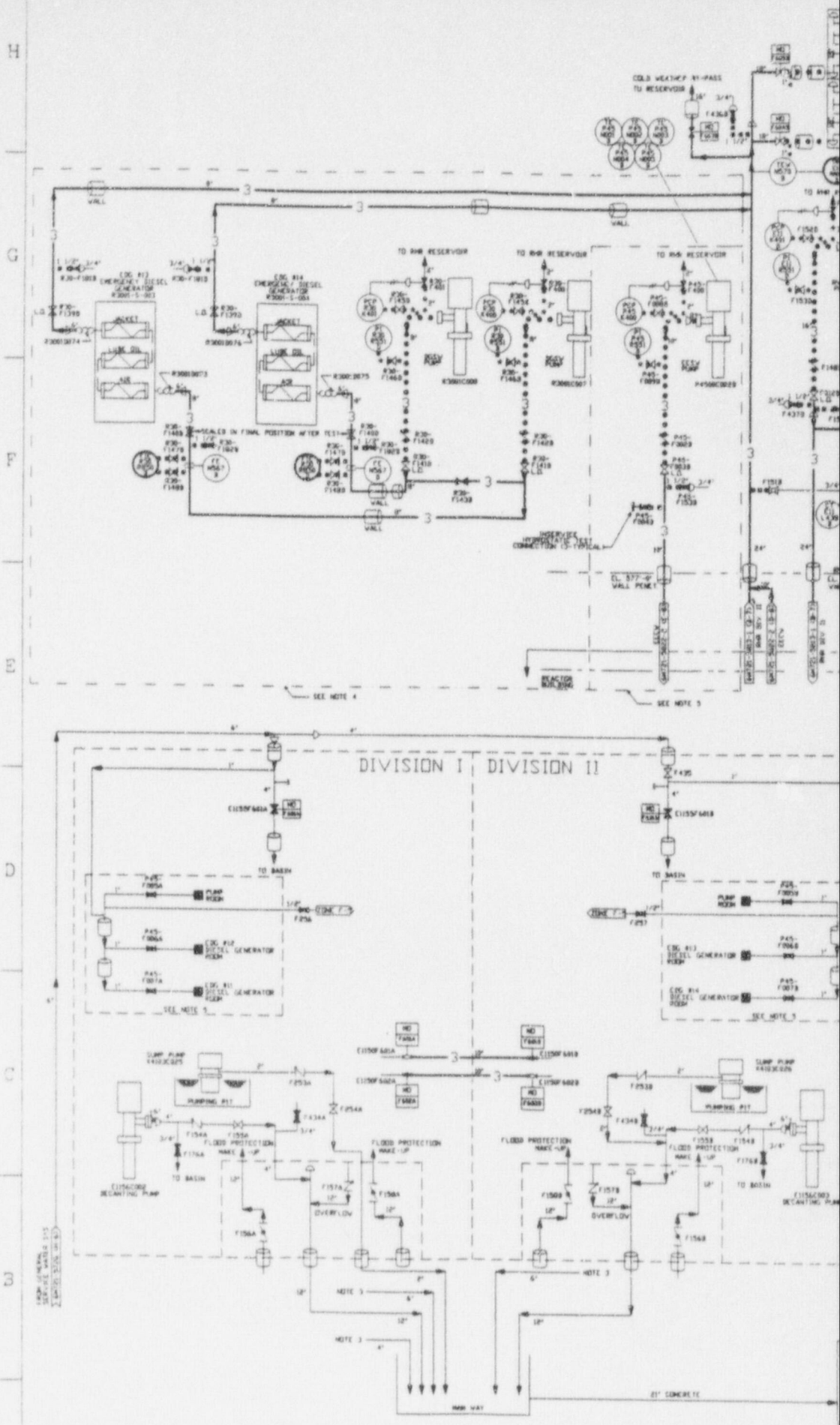
6M721-5813-2
LATEST REVISION B

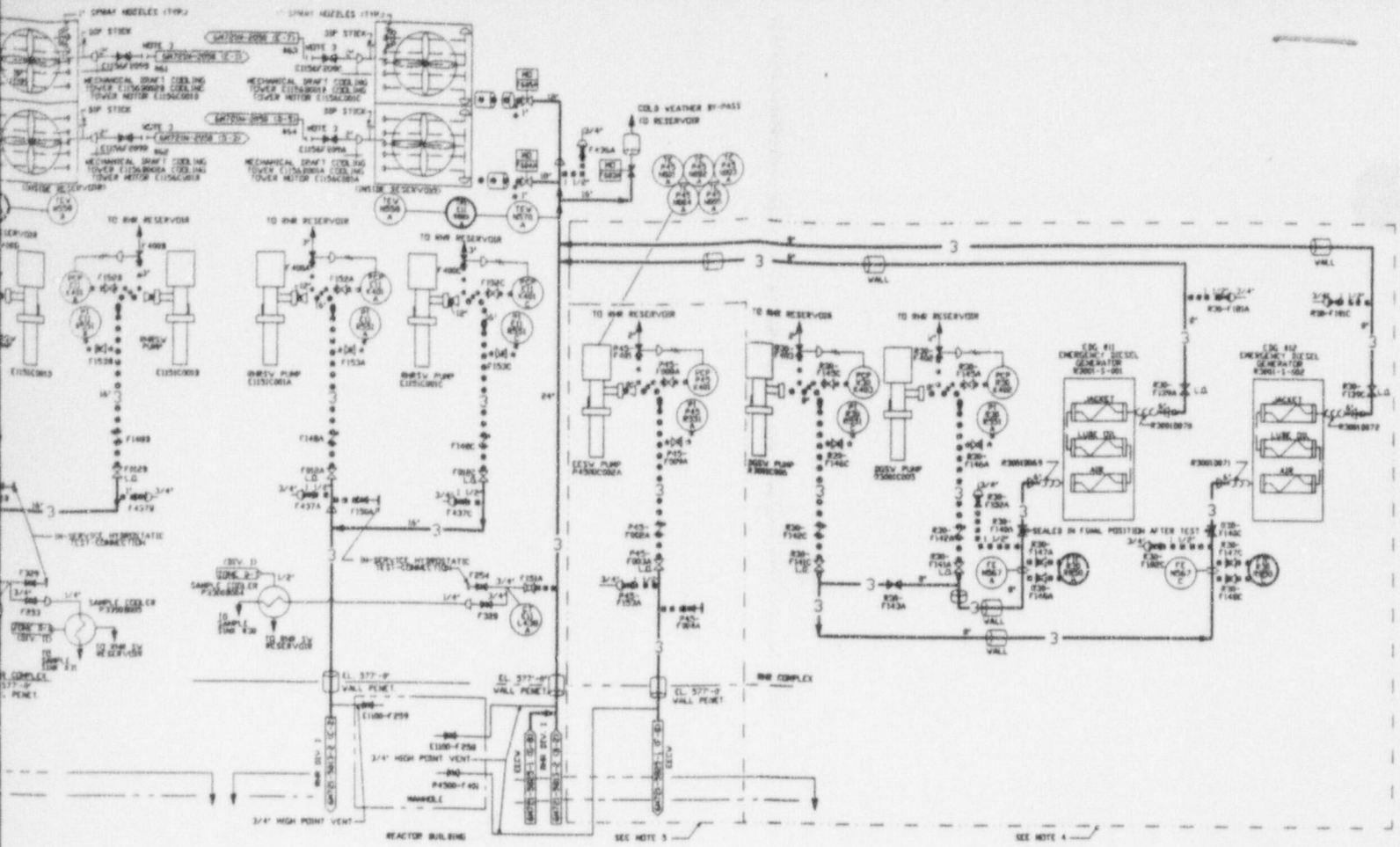
169

NUCLEAR SAFETY RELATED

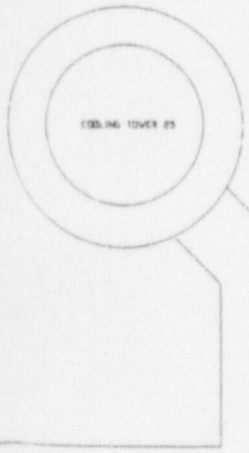
THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

INC CODE	S
Detroit Edison	Fermi 2
ISI CLASSIFICATION BOUNDRY DRAWING RESIDUAL HEAT REMOVAL (R.H.R.) DIVISION 1 ISI-E11-2	
APERTURE CARD TITLE	RESIDUAL HT REMOVAL DIV
PLANT IDENTIFICATION SYSTEM NUMBER	E11-02
DRAWING TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5813-2


COLD WEATHER BY-PASS TO RESERVOIR
TO RHR RESERVOIR
EMERGENCY DIESEL GENERATOR
SEALED IN FINAL POSITION AFTER TEST
INSERVICE HYDROSTATIC TEST CONNECTION (3" TYPICAL)
SEE NOTE 4
SEE NOTE 5
DIVISION I
DIVISION II
TO BASIN
SEE NOTE 1
SEE NOTE 3
SUMP PUMP
PUMPING #17
FLOOD PROTECTION MAKE-UP
OVERFLOW
DECANTING PUMP
NOTE 3
MAIN WAY
21" CONCRETE



RHR COMPLEX



NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5806.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. TO OR FROM RHR COMPLEX FLOOR & EQUIP. DRAING.
4. ALL VALVES WITHIN THIS BOUNDARY ARE OF THE R30 SYSTEM.
5. ALL VALVES WITHIN THIS BOUNDARY ARE OF THE P45 SYSTEM.
6. THE OPEN/CLOSE STATUS OF VALVES E11SF606A AND E11SF608B RESPECTIVELY, AND E11SF608B AND E11SF606A RESPECTIVELY, MAY BE THE OPPOSITE AS SHOWN ON THIS DRAWING. THE OPEN/CLOSED STATUS OF EACH PAIR OF CROSS-TIE VALVES WILL BE PERIODICALLY REVERSED FOR PREVENTIVE MAINTENANCE. FOR EXACT INDICATION OF THESE VALVES CONTACT OPERATIONS.

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5813-3
LATEST REVISION A

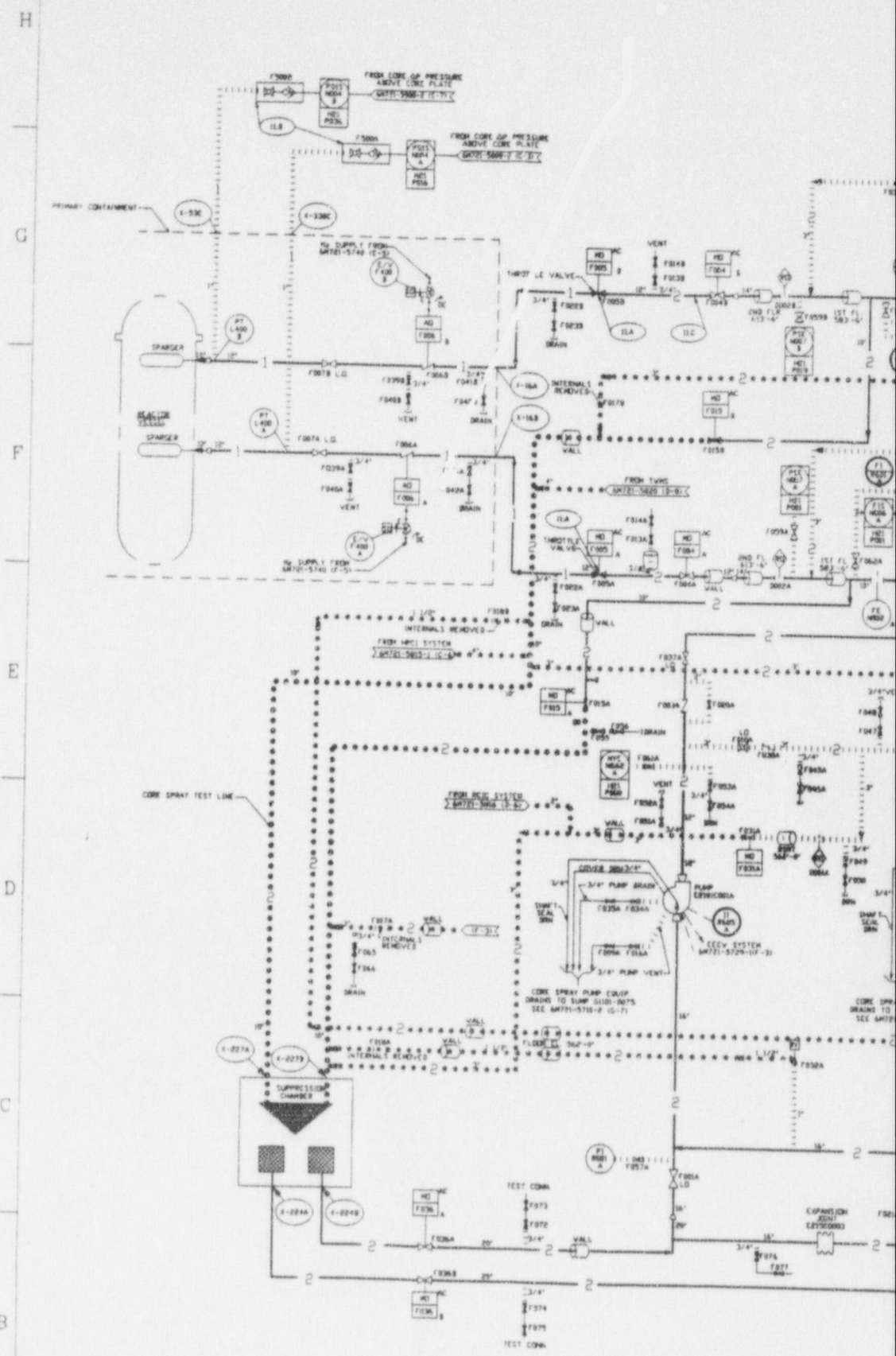
9412300121-11

NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

DOC. CODE	S
Detroit Edison	Fermi 2
TITLE	ISI CLASSIFICATION BOUNDARY DRAWING RHR SERVICE WATER MAKE UP DECANT AND OVERFLOW SYSTEMS ISI-E11-3
APPROVED CLASS TITLE	RHR SERV WTR MAKUP DECANT
PLANT DESIGNATION SYSTEM NUMBER	E11-00
DOCUMENT TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5813-3
REV	A

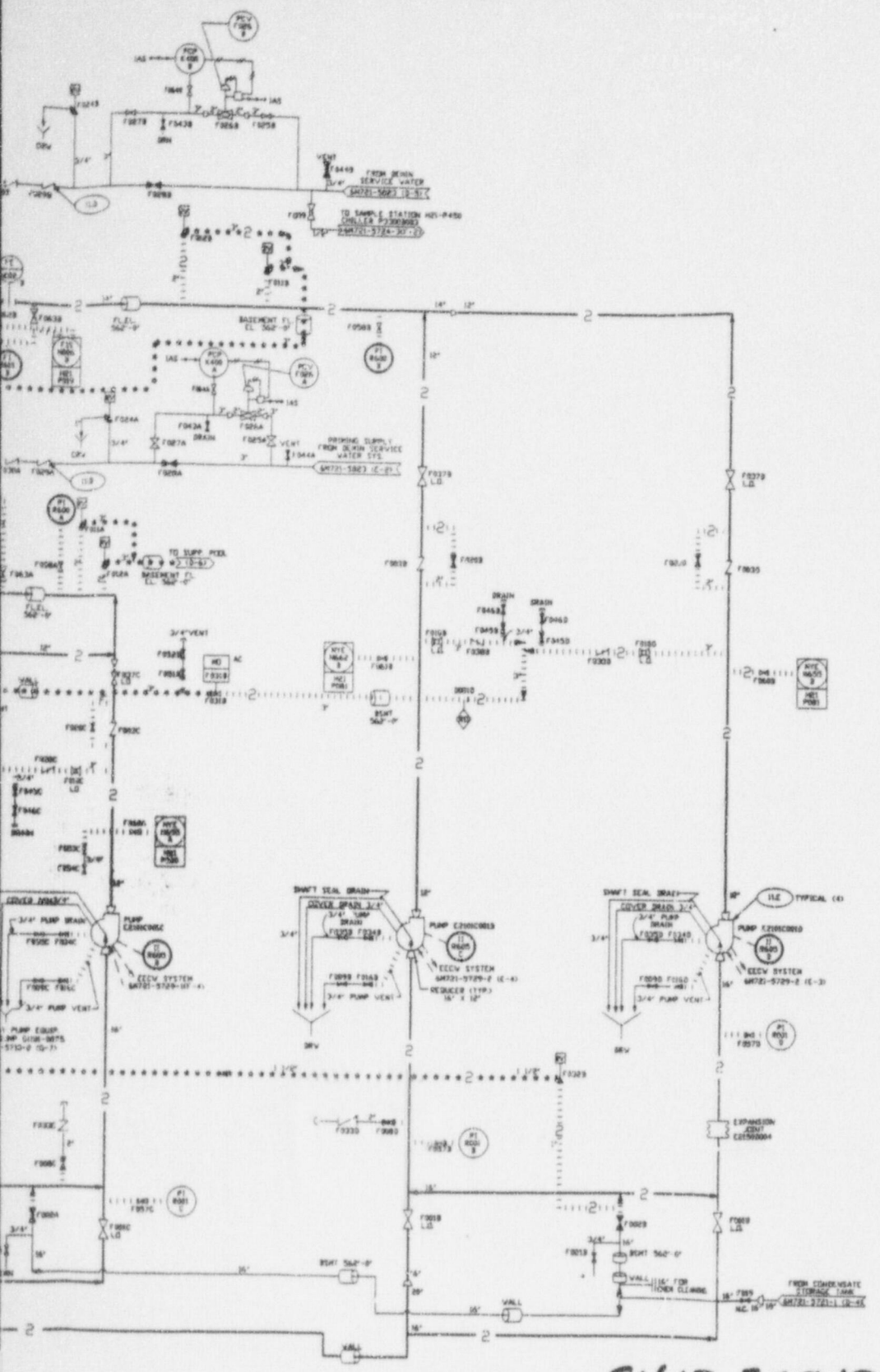
A INCORPORATED CHANGES PER ARN L2399-1 REV.# (PAGE 1 OF 10) CHANGED CONTINUATION FLAGS AS SHOWN



FROM CORE OP PRESSURE ABOVE CORE PLATE
PRIMARY CONTAINMENT
SPARGER
REACTOR VESSEL
THROTTLE VALVE
INTERNALS REMOVED
FROM TWHS
FROM HPCI SYSTEM
CORE SPRAY TEST LINE
FROM RCIC SYSTEM
COVER DRN
PUMP DRAIN
SHAFT SEAL DRN
CCCW SYSTEM
CORE SPRAY PUMP EQUIP DRAINS TO SUMP
SUPPRESSION CHAMBER
TEST CONN
EXPANSION JOINT

NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS REVEALED FROM DRAWING 6M721-5781



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5814
LATEST REVISION C

9412300121-12

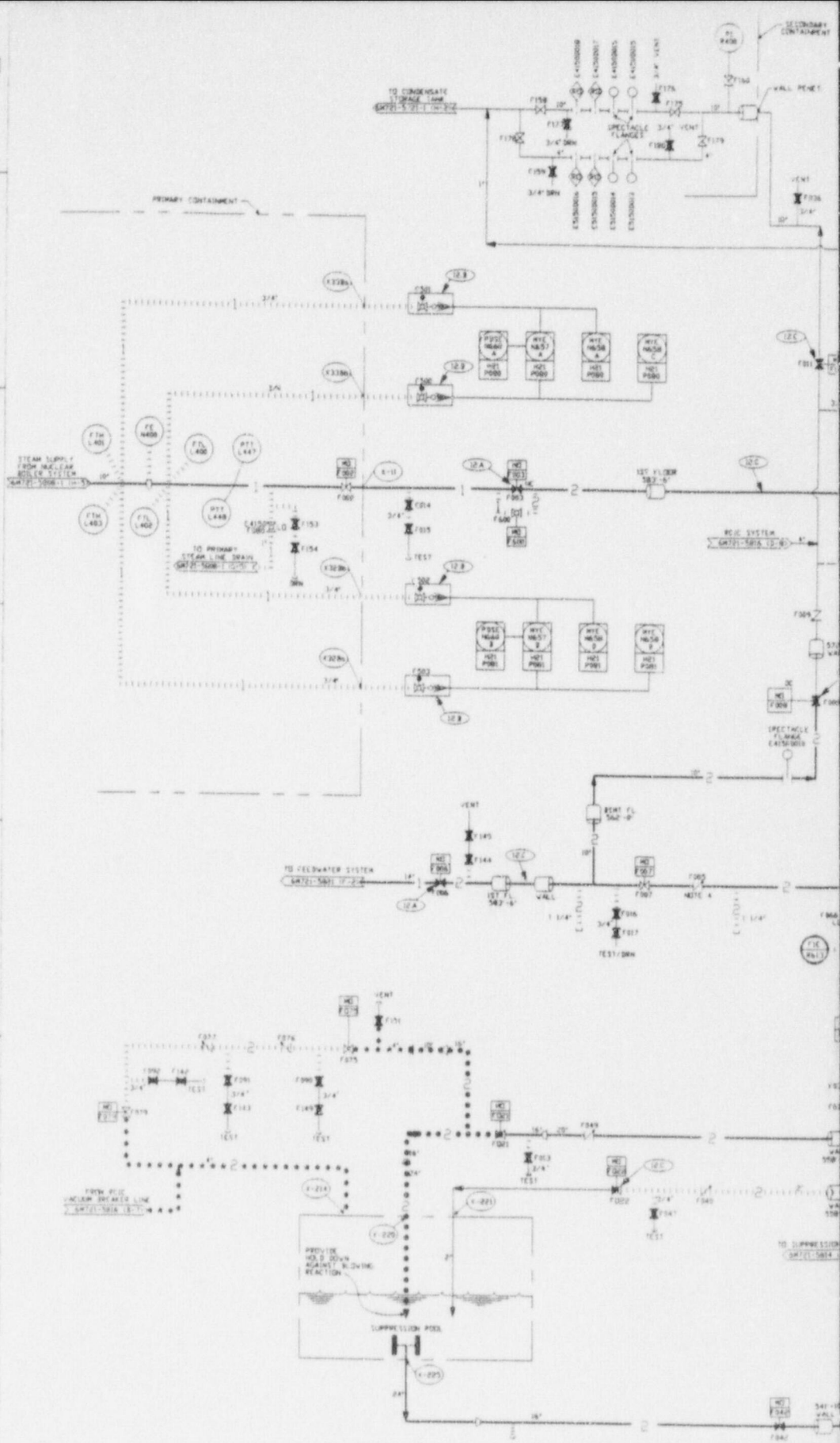
THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

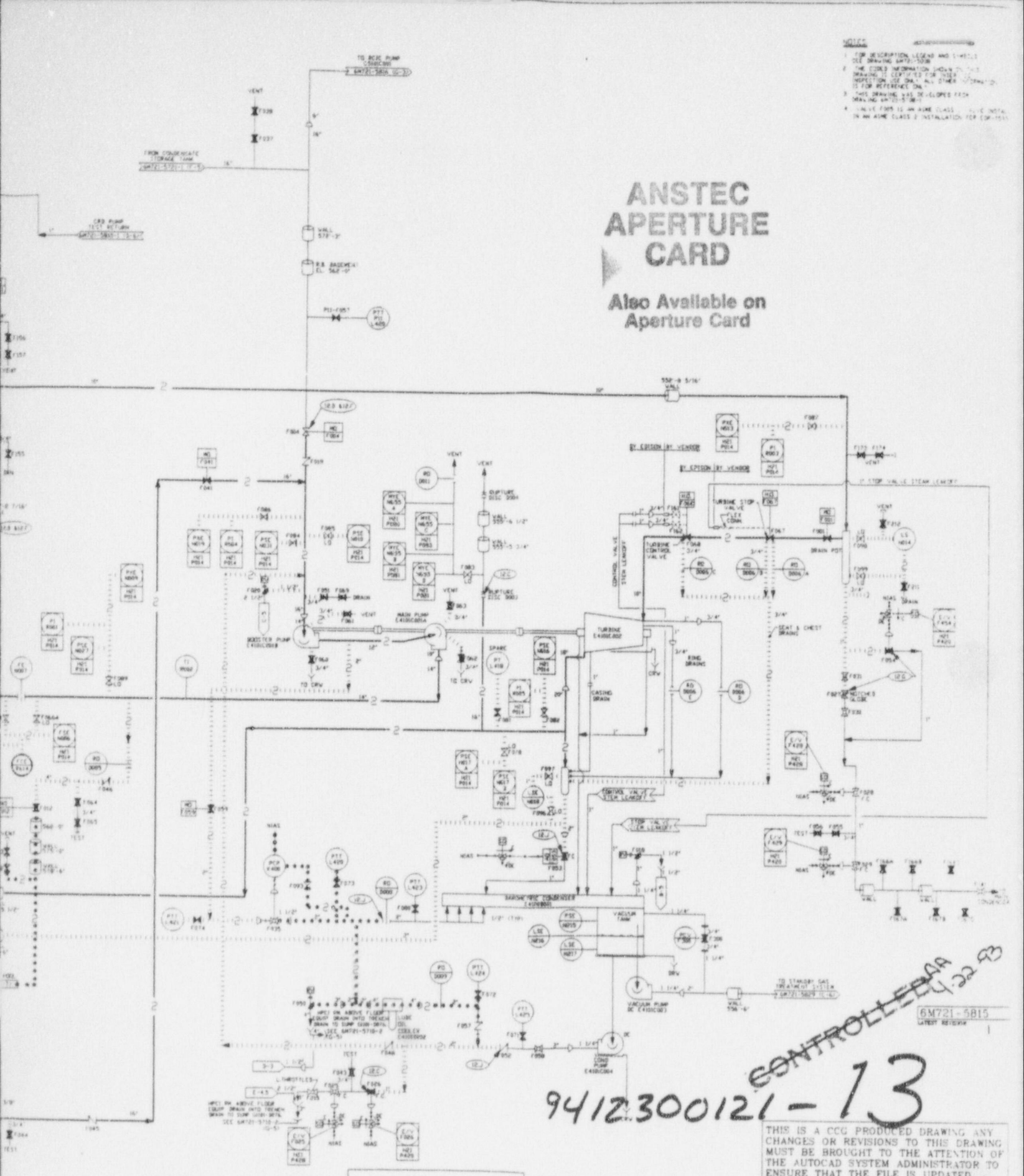
NUCLEAR SAFETY RELATED

Detroit Edison	Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
CORE SPRAY SYSTEM
ISI-E21-1

CORE SPRAY SYSTEM ISI
E21-00
DDDMEC
6M721-5814


SECONDARY CONTAINMENT
TO CONDENSATE STORAGE TANK
WALL PENET
SPECTACLE FLANGES
PRIMARY CONTAINMENT
STEAM SUPPLY FROM NUCLEAR BOILER SYSTEM
TO PRIMARY STEAM LINE DRAIN
RCIC SYSTEM
TO FEEDWATER SYSTEM
SUPPRESSION POOL
TO SUPPRESSION



THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

NUCLEAR SAFETY RELATED

Detroit Edison Fermi 2

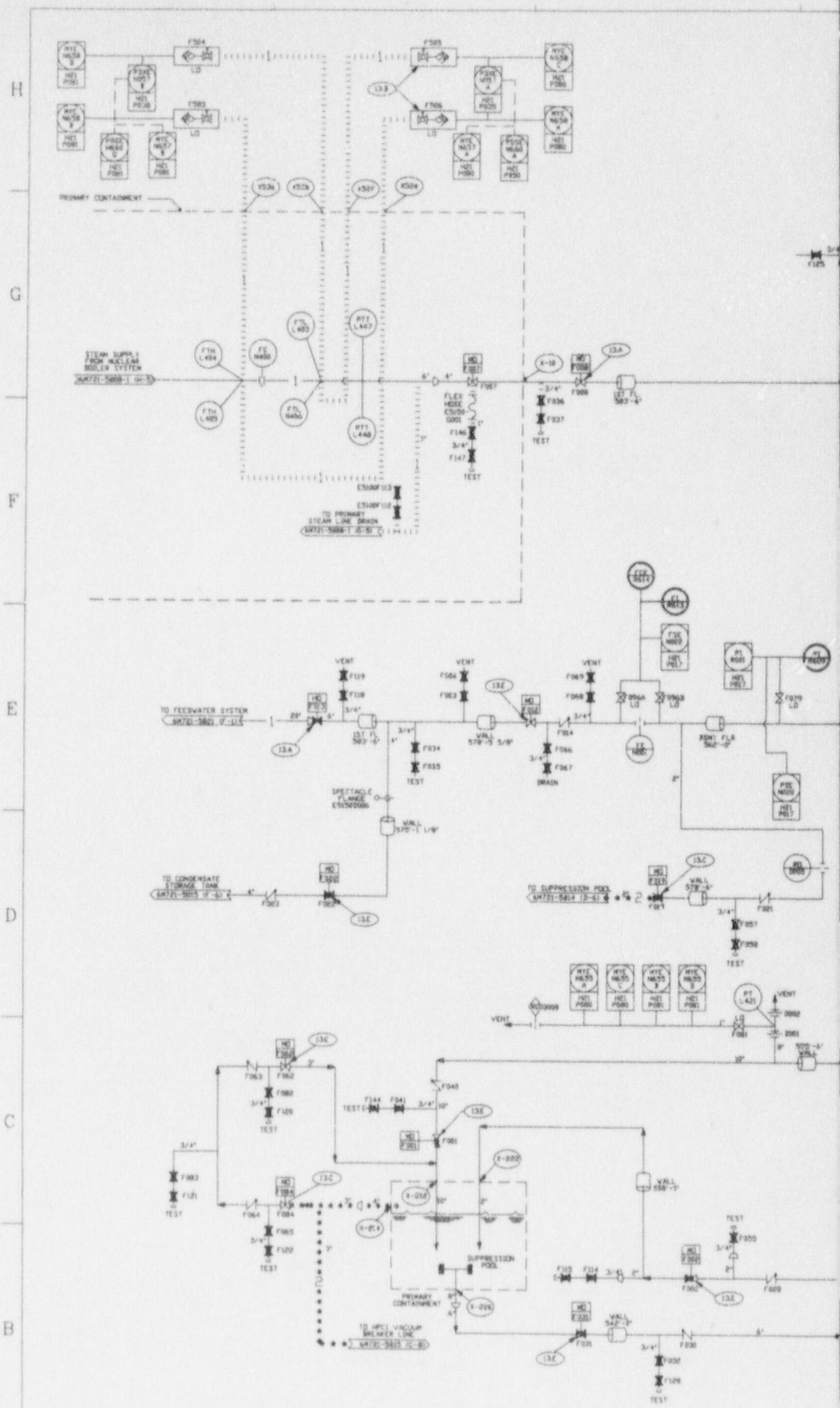
ISI CLASSIFICATION BOUNDARY DRAWING
HIGH PRESSURE COOLANT
INJECTION SYSTEM

HI PRESS COOL INJECT

E41-00

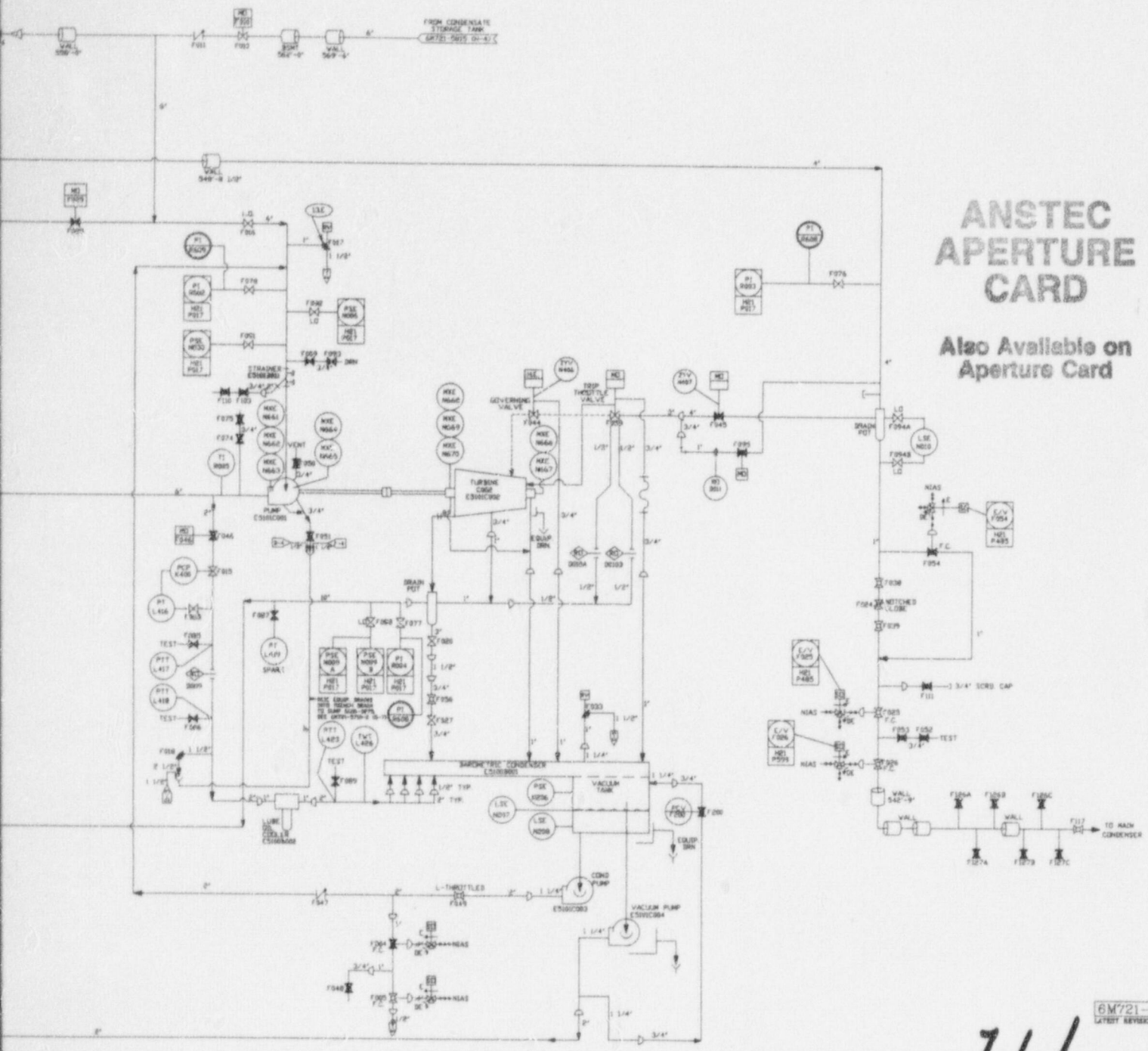
DDDMEC

6M721-5815


PRIMARY CONTAINMENT
STEAM SUPPLY FROM NUCLEAR BOILER SYSTEM
TO PRIMARY STEAM LINE DRAIN
TO FEEDWATER SYSTEM
TO CONDENSATE STORAGE TANK
TO SUPPRESSION POOL
SPECTACLE FLANGE
SUPPRESSION POOL
TO HPCI VACUUM BREAKER LINE
VENT
TEST
DRAIN

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER [illegible] IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FR DRAWING 6M721-5709-L



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5816
LATEST REVISION F

9412300121-14

NUCLEAR SAFETY RELATED

THIS DRAWING WAS REPRODUCED BY AUTOCAD AT REVISION 5 AND PREVIOUS APPROVAL SIGNATURES ARE ON FILE OR MICROFILM IN DOCUMENT CONTROL.

THIS IS AN AUTOCAD PRODUCED DRAWING. CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED.

F	DCD'S INCORPORATED: ABN-26373-L REV. 0		
OTHER REVISIONS			
PREPARED BY A. ANIOL (CDA)	DATE 9-19-94	CHECKED BY A. Anderle / CDA	DATE 10-6-94
APPROVED BY [signature]	DATE 10/4/94		

A PORTION OF THIS DRAWING IS APPROVED BY THE FOLLOWING:

IN	GRANDE DOCUMENT
EDP	13977 "0" AFC

PREPARED BY	DATE	
CHECKED BY	DATE	
APPROVED BY	DATE	
OTHER APPROVALS	DATE	

INC. CODE	
S	Detroit Edison Fermi 2

TITLE: ISI CLASSIFICATION BOUNDRY DRAWING REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM SKETCH ISI-E51-1

APERTURE CARD TITLE: REACTOR CORE ISOLAT COOL ISI

PLANT IDENTIFICATION SYSTEM NUMBER: E5100

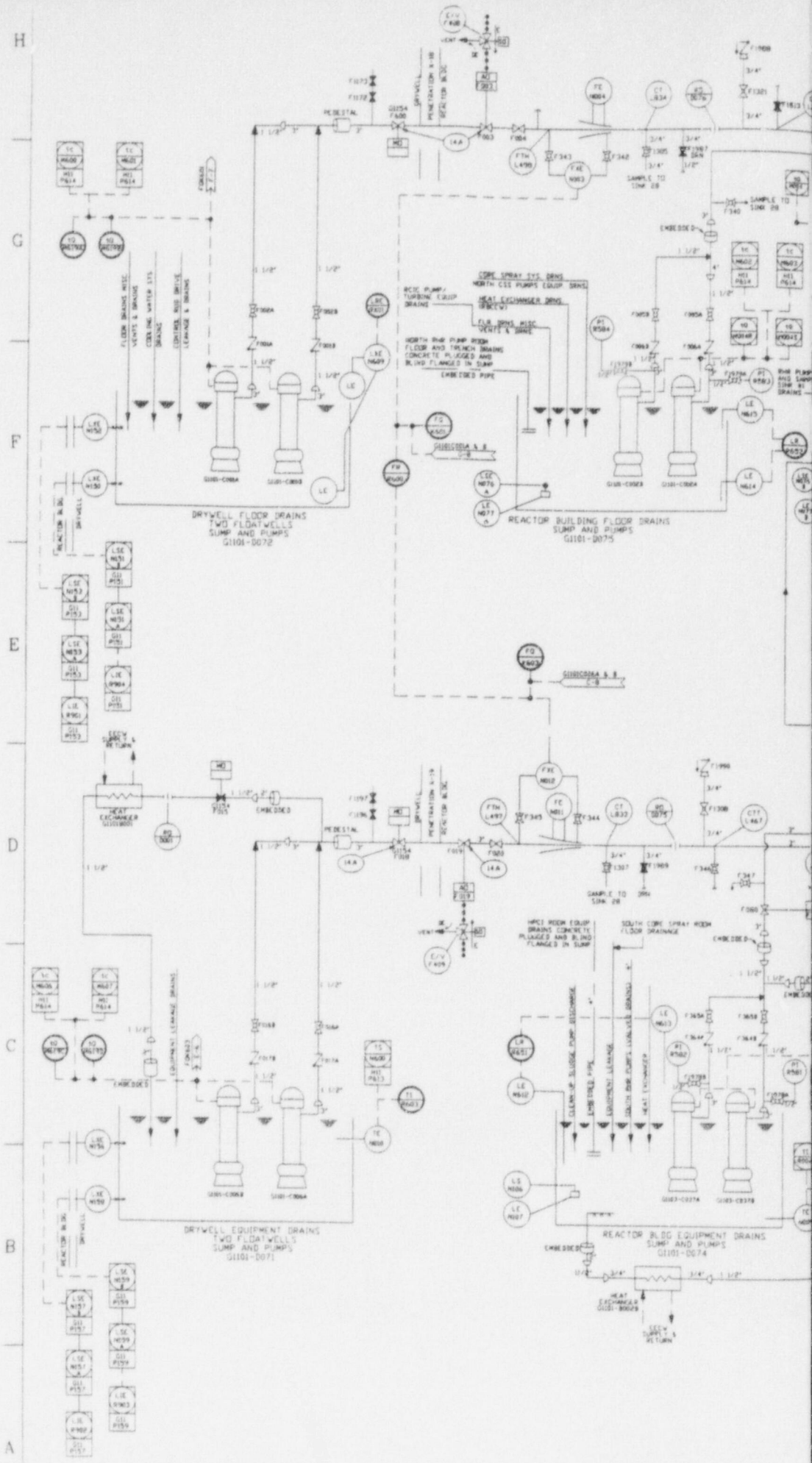
ORDER RELEASE: 1

DOCUMENT TYPE CODE: DDDMEC

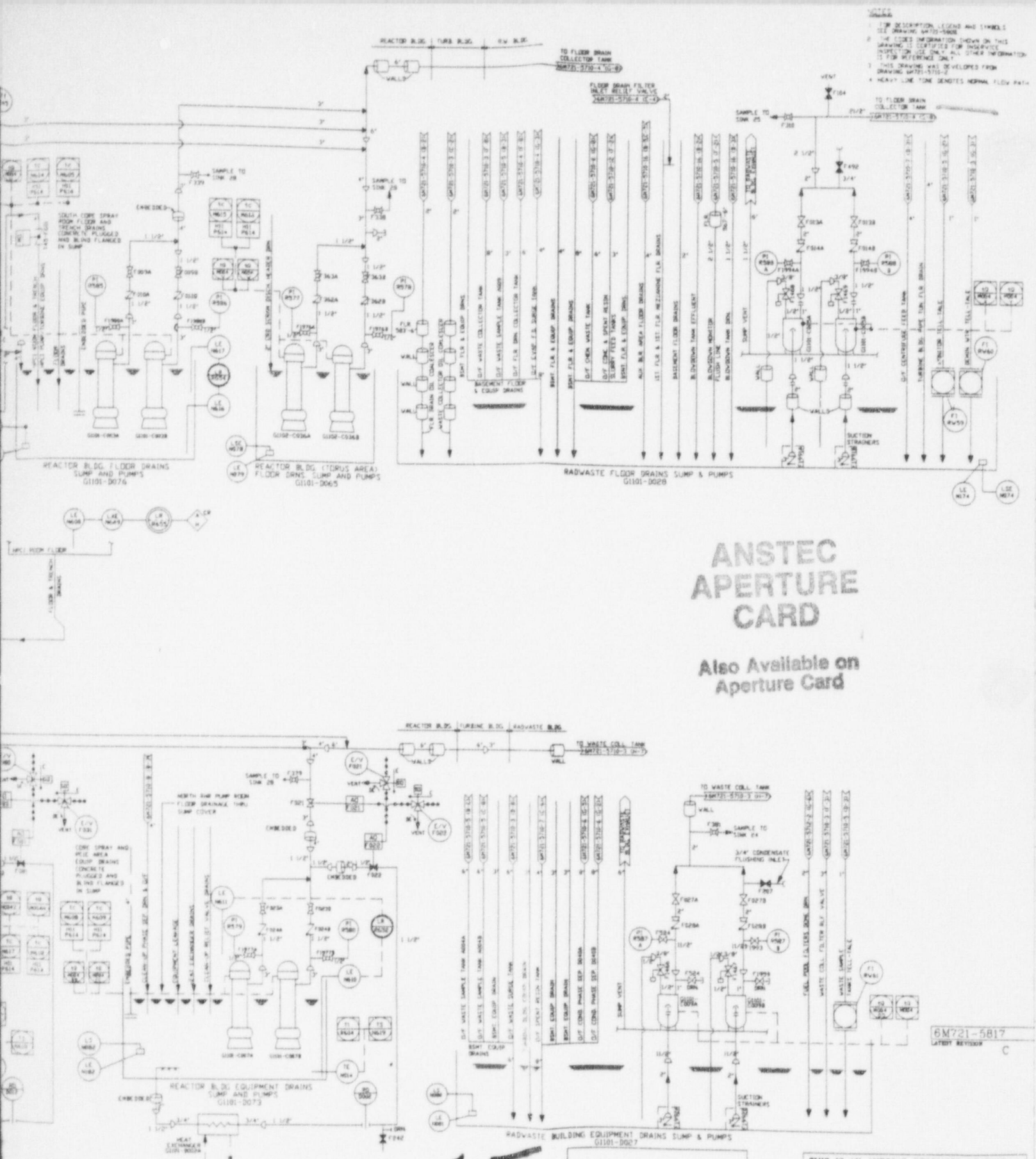
DATE ISSUED: 10-14-94

DRAWING NUMBER: 6M721-5816

REV: F



DRYWELL FLOOR DRAINS
TWO FLOATWELLS
SUMP AND PUMPS
G1101-D072
REACTOR BUILDING FLOOR DRAINS
SUMP AND PUMPS
G1101-D075
DRYWELL EQUIPMENT DRAINS
TWO FLOATWELLS
SUMP AND PUMPS
G1101-D071
REACTOR BLDG EQUIPMENT DRAINS
SUMP AND PUMPS
G1101-D074
PEDESTAL
EMBEDDED
SAMPLE TO SINK 28
HEAT EXCHANGER
EECW SUPPLY & RETURN



ANSTEC APERTURE CARD

Also Available on Aperture Card

9412300121-15

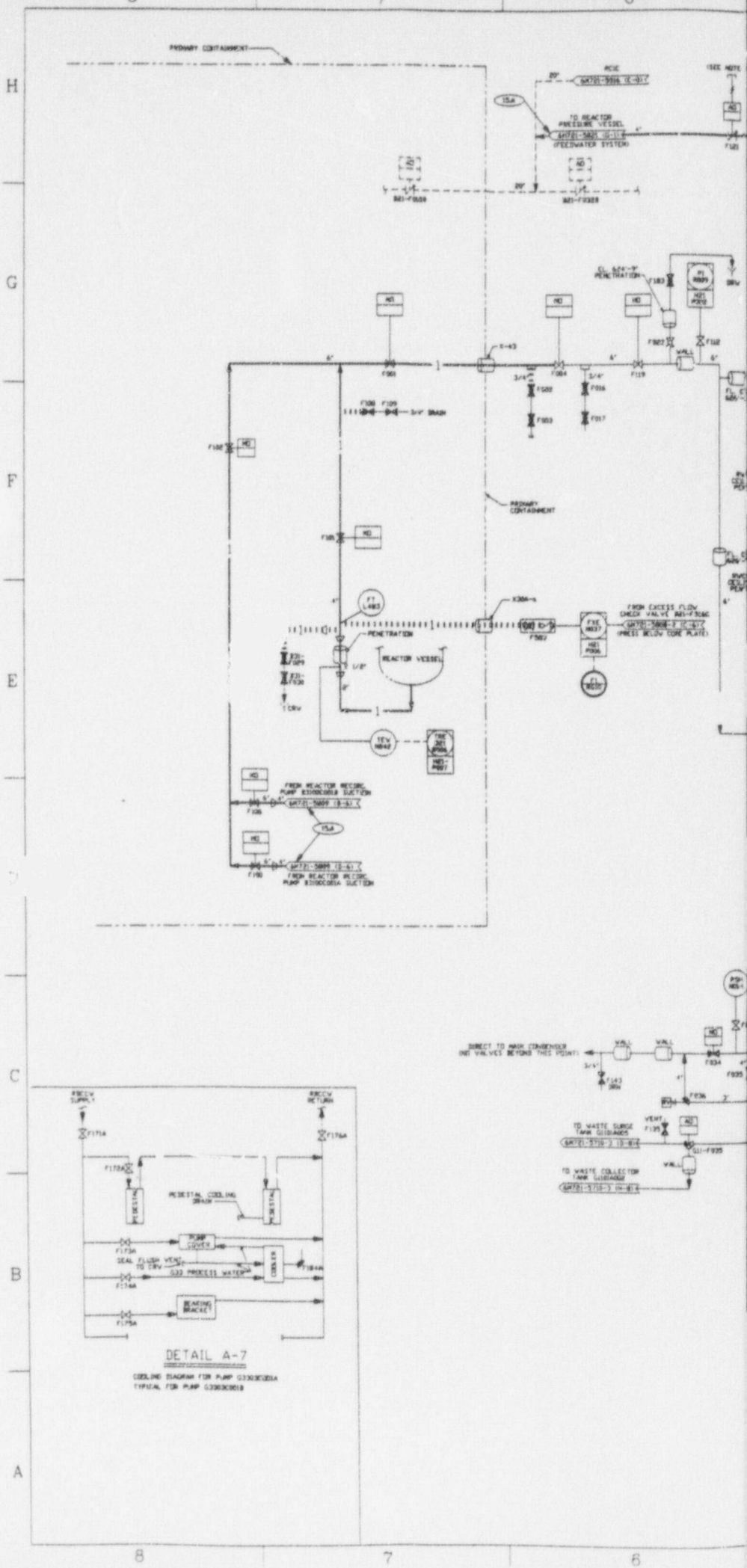
NUCLEAR SAFETY RELATED

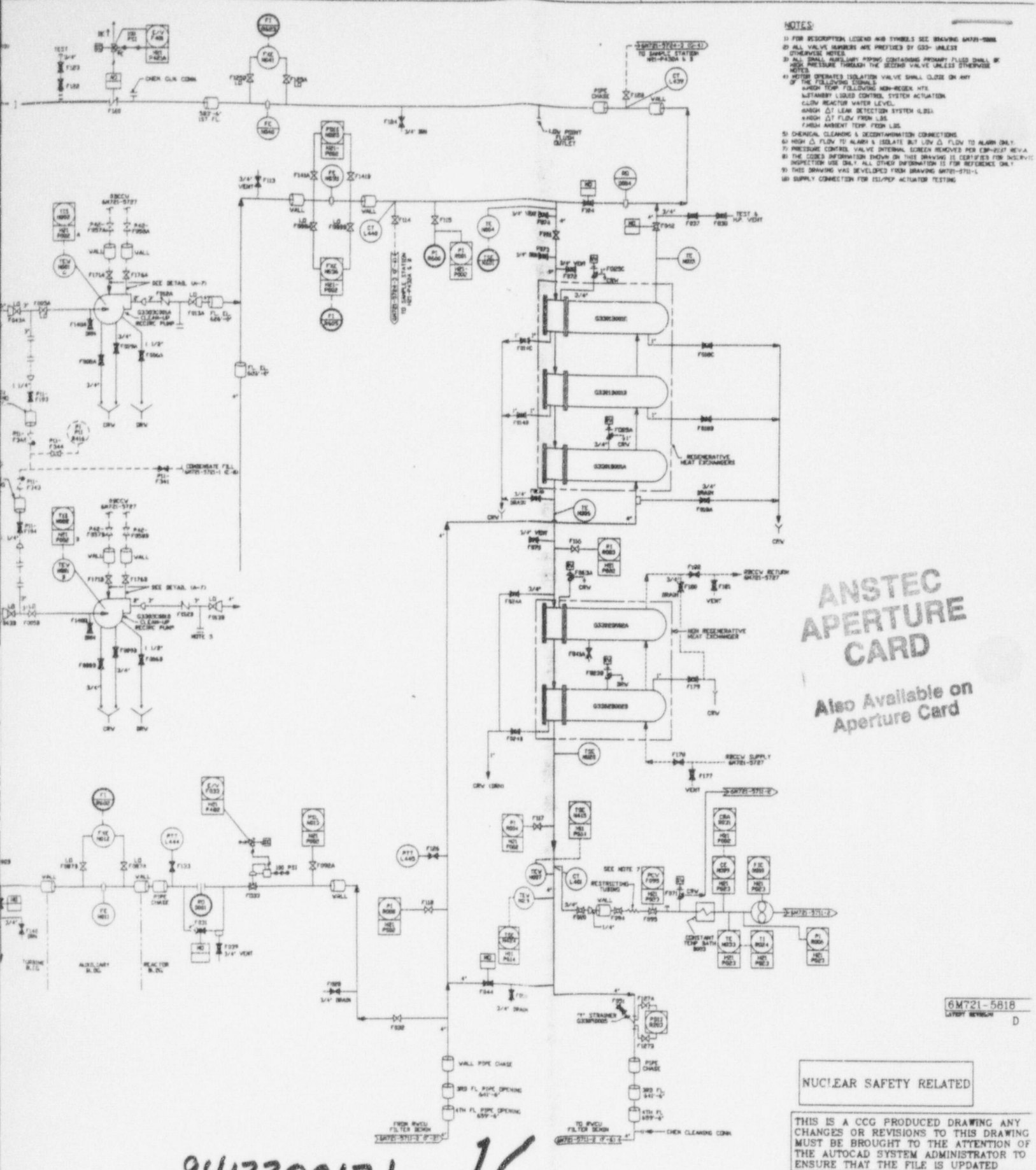
THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED

C DCD'S INCORPORATED ABN-26651-1 REV #

OTHER REVISIONS
CORRECTED VALVE SYMBOLOGY
ADDED ENLARGED CROSSOVERS AT ZONE 3/F-2

INC. CODE	S
Detroit Edison	Fermi 2
TITLE	ISI CLASSIFICATION BOUNDRY DRAWING SUMP PUMPS SYSTEM ISI-G11-2
APERTURE CARD TITLE	SUMP PUMPS SYS ISI
PLANT IDENTIFICATION SYSTEM NUMBER	G1102
DOCUMENT TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5817
REV	C


PRIMARY CONTAINMENT
RCIC
TO REACTOR PRESSURE VESSEL
(FEEDWATER SYSTEM)
PENETRATION
REACTOR VESSEL
FROM EXCESS FLOW CHECK VALVE
(PRESS BELOW CORE PLATE)
FROM REACTOR RECIRC. PUMP B33D0C001A SUCTION
FROM REACTOR RECIRC. PUMP B33D0C001A SUCTION
DIRECT TO MAIN CONDENSER
TO WASTE SURGE TANK G33D0A005
TO WASTE COLLECTOR TANK G33D0A002
RECIRC SUPPLY
RECIRC RETURN
RESIDUAL COOLING DRAIN
PUMP COVER
SEAL FLUSH VENT TO TBV
G33 PROCESS WATER
COOLER
BEARING BRACKET
DETAIL A-7
COOLING DIAGRAM FOR PUMP G33D0C001A
TYPICAL FOR PUMP G33D0C001B



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5818
LATEST REVISION D

NUCLEAR SAFETY RELATED

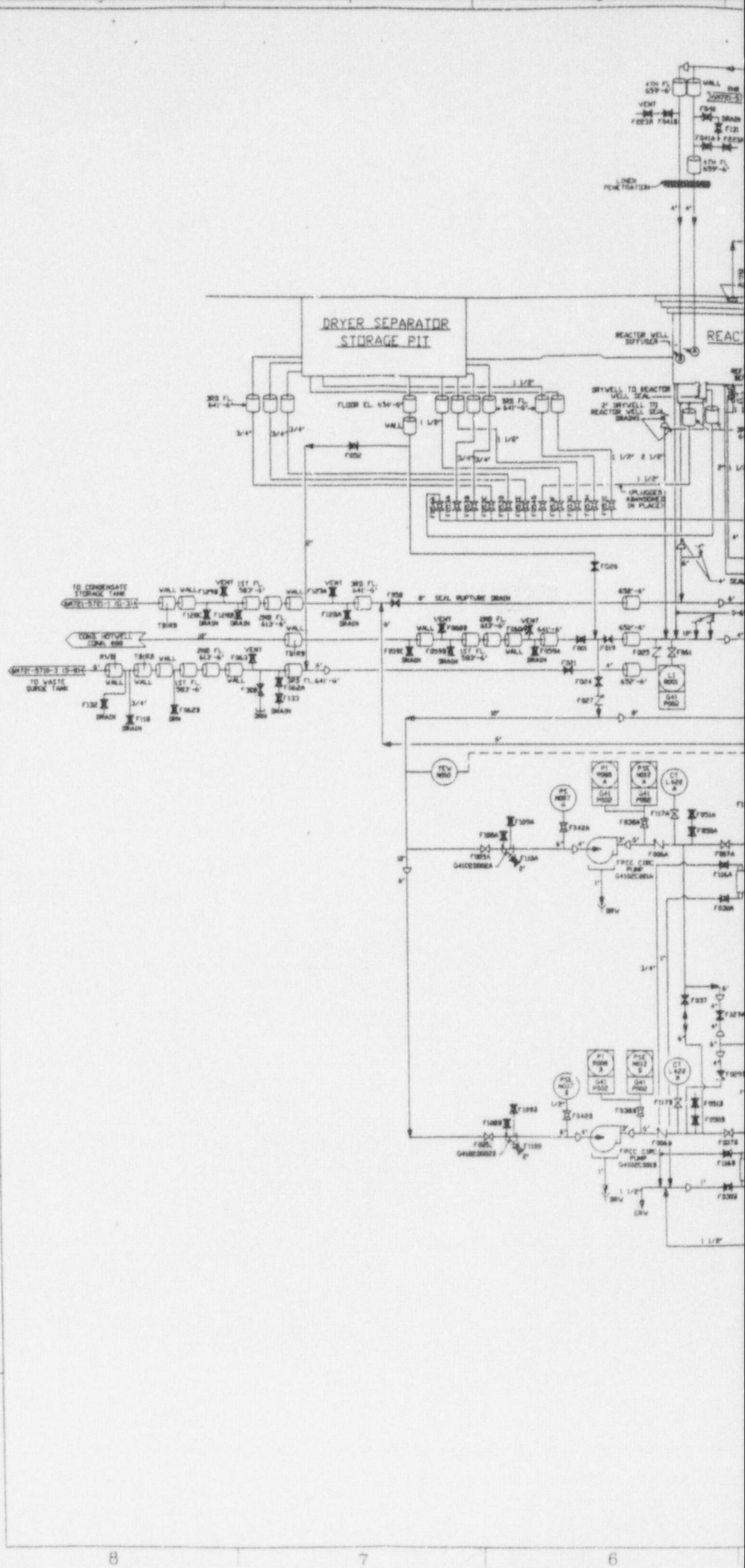
THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

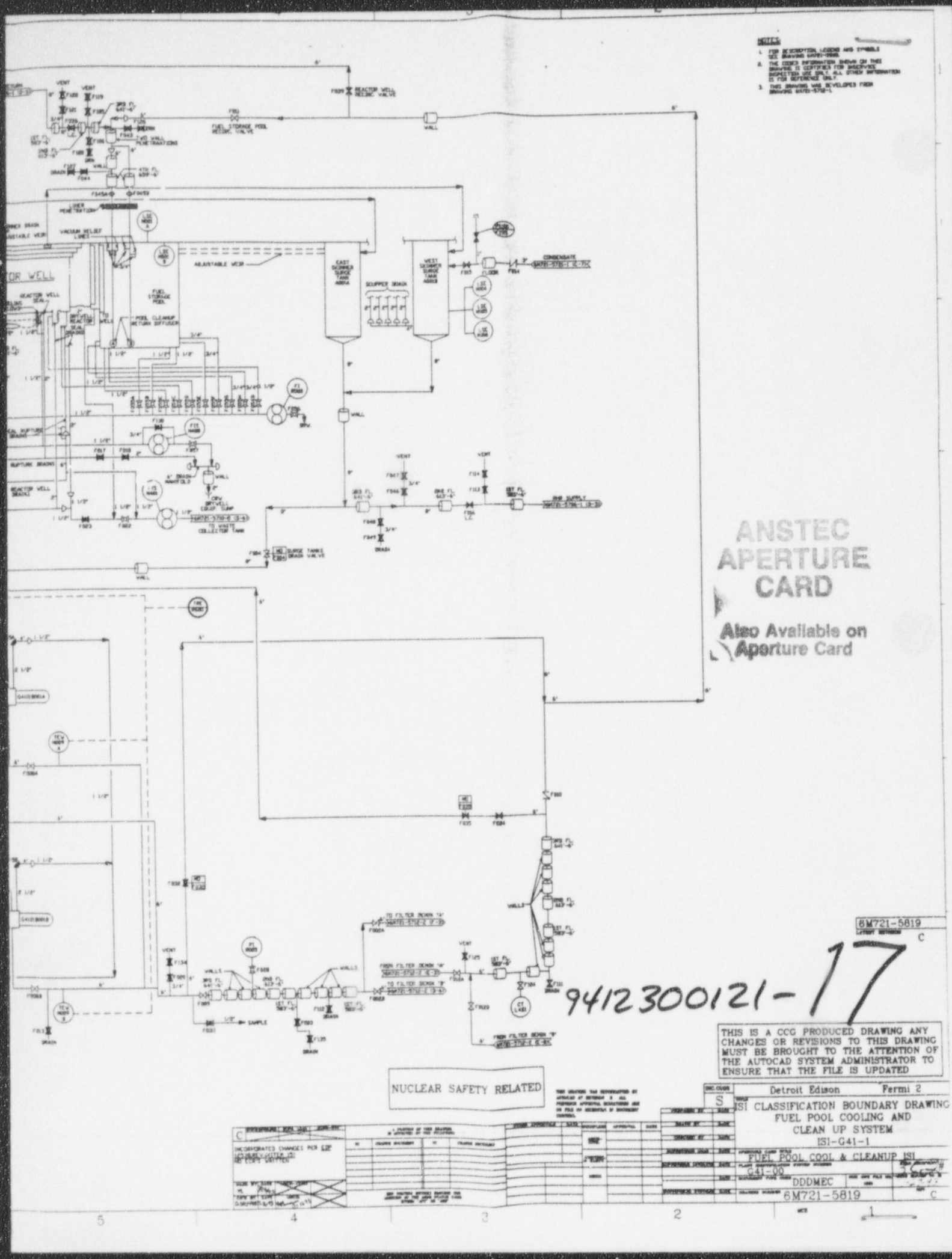
9412300121-16

INCORPORATES CHANGES PER CDP 1200-06-1 (NOTICE 10) NE EDP'S CHECKED

Detroit Edison Fermi 2

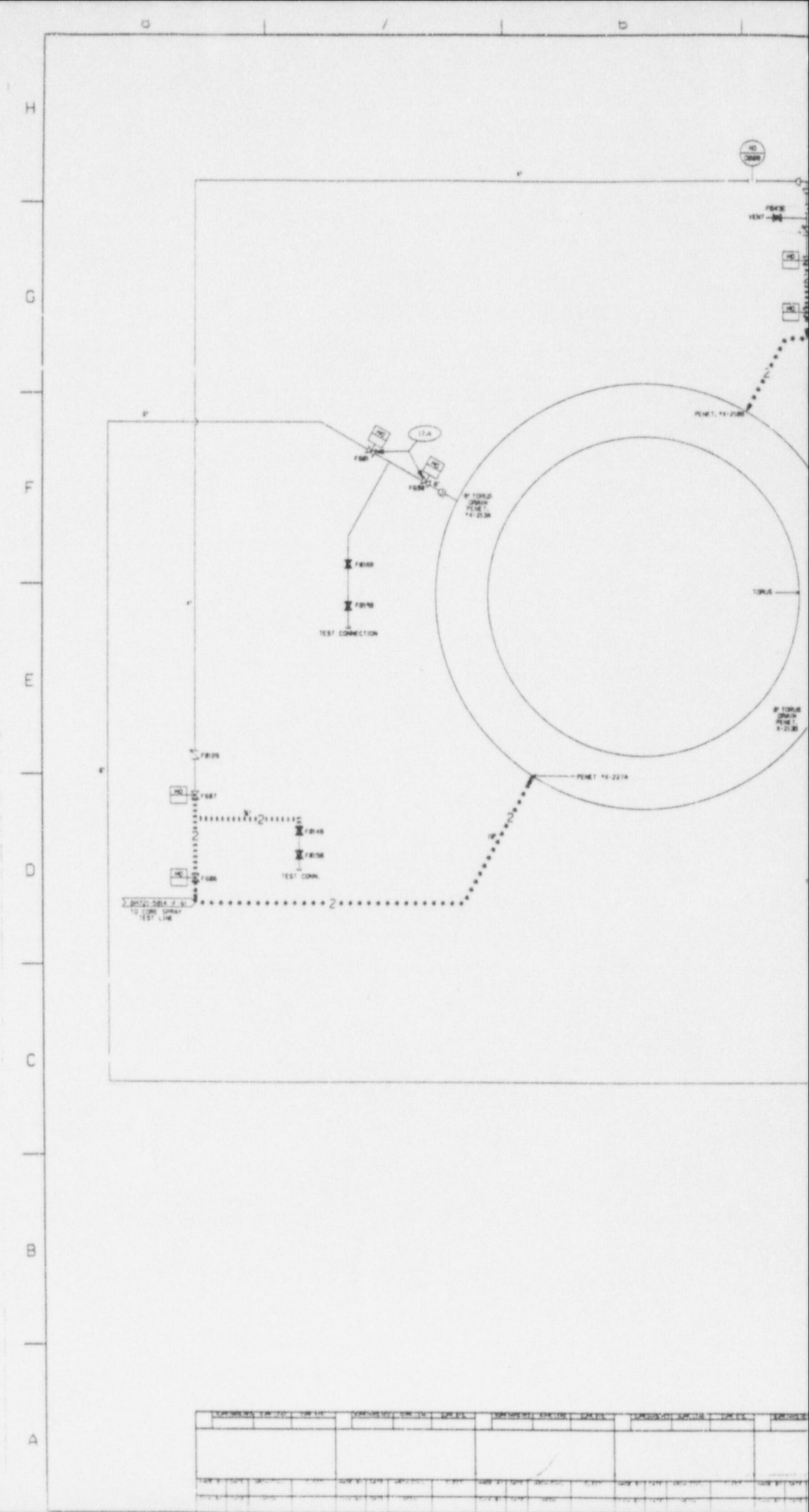
ISI CLASSIFICATION BOUNDARY DRAWING
REACTOR WATER CLEAN-UP
REACTOR BUILDING
FSI-G33-1


DRYER SEPARATOR
STORAGE PIT
REACTOR WELL DIFFUSER
DRYWELL TO REACTOR WELL SEAL
2" DRYWELL TO REACTOR WELL SEAL DRAINS
(PLUGGED ABANDONED IN PLACE)
TO CONDENSATE STORAGE TANK
COND. HOTWELL CONN. 800
TO WASTE SURGE TANK
SEAL RUPTURE DRAIN
FPCC CIRC PUMP
H
G
F
E
D
C
B
A
8
7
6

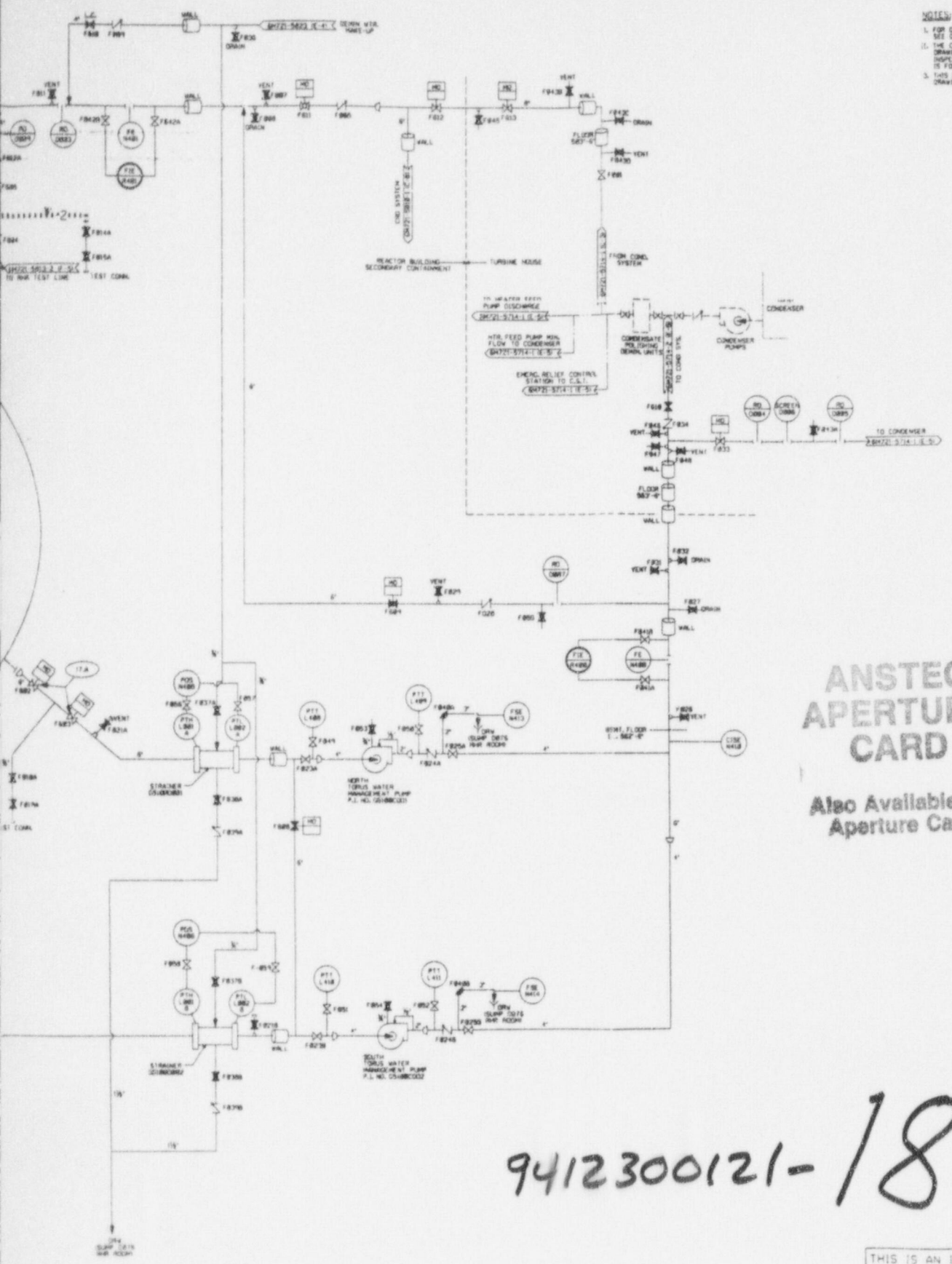


ANSTEC APERTURE CARD

Also Available on Aperture Card



H
G
F
E
D
C
B
A
VENT
TORUS
TEST CONNECTION
TEST CONN.
TO CORE SPRAY TEST LINE



NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5588.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5713.

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5820
LATEST REVISION "0"

9412300121-18

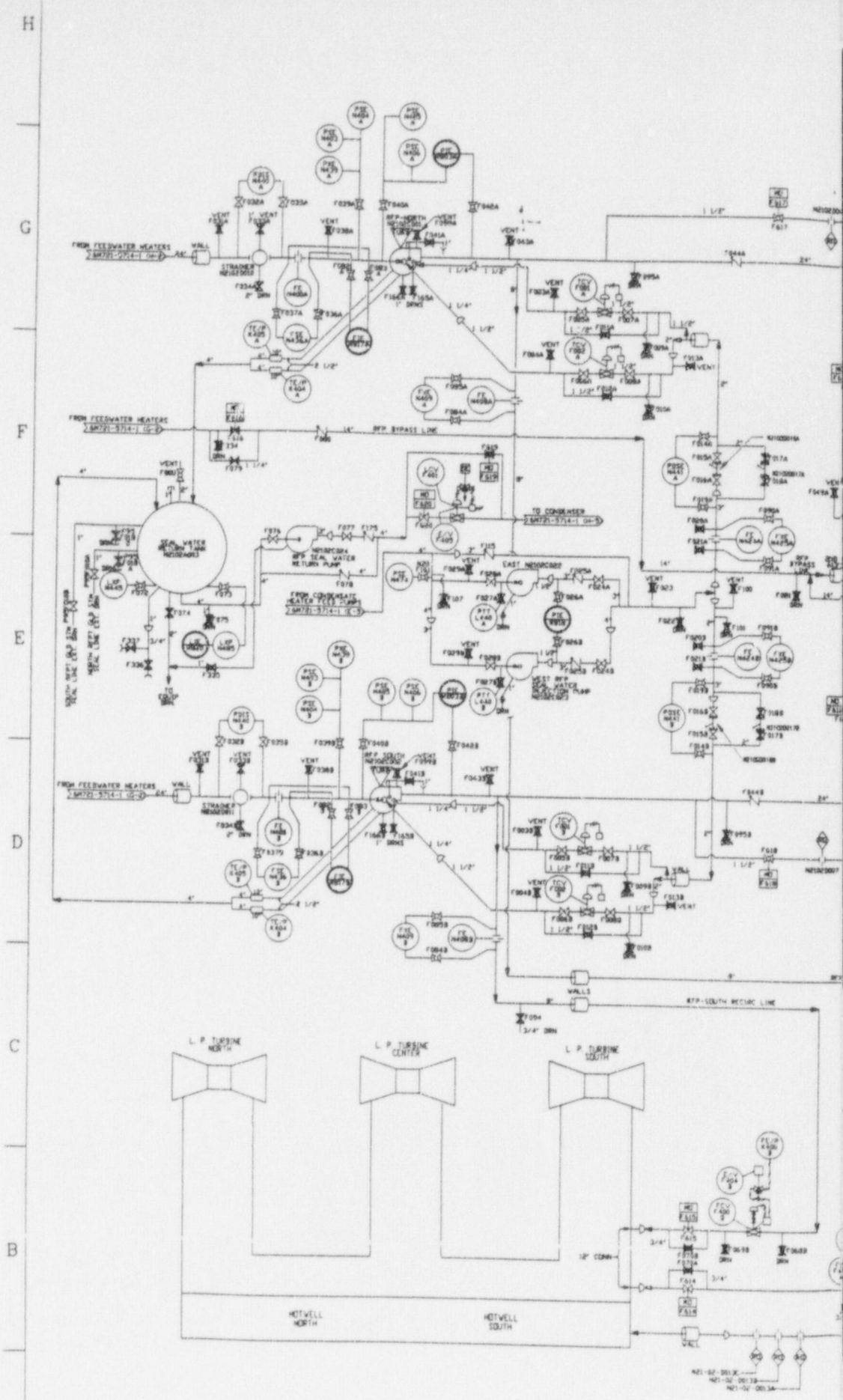
177

THIS IS AN IGDS PRODUCED DRAWING. ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE IGDS COORDINATOR TO ENSURE THAT THE IGDS FILE IS UPDATED.

NUCLEAR SAFETY RELATED

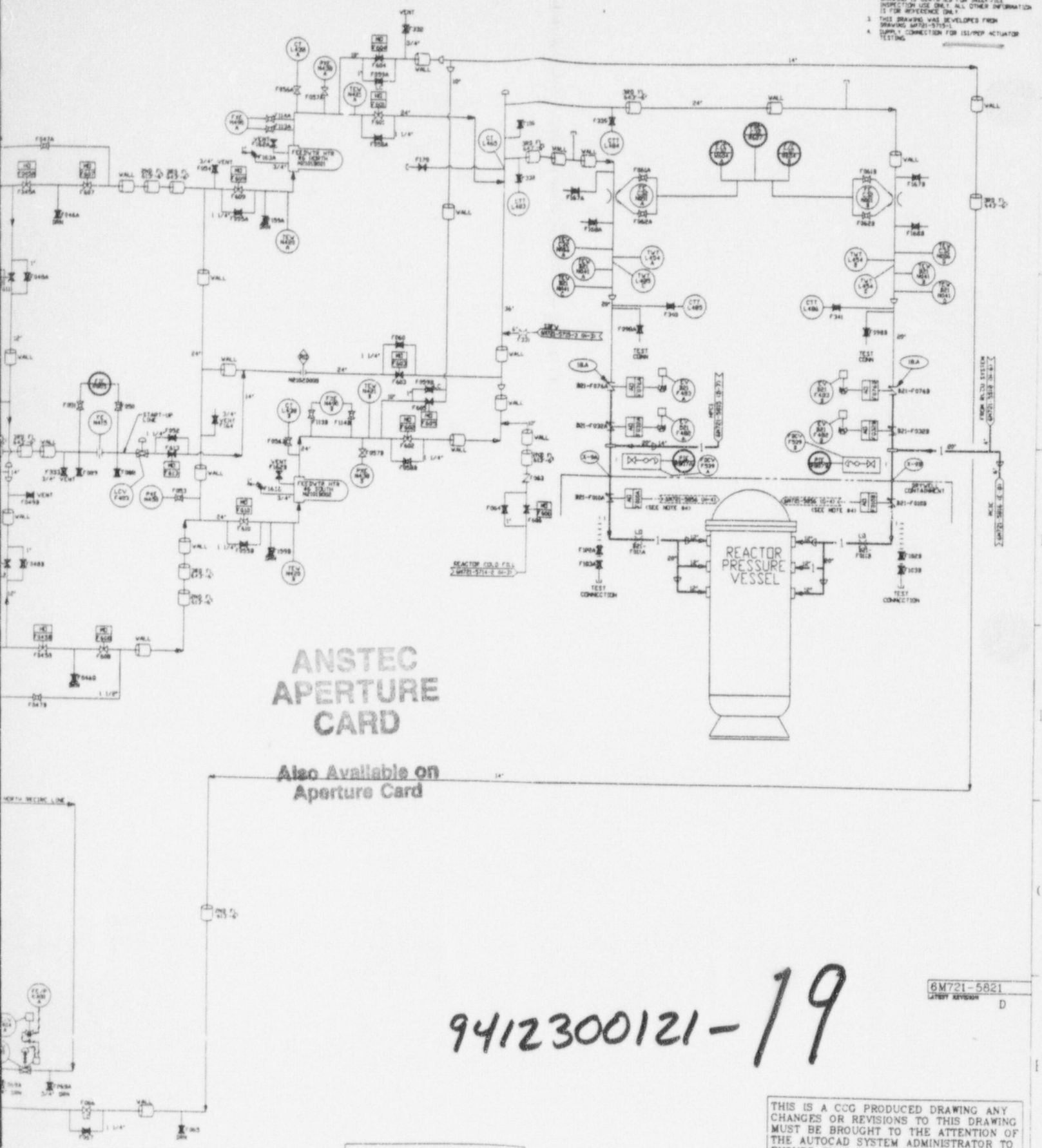
"THE FOLLOWING CHANGE PAPERS ARE STATUSED "NFC" AND MUST BE INCORPORATED ON THIS DRAWING WHEN THEY BECOME "NCR" STATUS. EDP-7816.

ENG. CODE	S
Detroit Edison	Fermi 2
TITLE	ISI CLASSIFICATION BOUNDARY DRAWING TORUS WATER MANAGEMENT SYSTEM ISI-G51-1
APPLICATION	TORUS WATER MANAGEMT. SYS. ISI
PLANT IDENTIFICATION SYSTEM NUMBER	G51-00
DOCUMENT CODE	DOOMEC
DRAWING NUMBER	6M721-5820
REV	0


FROM FEEDWATER HEATERS
STRAINER
RFP-NORTH
RFP-SOUTH
RFP BYPASS LINE
TO CONDENSER
EAST RFP SEAL WATER RETURN PUMP
WEST RFP SEAL WATER RETURN PUMP
FROM CONDENSATE HEATER FEED PUMP
RFP-SOUTH RECIRC LINE
L P TURBINE NORTH
L P TURBINE CENTER
L P TURBINE SOUTH
HOTWELL NORTH
HOTWELL SOUTH

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5715-1.
4. SUPPLY CONNECTION FOR ISI/PEP ACTUATOR TESTING.



ANSTEC APERTURE CARD

Also Available on Aperture Card

9412300121-19

6M721-5821
LATEST REVISION D

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

NUCLEAR SAFETY RELATED

DWG CODE S

Detroit Edison Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
REACTOR FEEDWATER SYSTEM
ISI-N21-1

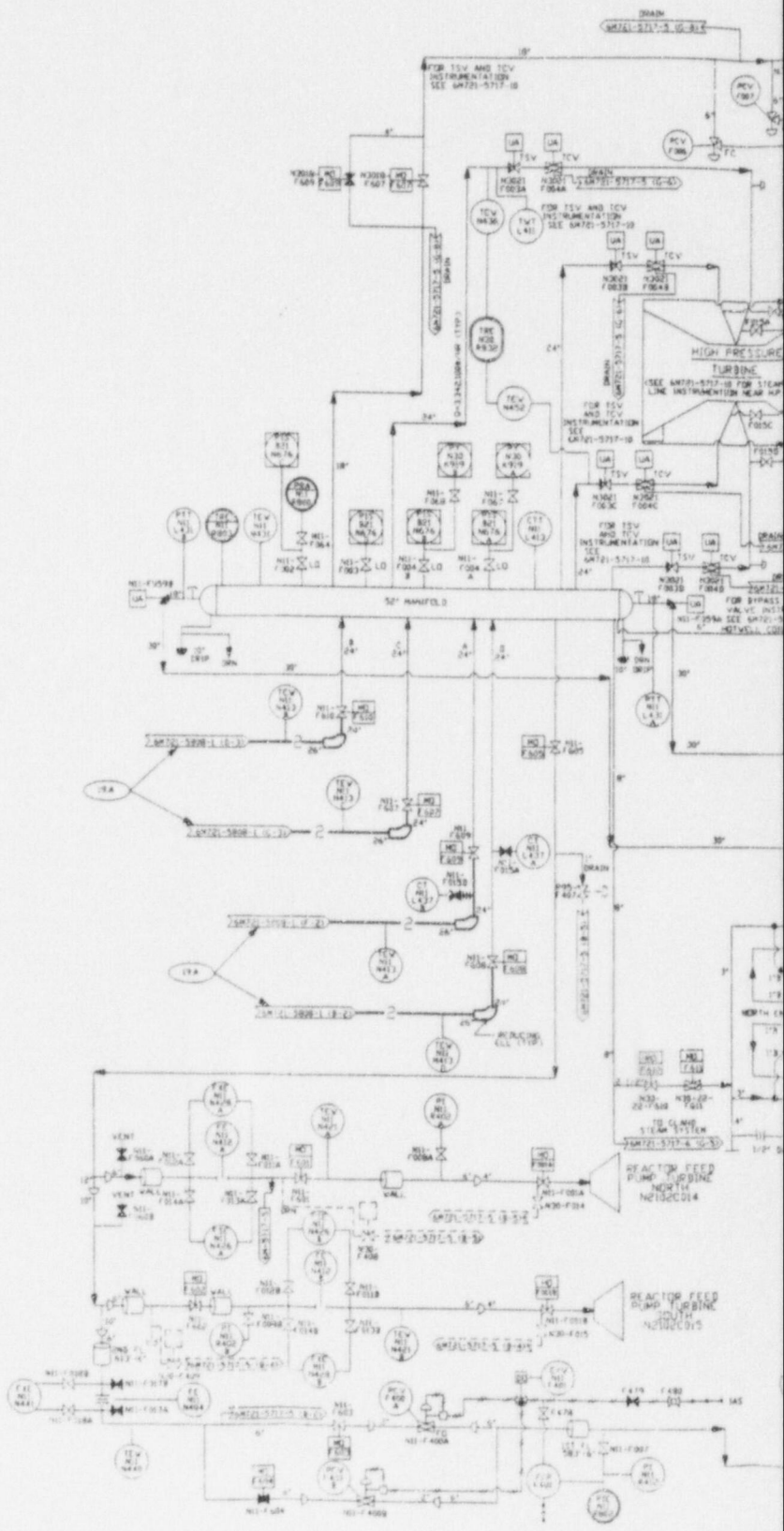
APERTURE CARD TITLE: REACTOR FEEDWATER SYSTEM ISI

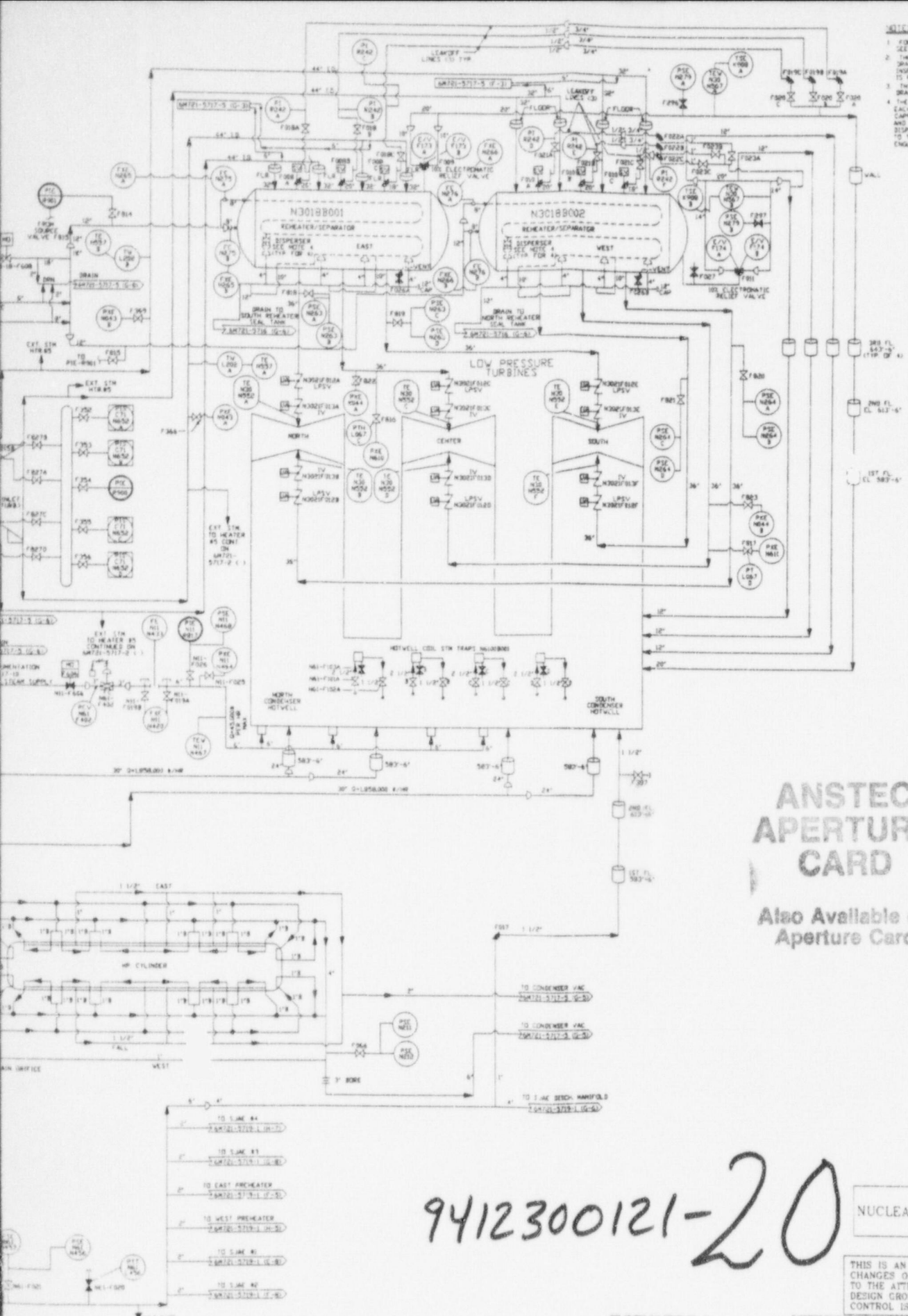
PLANT IDENTIFICATION SYSTEM NUMBER: N21-01

DOCUMENT TYPE CODE: DDDMEC

DRAWING NUMBER: 6M721-5821

ASSY D


HIGH PRESSURE
TURBINE
52" MANIFOLD
REACTOR FEED
PUMP TURBINE
NORTH
REACTOR FEED
PUMP TURBINE
SOUTH



NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5800.
2. THE COSED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5717-1.
4. THE 4 (4") & 1 VENT ELEMENT DRAIN [illegible] EACH REHEATER/SEPARATOR DESIGNATED [illegible] ARE CAPPED INTERNALLY IN THE REHEATER SEPARATOR AND THEIR FORMER FLOW IS DISCHARGED THRU A DISPERSER PIPE INSIDE THE SHELL TO BE DRAINED TO THE NO. 5 FEEDWATER HEATERS AS DESIGNED BY ENGLISH ELECTRIC PER ESP-8350.

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5822
LATEST REVISION F

9412300121-20

NUCLEAR SAFETY RELATED

THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED.

THIS DRAWING WAS REFORMATTED BY AUTOCAD AT REVISION "C". ALL PREVIOUS APPROVAL SIGNATURES ARE ON FILE ON MICROFILM IN DOCUMENT CONTROL.

F DCD'S INCORPORATED
ABN 11321-1 REV 9

OTHER REVISIONS

PREPARED BY	DATE	CHECKED BY	DATE
[illegible]	[illegible]	[illegible]	[illegible]

PREPARED BY	DATE	
CHECKED BY	DATE	
APPROVED BY	DATE	
OTHER APPROVALS	DATE	

INC CODE S

Detroit Edison Fermi 2

TITLE
ISI CLASSIFICATION
BOUNDARY DRAWING
MAIN AND REHEAT STEAM SYSTEM
ISI-N30-1

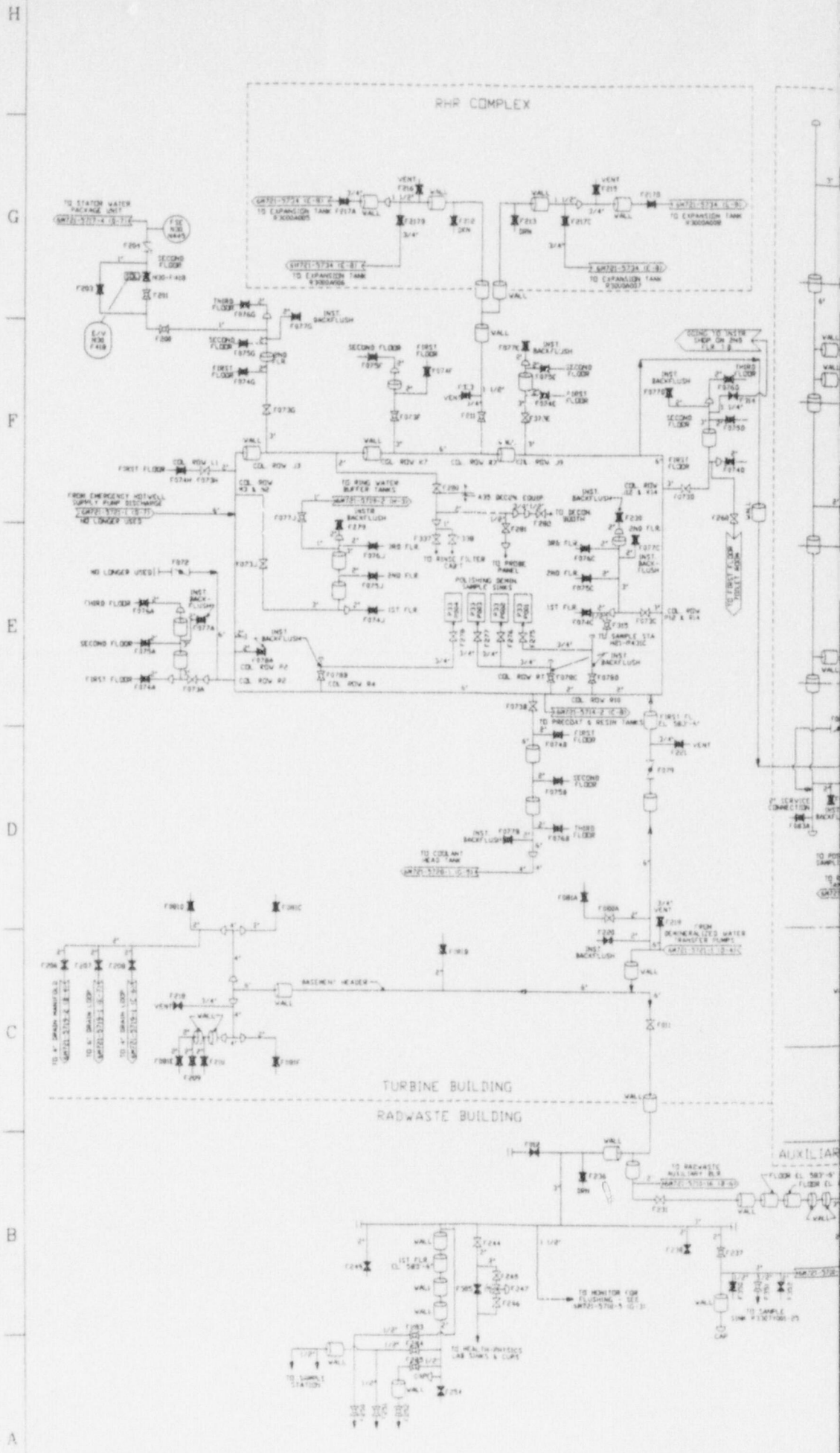
APERTURE CARD TITLE
MAIN & REHEAT STEAM SYS ISI

PLANT IDENTIFICATION SYSTEM NUMBER
N1100

DOCUMENT TYPE CODE
DDDMEC

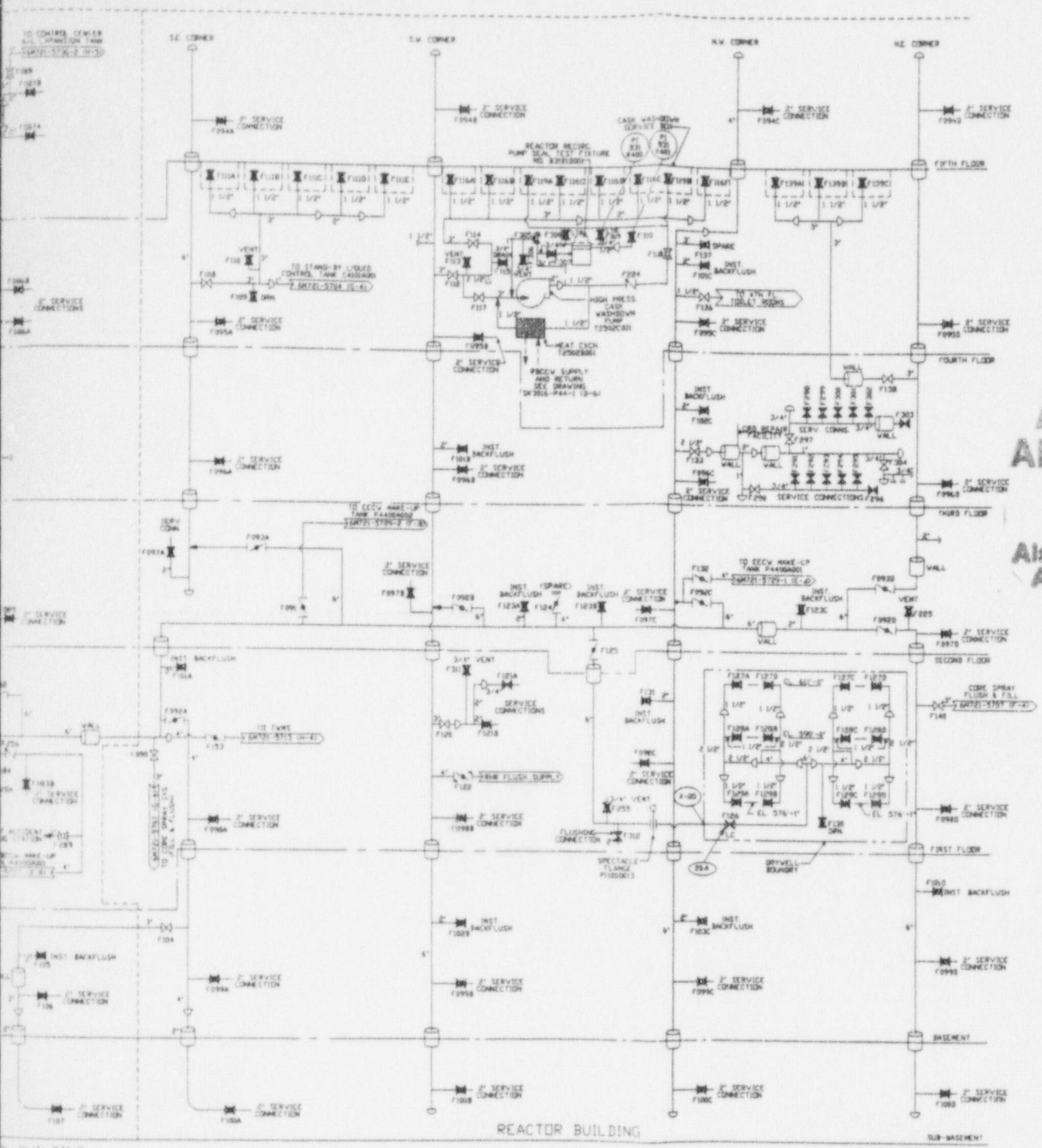
DRAWING NUMBER
6M721-5822

REV F


RHR COMPLEX
TURBINE BUILDING
RADWASTE BUILDING
AUXILIAR
TO STATOR WATER PACKAGE UNIT
TO EXPANSION TANK
TO RING WATER BUFFER TANKS
FROM EMERGENCY HOTWELL SUPPLY PUMP DISCHARGE
NO LONGER USED
POLISHING DEMIN SAMPLE SINKS
TO RINSE FILTER CAPT
TO PROBE PANEL
TO SAMPLE STA
TO PRECOAT & RESIN TANKS
TO COOLANT HEAD TANK
FROM DEMINERALIZED WATER TRANSFER PUMPS
BASEMENT HEADER
TO RADWASTE AUXILIARY BLR
TO MONITOR FOR FLUSHING - SEE
TO HEALTH-PHYSICS LAB SINKS & CUPS
TO SAMPLE STATION
TO SAMPLE SINK
2" SERVICE CONNECTION
H
G
F
E
D
C
B
A
8
7
6

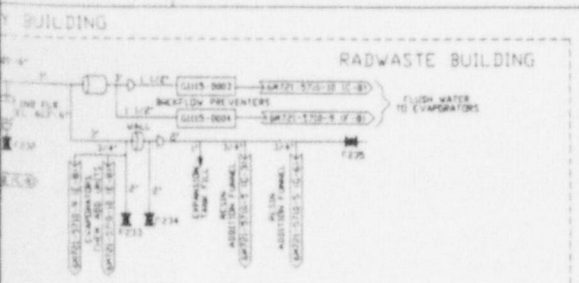
NOTES

1. FOR DESCRIPTION LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5721-2



ANSTEC APERTURE CARD

Also Available on Aperture Card



9412300121-21

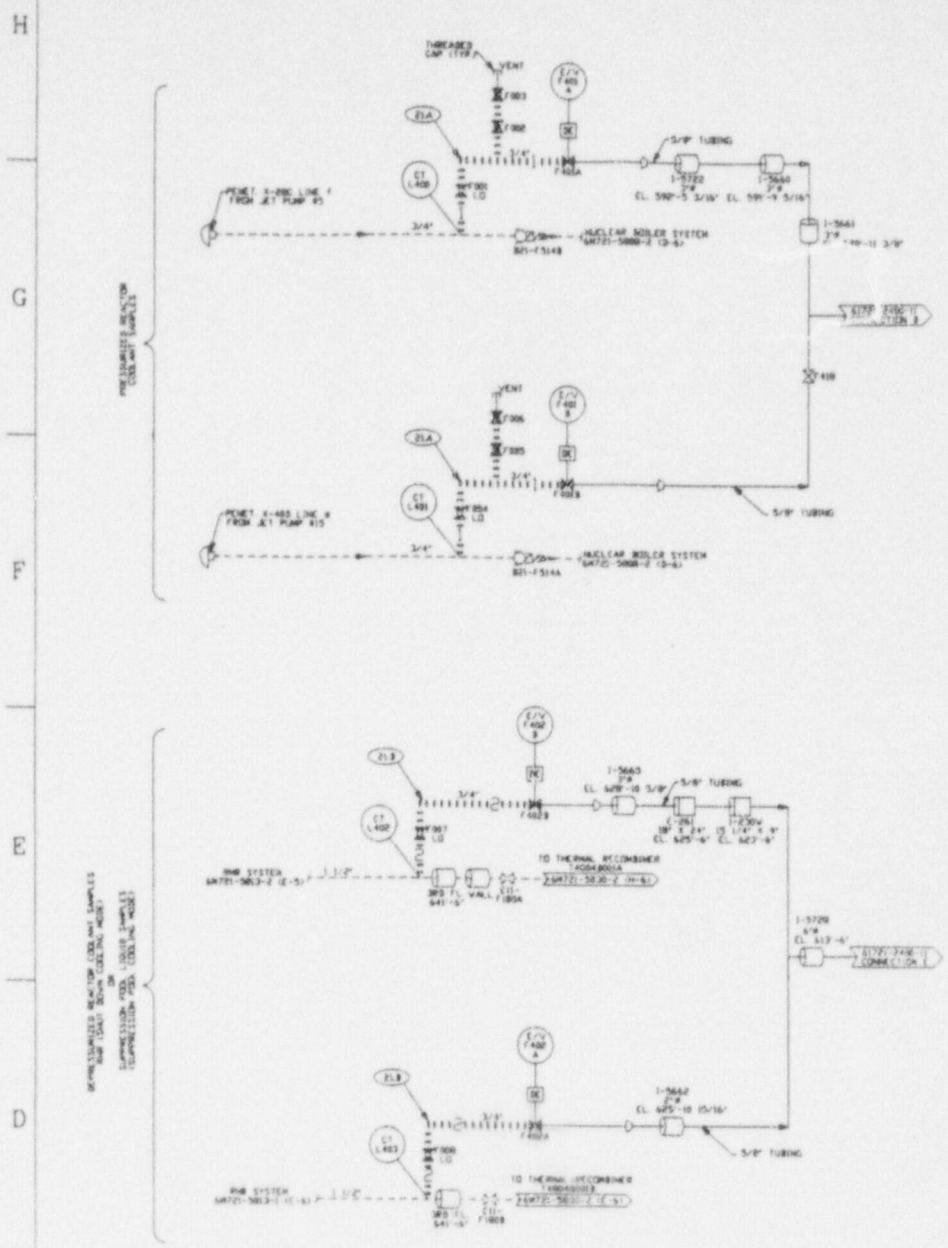
6M721-5823
LATEST REVISION D

NUCLEAR SAFETY RELATED

THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED

DCD'S INCORPORATED	ABN-26700-1, REV. 0
OTHER REVISIONS	
PREPARED BY	A. ANIOL
CHECKED BY	A. Lombardo
DATE	7/14/94
APPROVED BY	
DATE	8/16/94

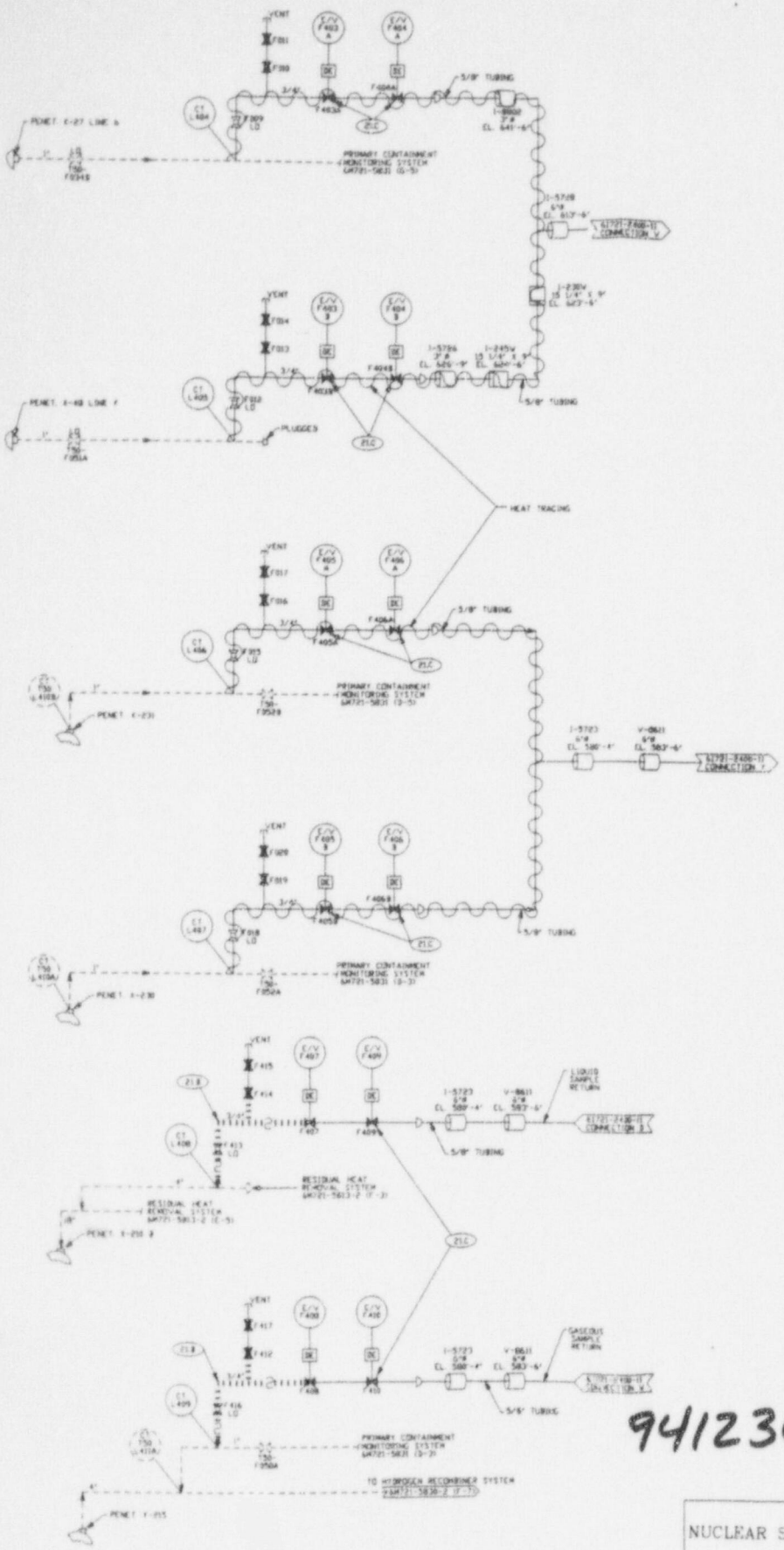
DRC CODE	S
Detroit Edison	Fermi 2
ISI CLASSIFICATION BOUNDARY DRAWING DEMINERALIZED SERVICE WATER RISERS-TURB., RADWASTE & REACTOR ISI-P11-2	
APERTURE CARD TITLE	DEMIN SERVICE WTR RISERS ISI
PLANT IDENTIFICATION SYSTEM NUMBER	P1100
DOCUMENT TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5823
REV	D



H
G
F
E
D
C
B
A
THREADED CAP (TYP)
VENT
5/8" TUBING
NUCLEAR BOILER SYSTEM
PRESSURIZED REACTOR COOLANT SAMPLES
TO THERMAL RECOMBINER
RHR SYSTEM

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808.
2. THE CODES INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5705.



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5824
LATEST REVISION B

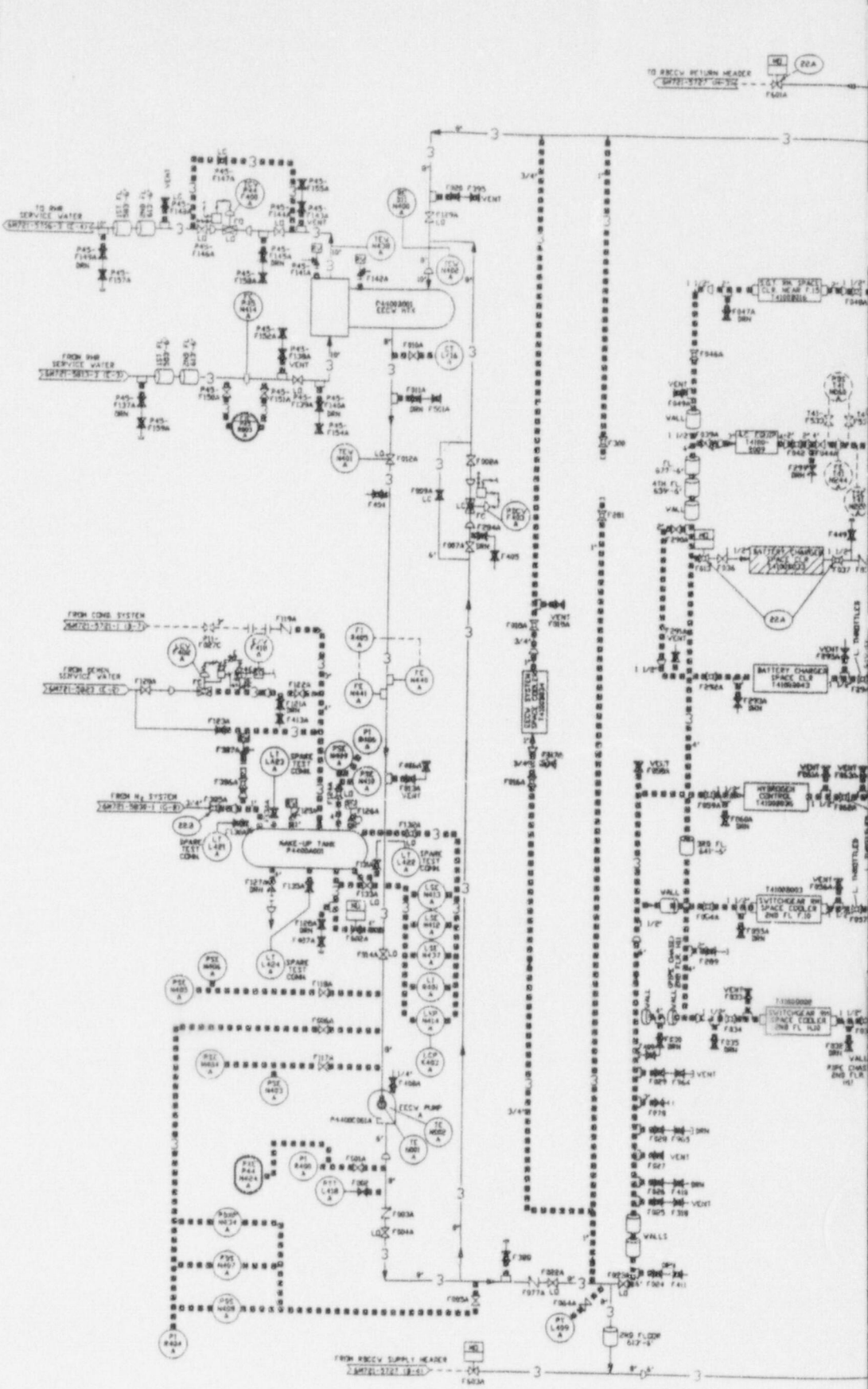
9412300121-22

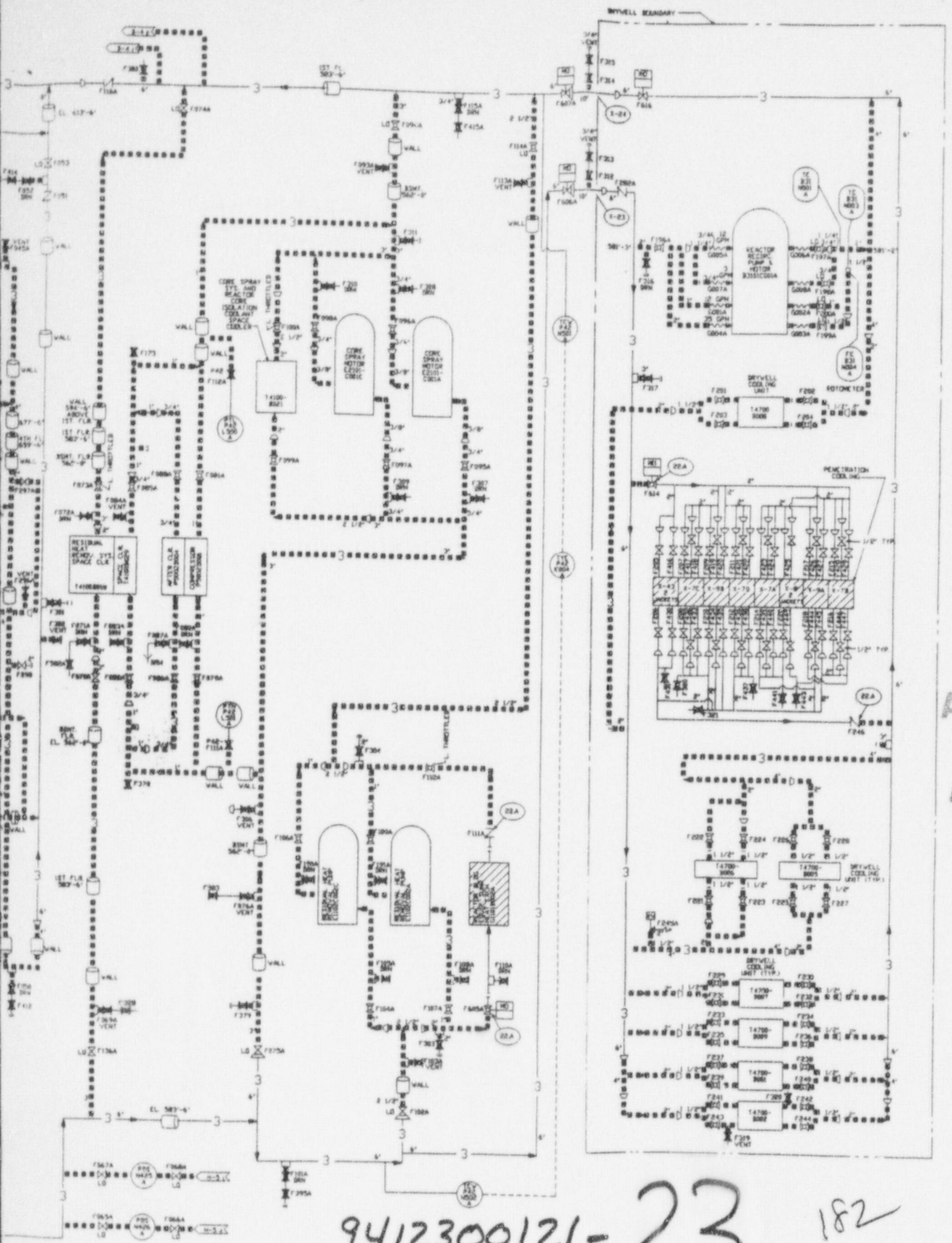
NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

B	INCORPORATED CHANGES PER LAP 8010-0M-A-0000-1-TCM-241 CORRECTED DWG. ZONES AND REMOVED DUPLICATE REFERENCE INFORMATION

SMC CODE	S
Detroit Edison	Fermi 2
TITLE	ISI CLASSIFICATION BOUNDARY DRAWING POST ACCIDENT SAMPLING SYSTEM ISI-P34-1
APPROVED FOR TITLE	POST ACCIDENT SAMPLG SYS ISI
PLANT CONSTRUCTION SYSTEM NUMBER	P34-00
DOCUMENT TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5824


TO RBCCW RETURN HEADER
TO RHR SERVICE WATER
FROM RHR SERVICE WATER
FROM CONS SYSTEM
FROM DEMIN SERVICE WATER
FROM H2 SYSTEM
MAKE-UP TANK
EECW PUMP
EECW SYSTEM SPACE COOLER
BATTERY CHARGER SPACE CLR
SWITCHGEAR RM SPACE COOLER
FROM RBCCW SUPPLY HEADER
2ND FLOOR



ES:
1. DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5000
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5729-1

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5825-1
LATEST REVISION C

9412300121-23

182

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

NUCLEAR SAFETY RELATED

REVISED PER ABN 11273-1 REV.A

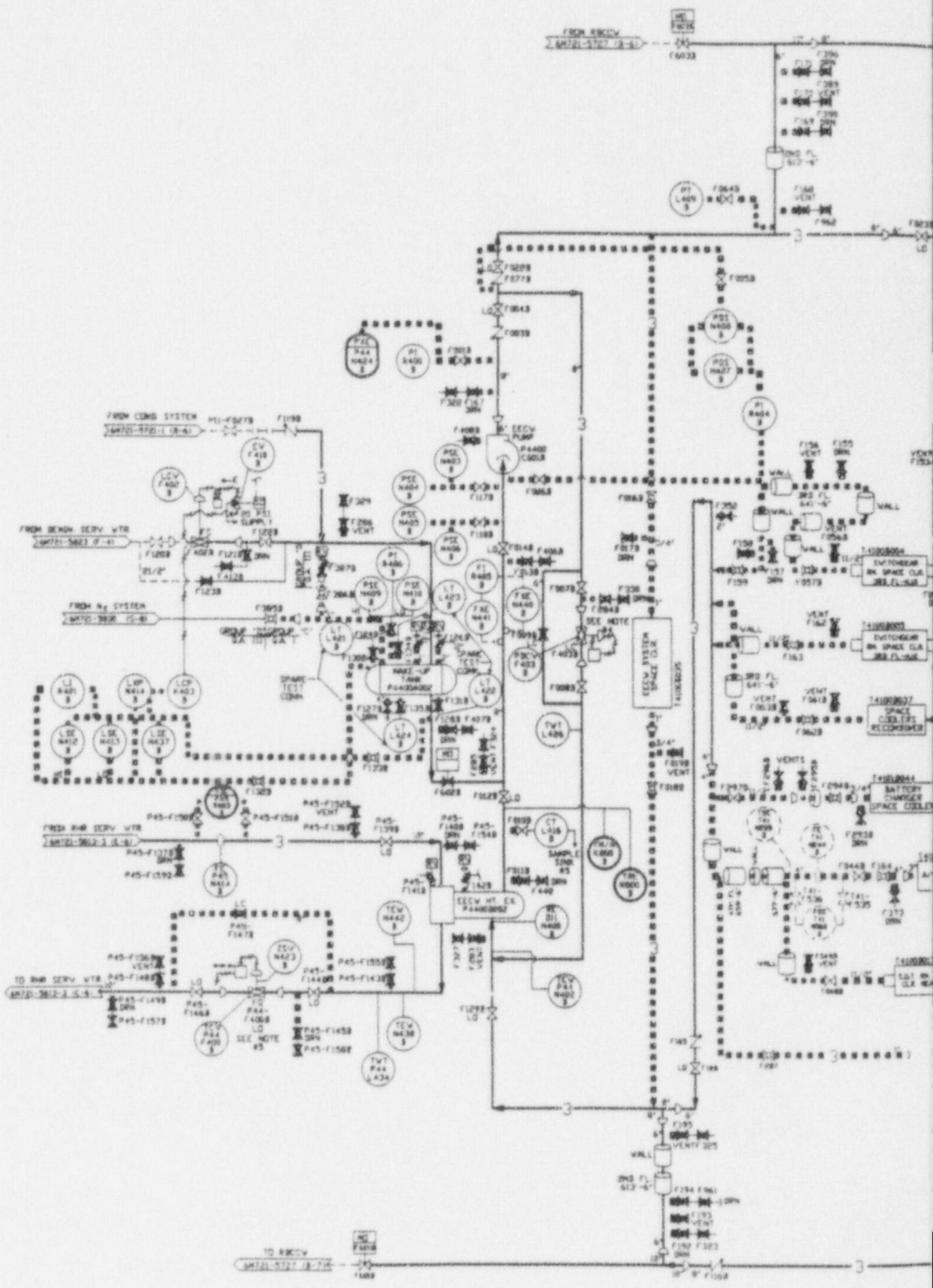
INC CODE S

Detroit Edison Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
EMERGENCY EQUIPMENT COOLING WATER (DIVISION I)
ISI-P44-1

EMER EQUIP CLG WTR DIV 1 ISI-P44-00

DDDMEC

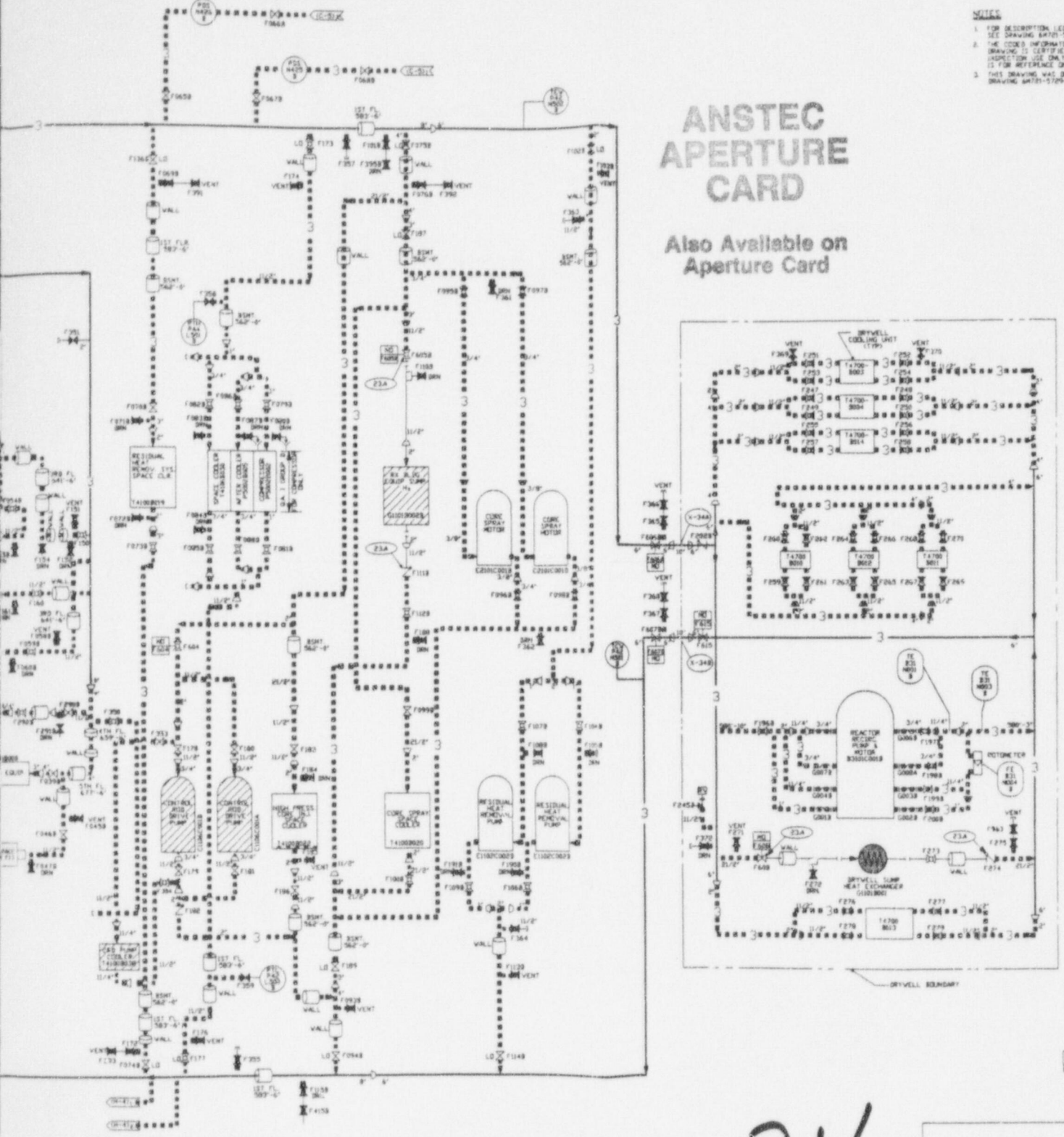

FROM RBCCW
FROM CONS SYSTEM
FROM DEMIN SERV WTR
FROM N2 SYSTEM
FROM RHR SERV WTR
TO RHR SERV WTR
TO RBCCW
ECCW PUMP
ECCW SYSTEM SURGE TANK
ECCW HT EX
SAMPLE SINK
SPARE TEST CONN
SEE NOTE
SWITCHGEAR RM SPACE CLR
SPACE COOLER RECORDER
BATTERY CHARGER SPACE COOLER
VALL
VENTS

NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5729-E

ANSTEC APERTURE CARD

Also Available on Aperture Card



6M721-5825-2
LATEST REVISION B

9412300121-24

NUCLEAR SAFETY RELATED

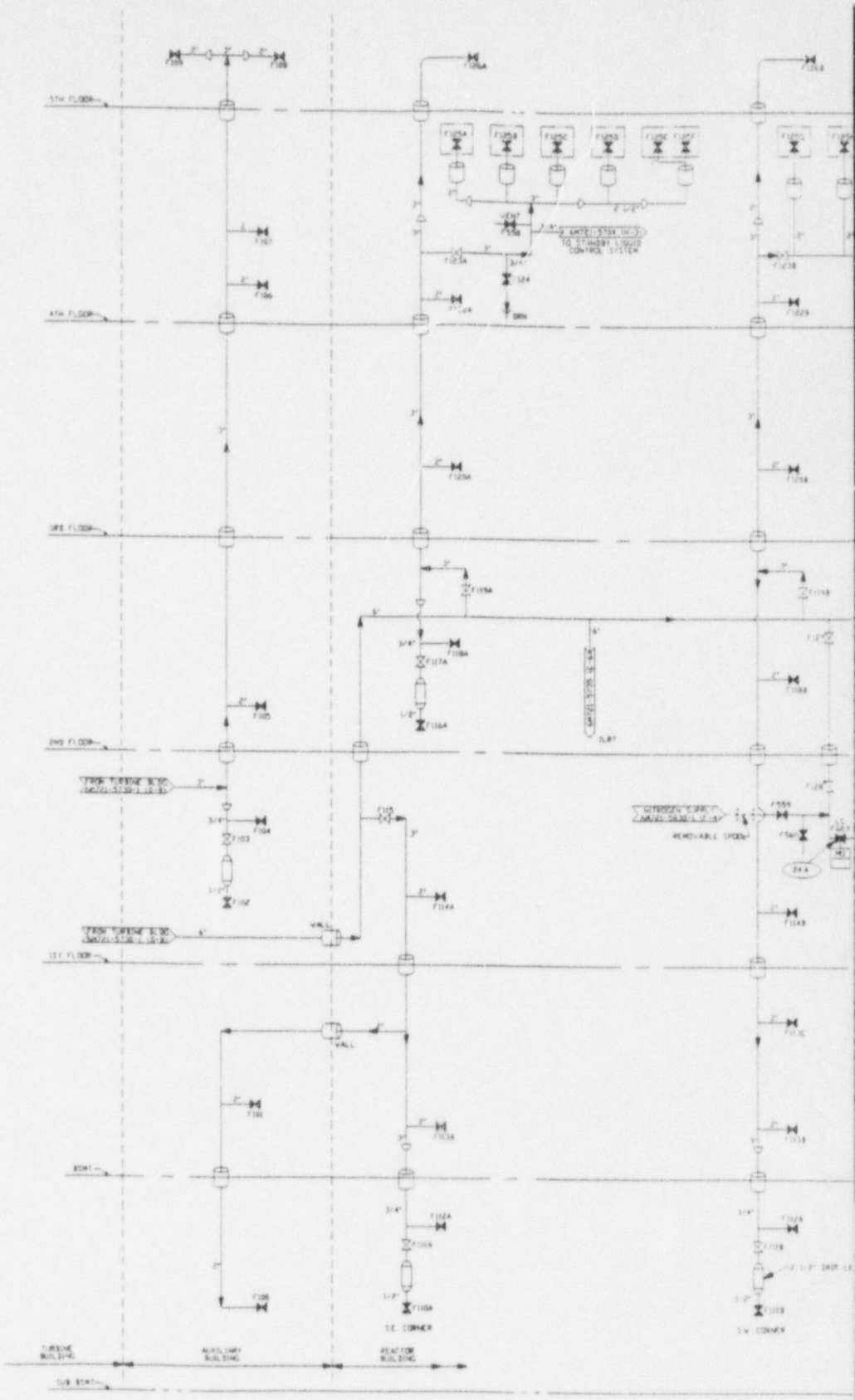
THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED

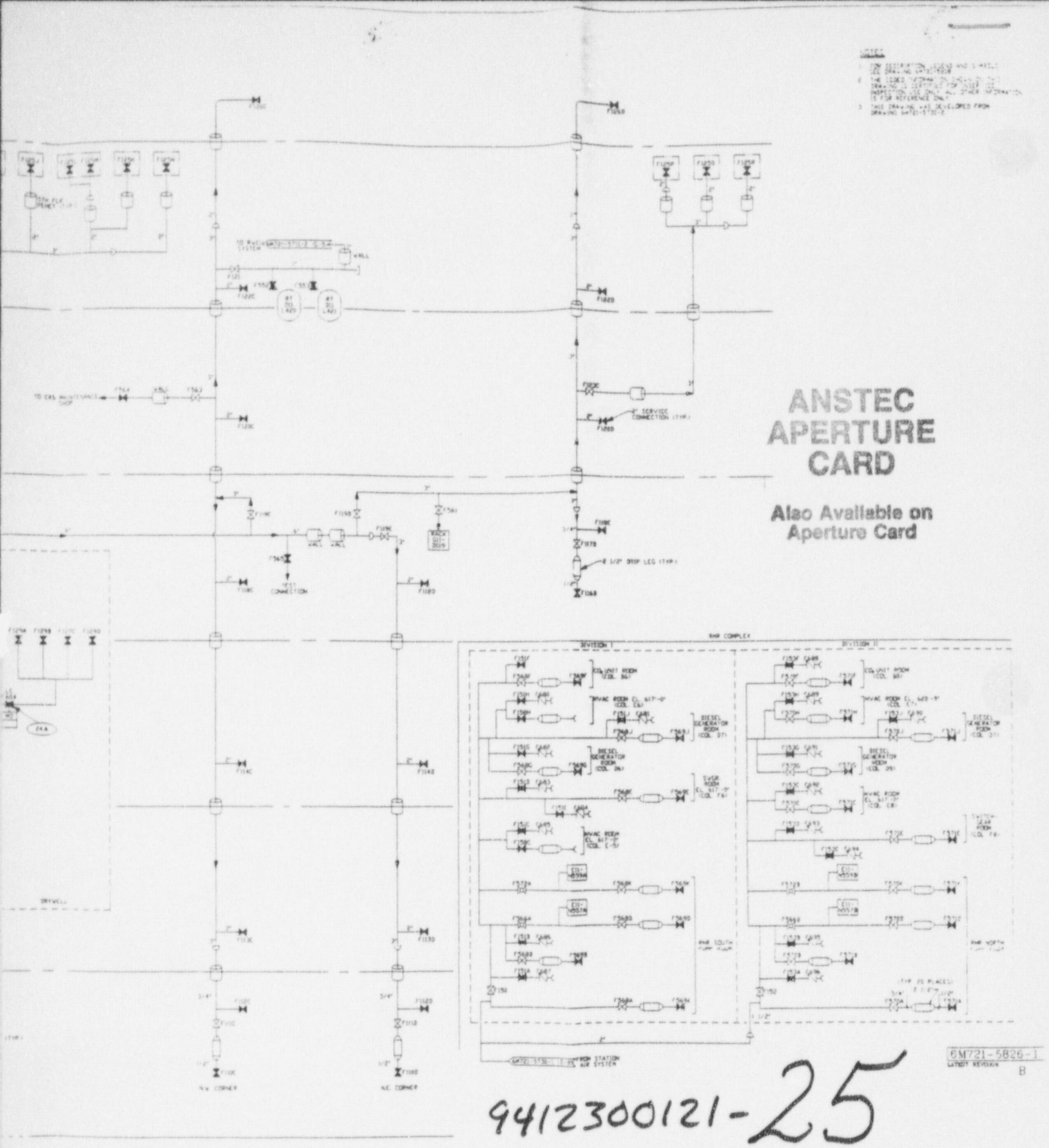
DWG CODE	S
TITLE	Detroit Edison Fermi 2
	ISI CLASSIFICATION BOUNDARY DRAWING EMERGENCY EQUIPMENT COOLING WATER (DIVISION II) ISI-P44-2
APERTURE CARD TITLE	EMER EQUIP COOL WTR DIV II ISI
PLANT DESIGNATION & SYSTEM NUMBER	P44-00
DOCUMENT TYPE CODE	DDDMEC
DRAWING NUMBER	6M721-5825-2 B

B DCO'S INCORPORATED N/A

OTHER REVISIONS
AT ZONE C5 ADDED DRAWING TO INDICATE THE EQUIPMENT THAT IS NOT OPERATING AT ENGINEERED CONDITIONS UNDER ISSUE OPEN ITEM P44-00-01 ANC LCR 93-00-0123

EDP 73187 Q-REV


5TH FLOOR
4TH FLOOR
3RD FLOOR
2ND FLOOR
1ST FLOOR
BSMT
SUB BSMT
TO STANDBY LIQUID CONTROL SYSTEM
REMOVABLE SPOOL
WALL
S.E. CORNER
S.W. CORNER
TURBINE BUILDING
AUXILIARY BUILDING
REACTOR BUILDING



ANSTEC APERTURE CARD

Also Available on Aperture Card

9412300121-25

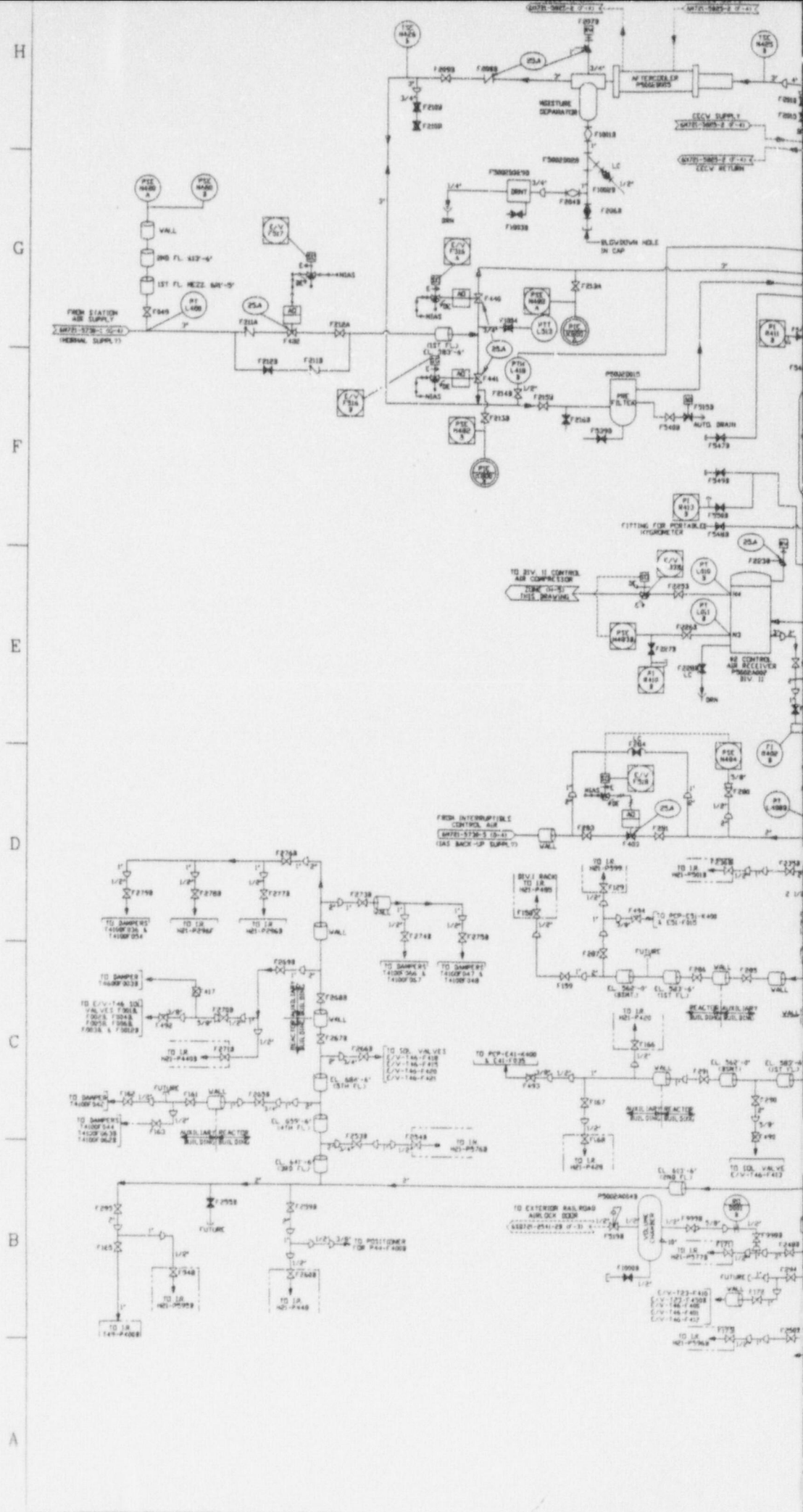
NON-NUCLEAR SAFETY RELATED

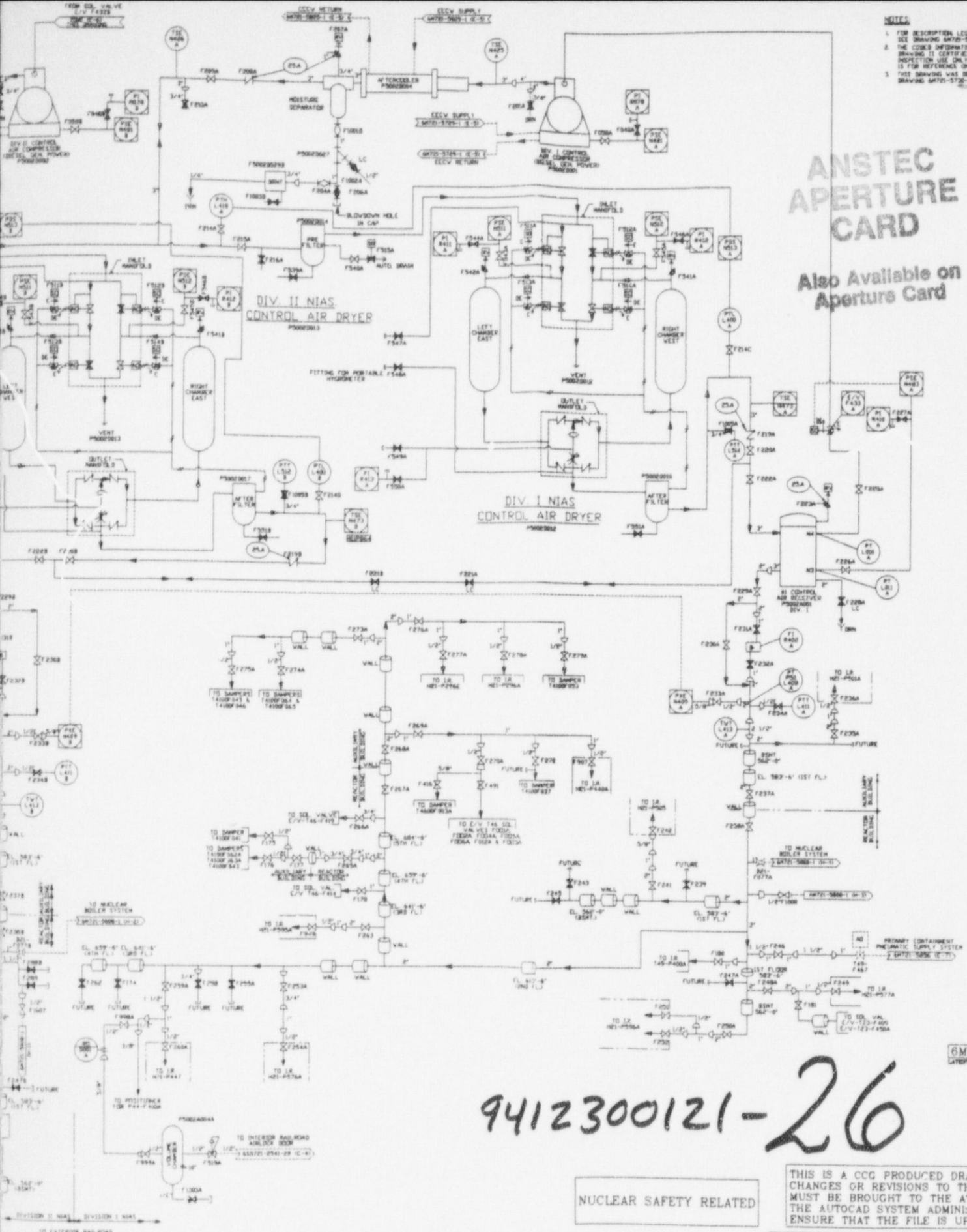
THIS IS A CCG PRODUCED DRAWING. ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

Detroit Edison — Fermi 2

ISI CLASSIFICATION BOUNDRY DRAWING
STATION AIR SYSTEM
(AUX BLDG REACTOR BLDG - RHR COMPLEX) ISI-P56-1B

STATION AIR SYS ISI
P56-01
DDDMEC
6M721-5826-1


H
G
F
E
D
C
B
A
AFTERCOOLER
MOISTURE SEPARATOR
CECW SUPPLY
CECW RETURN
BLOWDOWN HOLE IN CAP
FROM STATION AIR SUPPLY
WALL
AUTO. DRAIN
FITTING FOR PORTABLE HYGROMETER
TO DIV. II CONTROL AIR COMPRESSOR
#2 CONTROL AIR RECEIVER
FROM INTERRUPTIBLE CONTROL AIR
TO DAMPERS
TO SOL. VALVES
AUXILIARY REACTOR BUILDING
TO EXTERIOR RAILROAD AIRLOCK DOOR
TO POSITIONER
FUTURE
8
7
6



ANSTEC APERTURE CARD

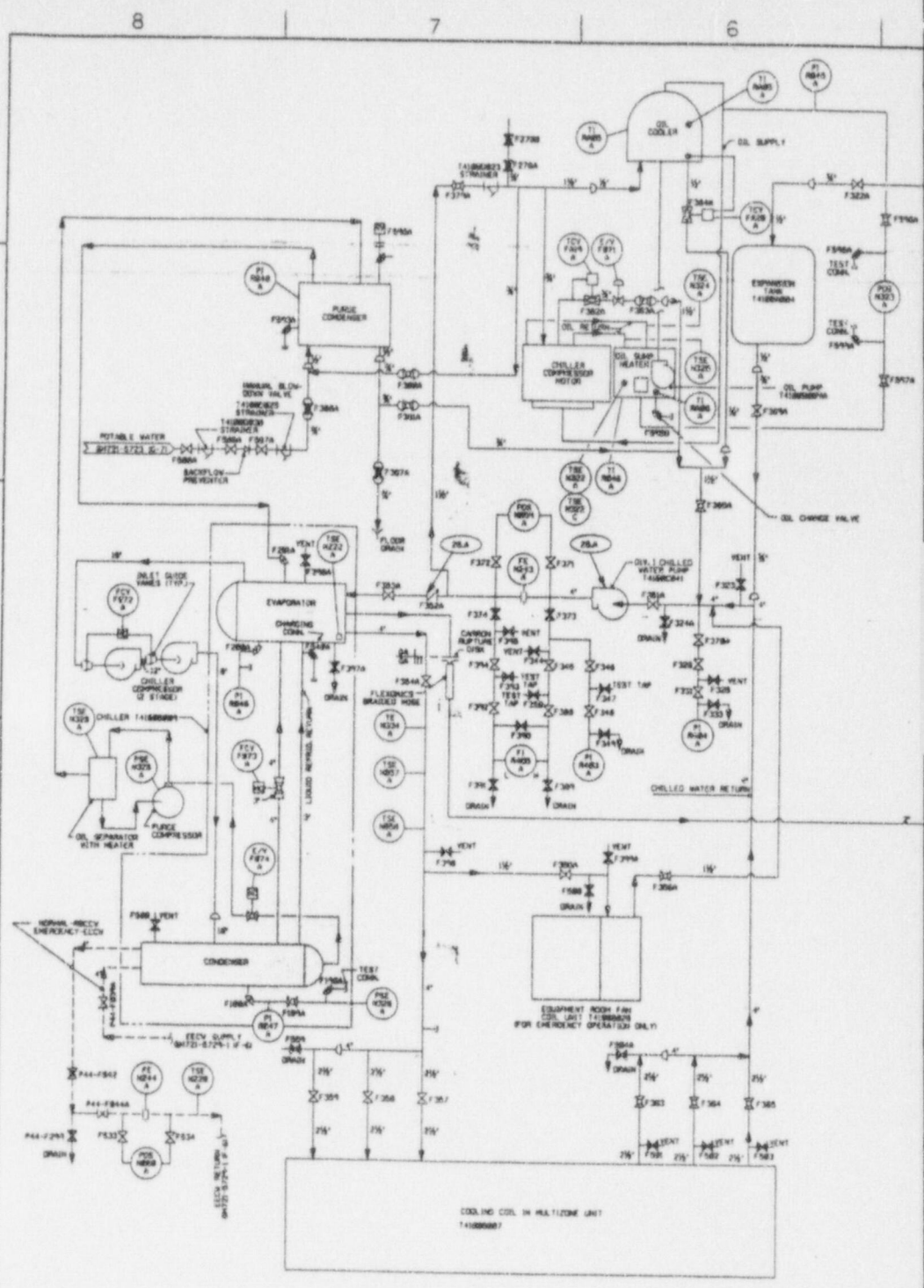
Also Available on Aperture Card

9412300121-26

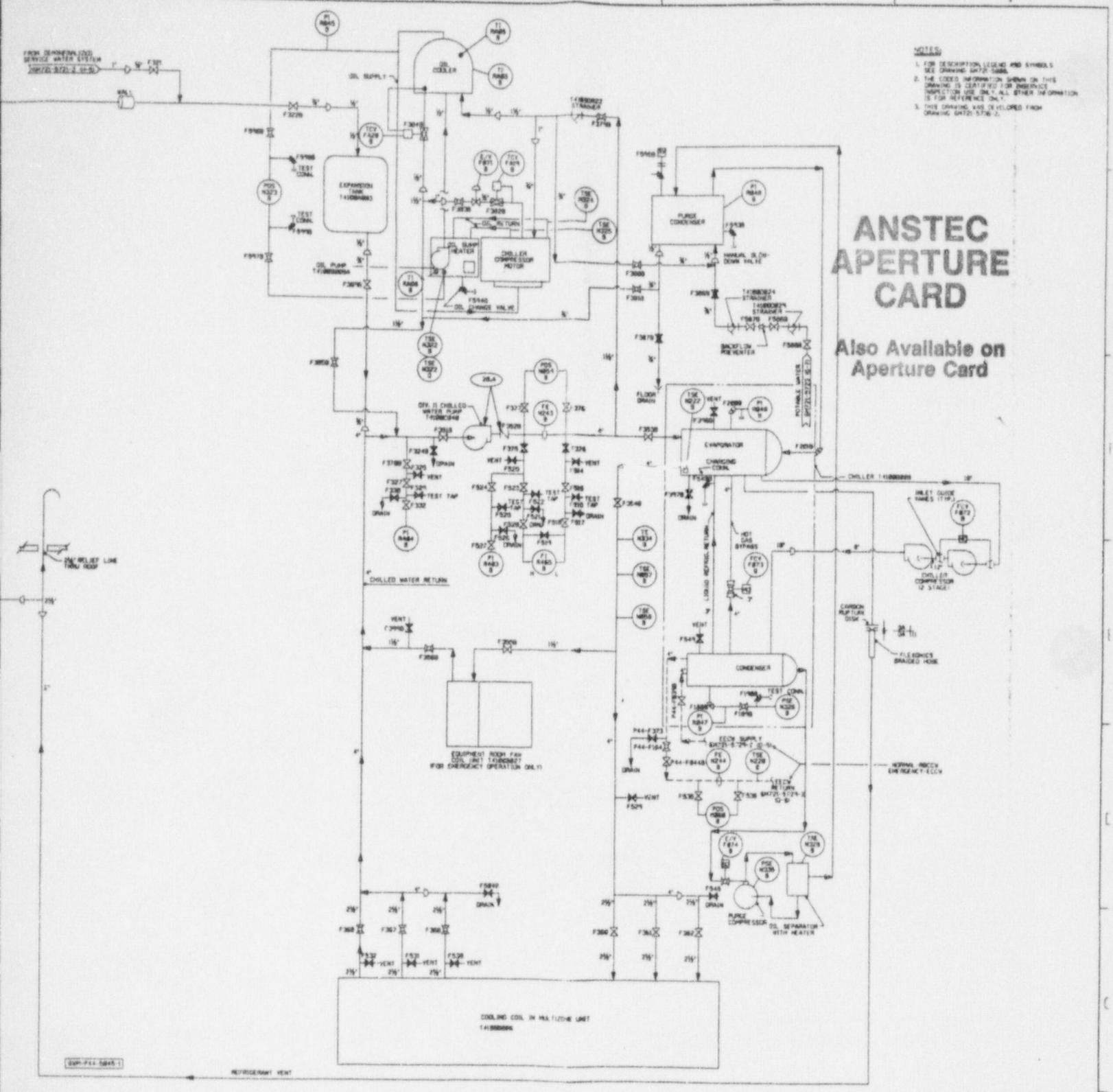
NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

DRC CODE	S
Detroit Edison	Fermi 2
ISI CLASSIFICATION BOUNDARY DRAWING NON-INTERRUPTIBLE CONTROL AIR SYS DIVISION I & II	ISI-P50-2A
NON INTRUPT CON AIR DIV I&II ISI	P50-02
DDDMEC	6M721-5826-2


OIL COOLER
OIL SUPPLY
PURGE CONDENSER
CHILLER COMPRESSOR MOTOR
OIL SUMP HEATER
EXPANSION TANK
OIL PUMP
OIL CHANGE VALVE
POTABLE WATER
BACKFLOW PREVENTER
FLOOR DRAIN
EVAPORATOR
CHARGING CONN.
CHILLER COMPRESSOR (2 STAGE)
CHILLER
OIL SEPARATOR WITH HEATER
PURGE COMPRESSOR
CHILLED WATER RETURN
CONDENSER
EQUIPMENT ROOM FAN COIL UNIT
(FOR EMERGENCY OPERATION ONLY)
COOLING COIL IN MULTIZONE UNIT

DIVISION I



ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5828
LATEST REVISION "0"

DIVISION II

9412300121-27

187

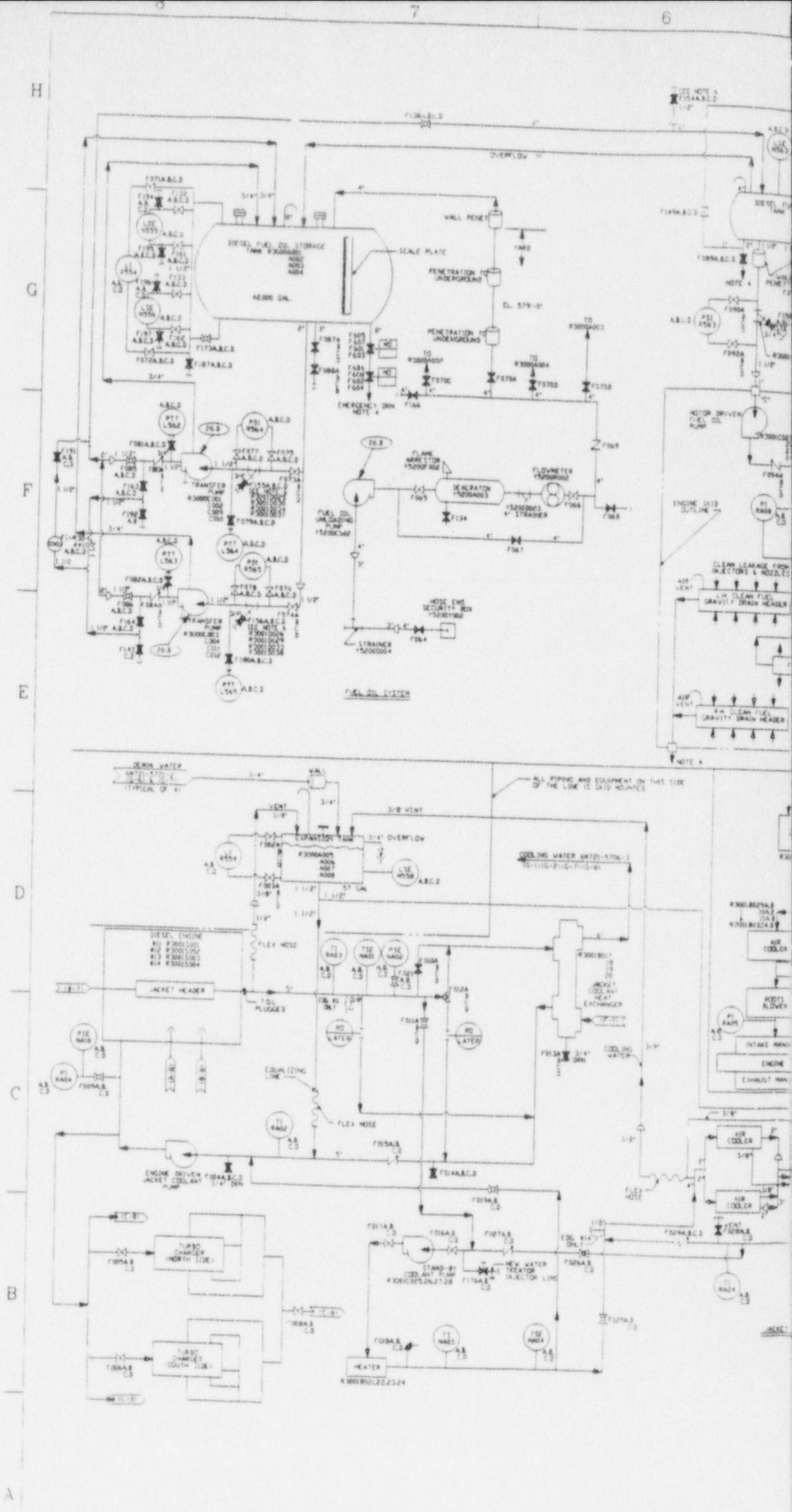
THIS IS AN IGDS PRODUCED DRAWING. ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE IGDS COORDINATOR TO ENSURE THAT THE IGDS FILE IS UPDATED.

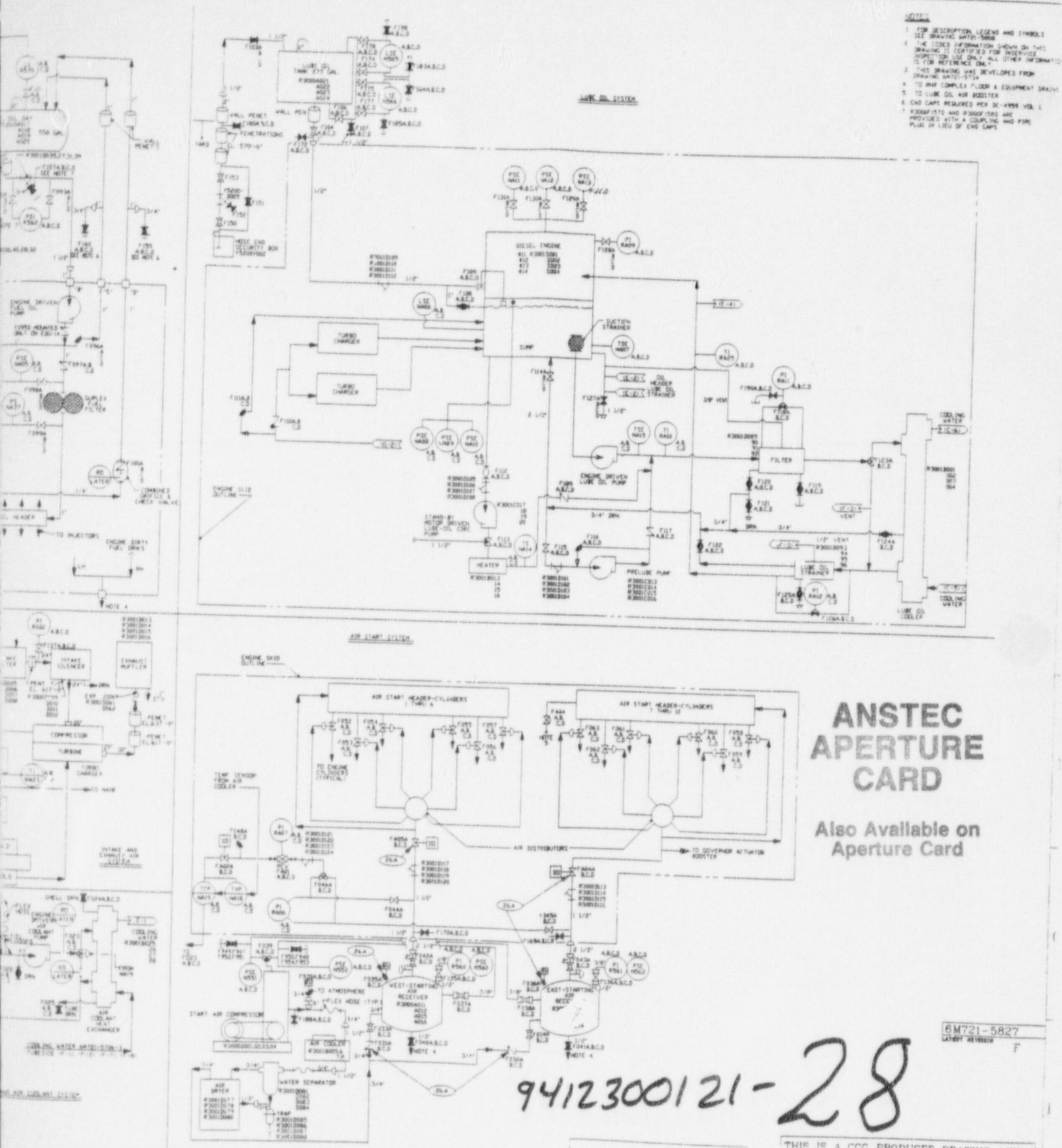
NUCLEAR SAFETY RELATED

INC. CODE	S
Detroit Edison	Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
CONTROL CENTER A/C WATER SYSTEM
ISI-T41-2

CONTROL CTR A/C WATER SYS ISI


DIESEL FUEL OIL STORAGE TANK
42,000 GAL
SCALE PLATE
WALL PENET
PENETRATION TO UNDERGROUND
EL 579'-0"
OVERFLOW
EMERGENCY DRN
FLAME ARRESTOR
DEAERATOR
FLOWMETER
4" STRAINER
FUEL OIL UNLOADING PUMP
HOSE EMS SECURITY BRN
STRAINER
TRANSFER PUMP
FUEL OIL SYSTEM
MOTOR DRIVEN FUEL OIL PUMP
ENGINE DIM OUTLINE
CLEAN LEAKAGE FROM INJECTORS & NOZZLES
L.H. CLEAN FUEL GRAVITY DRAIN HEADER
R.H. CLEAN FUEL GRAVITY DRAIN HEADER
DEMIN WATER
ALL PIPING AND EQUIPMENT ON THIS SIDE OF THE LINE IS SKID MOUNTED
3/8" VENT
EXPANSION TANK
3/4" OVERFLOW
57 GAL
COOLING WATER
DIESEL ENGINE
FLEX HOSE
JACKET HEADER
TOL PLUGGED
JACKET COOLANT HEAT EXCHANGER
EQUALIZING LINE
ENGINE DRIVEN JACKET COOLANT PUMP
AIR COOLER
INTAKE MANIFOLD
ENGINE
EXHAUST MANIFOLD
TURBO CHARGER (NORTH SIDE)
TURBO CHARGER (SOUTH SIDE)
STAND-BY COOLANT PUMP
NEW WATER HEATER (HEATER LINE)
HEATER



NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5734
4. TO RHR COMPLEX FLOOR & EQUIPMENT DRAINS
5. TO LUBE OIL AIR BOOSTER
6. END CAPS REQUIRED PER DC-4959 VOL 1
7. R3000F157D AND R3000F158D ARE PROVIDED WITH A COUPLING AND PIPE PLUG IN LIEU OF END CAPS

ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5827

LATEST REVISION F

9412300121-28

NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWING MUST BE BROUGHT TO THE ATTENTION OF THE AUTOCAD SYSTEM ADMINISTRATOR TO ENSURE THAT THE FILE IS UPDATED

Detroit Edison Fermi 2

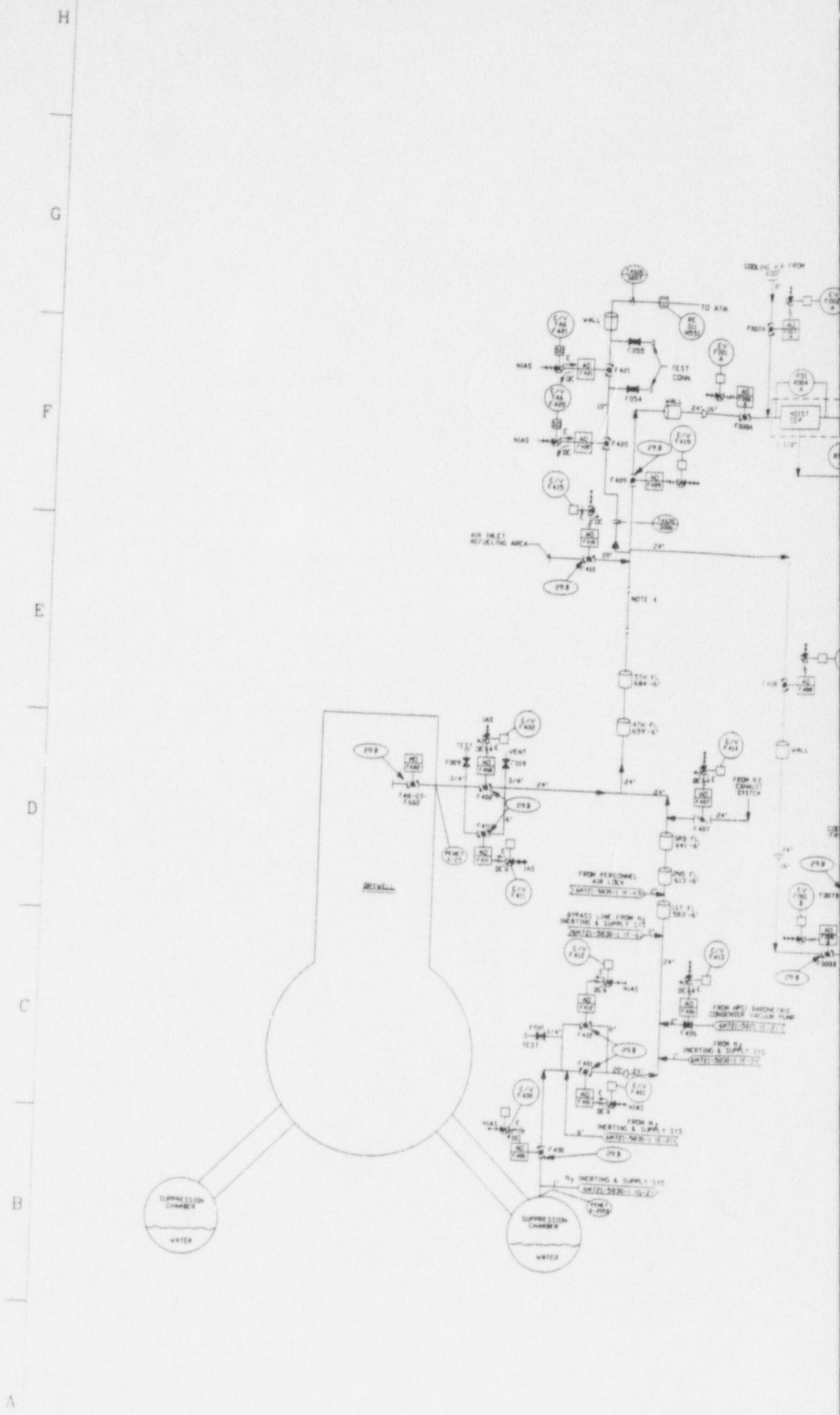
ISI CLASSIFICATION BOUNDARY DRAWING EMERGENCY DIESEL GENERATOR SYSTEM

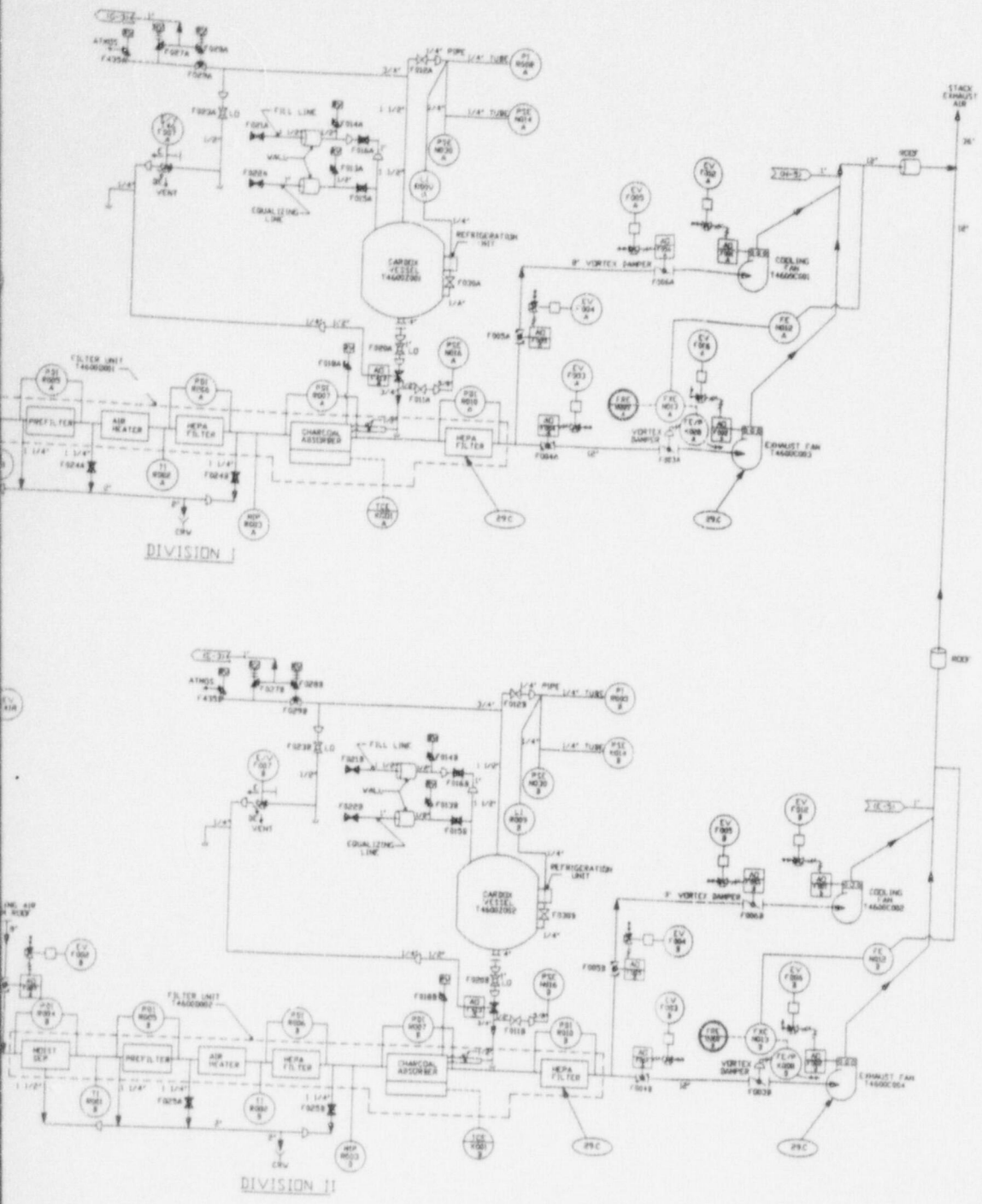
ISI-R30-1

FHPP DIESEL GENERATOR SYS ISI

R30-01

DDDMEC


H
G
F
E
D
C
B
A
TO ATM
WALL
TEST CONN
NIAS
AIR INLET REFUELING AREA
NOTE 4
DRYWELL
SUPPRESSION CHAMBER
WATER
FROM PERSONNEL AIR LOCK
BYPASS LINE FROM N2 INERTING & SUPPLY SYS
FROM HPCI BAROMETRIC CONDENSER VACUUM PUMP
FROM N2 INERTING & SUPPLY SYS
N2 INERTING & SUPPLY SYS
FROM R.C. EXHAUST SYSTEM
COOLING AIR FROM
HOIST SEP
TEST
VENT
IAS



NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5806
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5737.
4. TEMPORARY CONNECTION FOR RCDLRT PIPING

ANSTEC APERTURE CARD

Also Available on Aperture Card

9412300121-29

6M721-5829
LATEST REVISION D

NUCLEAR SAFETY RELATED

THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED

THIS DRAWING WAS REFORMATTED BY AUTOCAD AT REVISION "D". ALL PREVIOUS APPROVAL SIGNATURES ARE ON FILE OR MICROFILM IN DOCUMENT CONTROL.

D DCD'S INCORPORATED
CDP 10820 REV. A PNT
CDP 13358 REV. A

OTHER REVISIONS

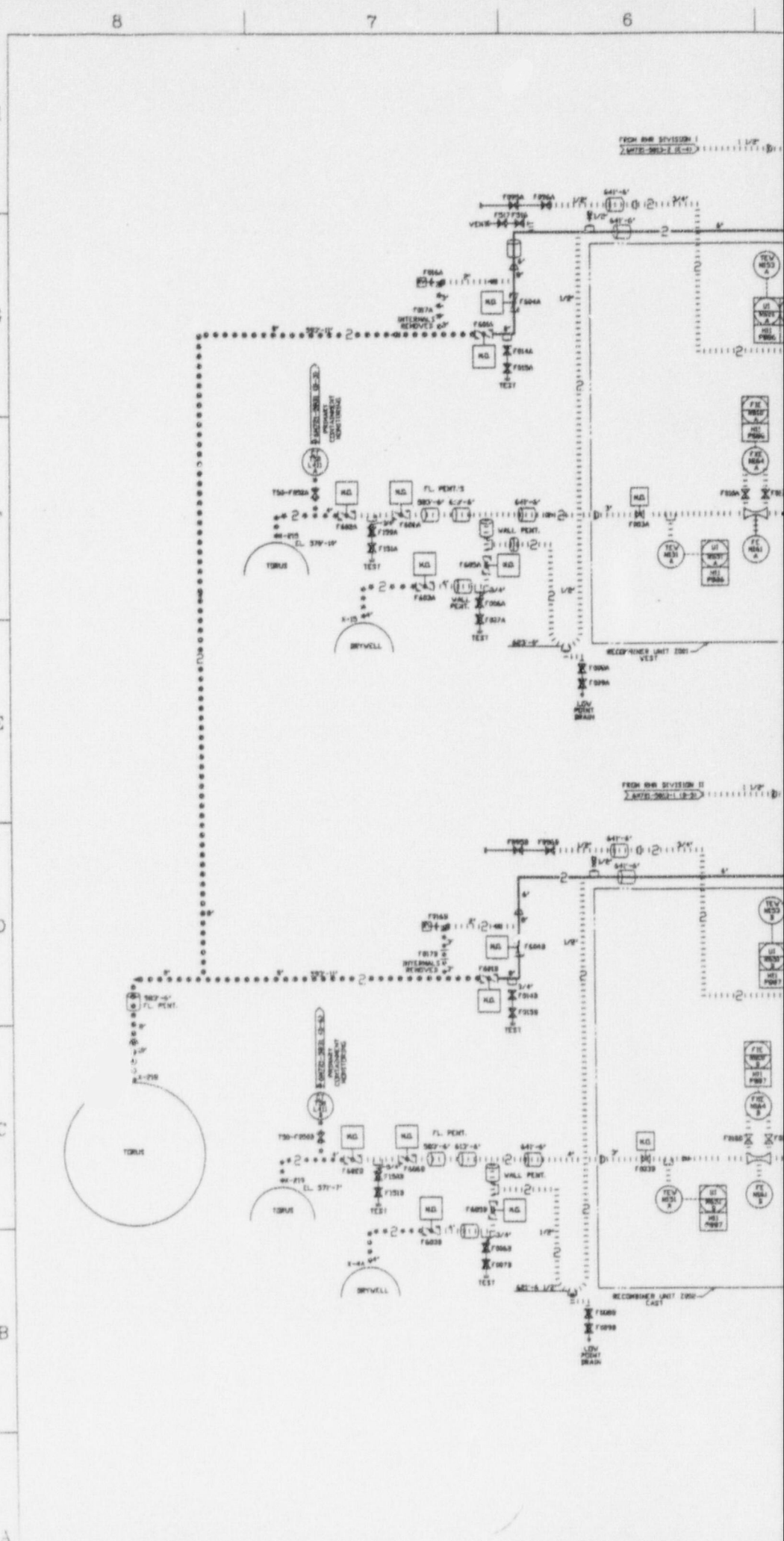
NO	CHANGE DOCUMENT

INC CODE S

Detroit Edison Fermi 2

TITLE
CLASSIFICATION BOUNDARY DRAWING
STAND-BY GAS TREATMENT
SYSTEM ISI-T46-1

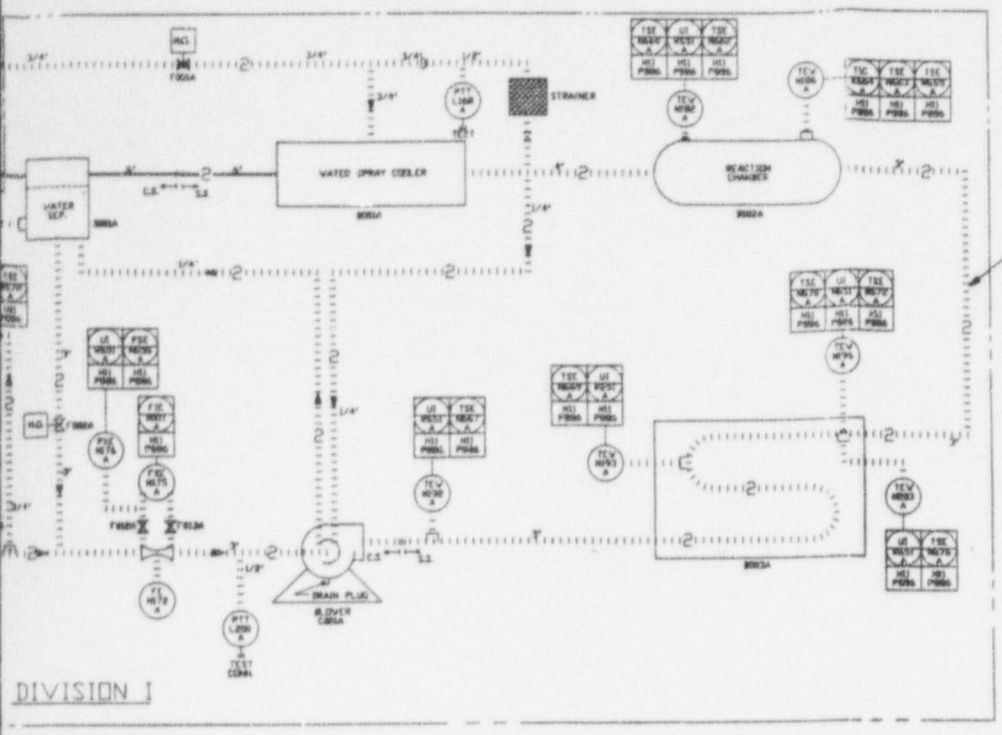
APERTURE CARD TITLE
STAND-BY GAS TREATMENT SYS ISI

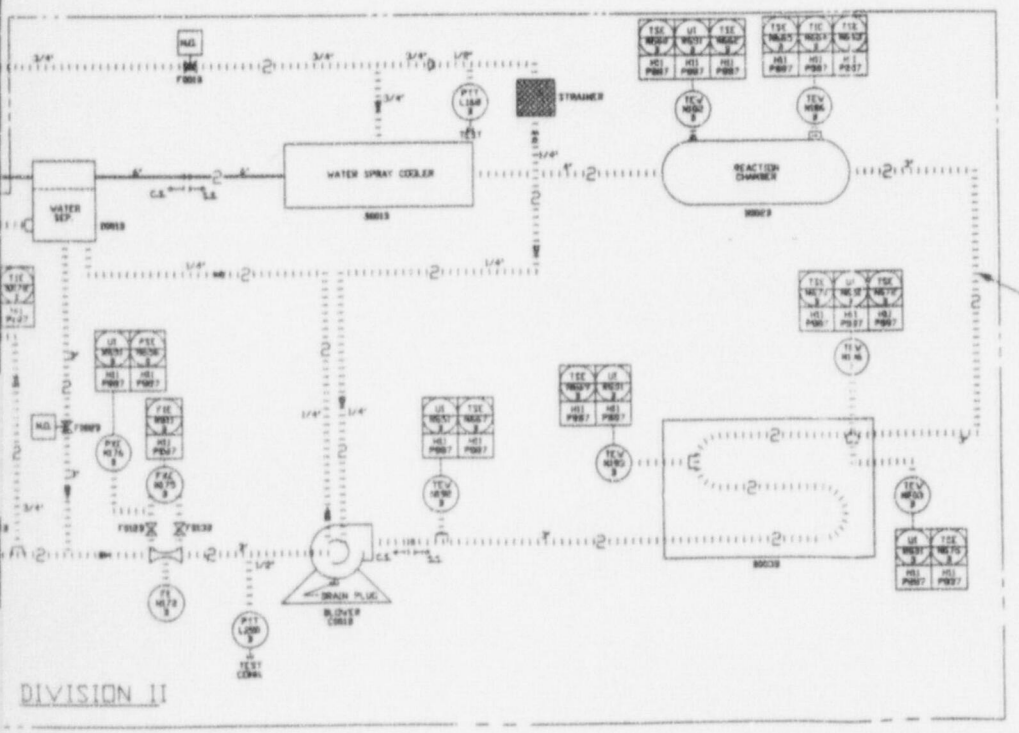

8
7
6
H
G
F
E
D
C
B
A
FROM RHR DIVISION I
FROM RHR DIVISION II
TORUS
DRYWELL
FL. PENT.
WALL PENT.
RECOMBINER UNIT
LOW POINT DRAIN

5 4 3 2 1

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5830.
2. THE CODED INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5839-2.





ANSTEC APERTURE CARD

Also Available on Aperture Card

6M721-5830
LATEST REVISION
B

9412300121-30

190

NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING AN
CHANGES OR REVISIONS TO THIS DRAWI
MUST BE BROUGHT TO THE ATTENTION
THE AUTOCAD SYSTEM ADMINISTRATOR
ENSURE THAT THE FILE IS UPDATED

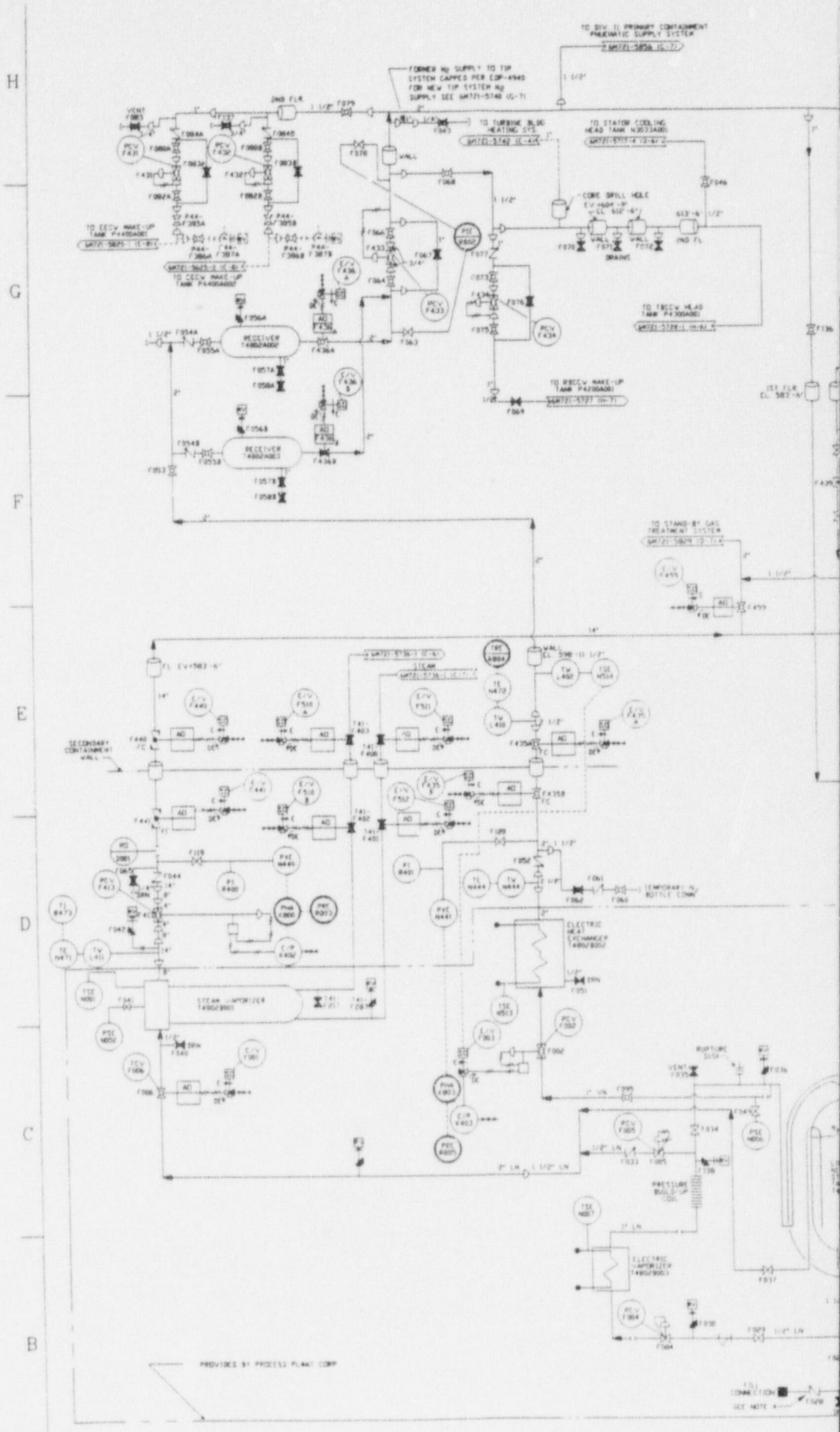
Detroit Edison Fermi 2

S

ISI CLASSIFICATION BOUNDRY DRA
HYDROGEN RECOMBINER SYSTE
ISI-T48-2

HYDROGEN RECOMBINER SYS ISI

T48-04



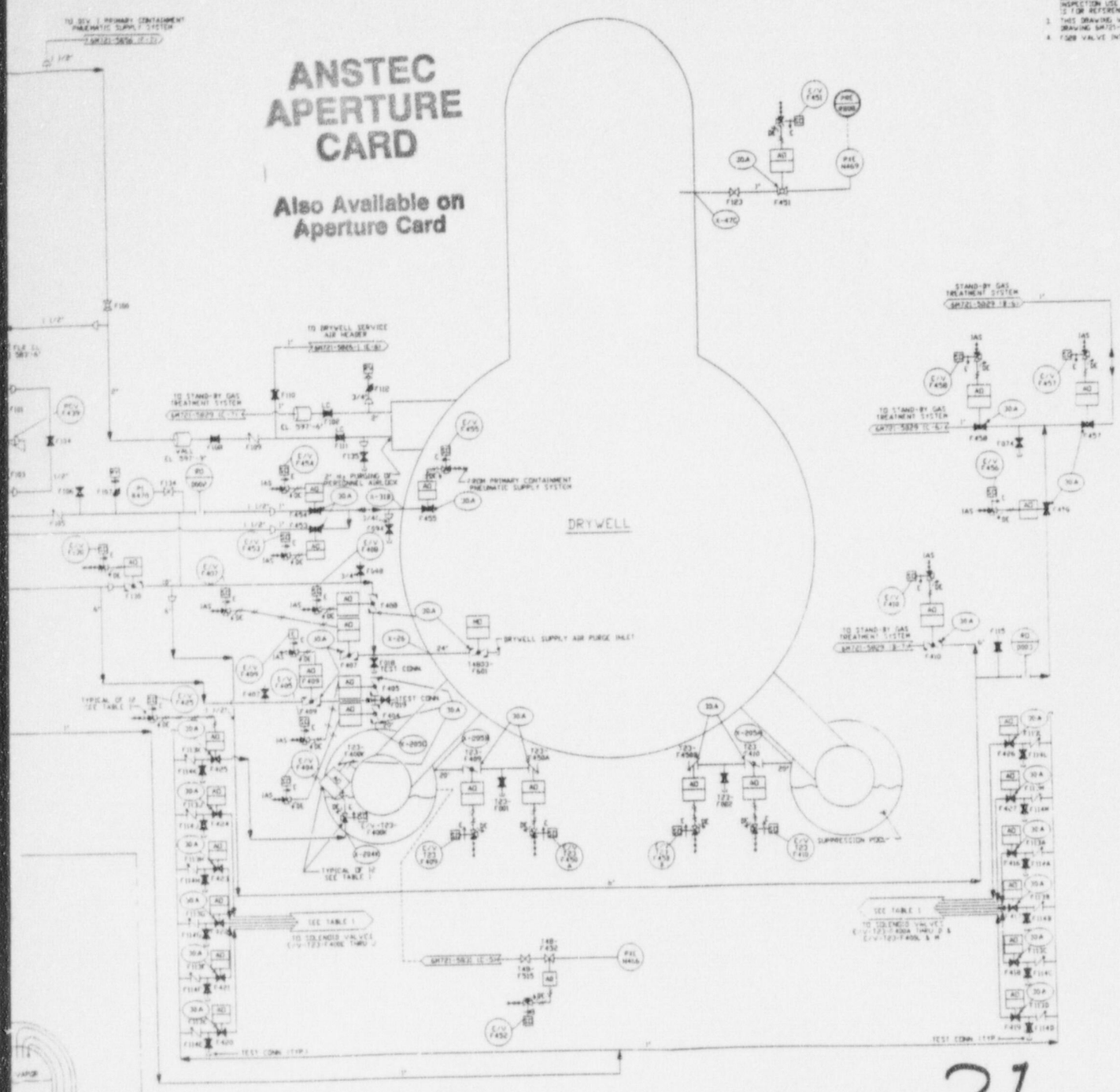
TO DIV. II PRIMARY CONTAINMENT PNUEMATIC SUPPLY SYSTEM
FORMER N2 SUPPLY TO TIP SYSTEM CAPPED PER EDP-4949 FOR NEW TIP SYSTEM N2 SUPPLY SEE 6M721-5740 (G-7)
TO TURBINE BLDG HEATING SYS
TO STATOR COOLING HEAD TANK N3033A001
CORE DRILL HOLE
TO EECW MAKE-UP TANK P4400A001
TO EECW MAKE-UP TANK P4400A002
TO TBCCW HEAD TANK P4300A001
TO RBCCW MAKE-UP TANK P4200A001
RECEIVER T4802A002
RECEIVER T4802A003
TO STAND-BY GAS TREATMENT SYSTEM
SECONDARY CONTAINMENT WALL
STEAM VAPORIZER T4802B001
ELECTRIC HEAT EXCHANGER T4802B002
TEMPORARY N2 BOTTLE CONN
RUPTURE DISK
PRESSURE BUILD-UP COIL
ELECTRIC VAPORIZER T4802B003
PROVIDES BY PROCESS PLANT CORP
FILL CONNECTION
SEE NOTE 4

ANSTEC
APERTURE
CARD

Also Available on
Aperture Card

NOTES:

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5808
2. THE CODES INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.
3. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5729-1
4. F588 VALVE INTERNALS HAVE BEEN REMOVED



94123001 21-31

6M721-5830
LATEST REVISION E

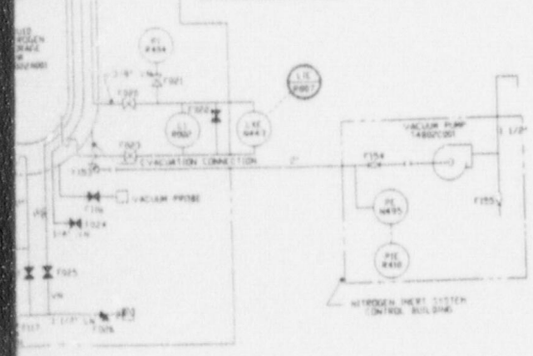


TABLE 1

N_2 SUPPLY ISOLATION VALVES				VACUUM BREAKER VALVES	
CHECK VALVE NUMBER	ISOLATION VALVE NUMBER	SOLENOID VALVE NUMBER	PENET. NUMBER	SOLENOID VALVE NUMBER	VAC. BREAKER VALVE NUMBER *
F113A	F416	E/V-149-F416	X-2046	E/V-123-F400A	123-F400A
F113B	F417	E/V-149-F417	X-2046	E/V-123-F400B	123-F400B
F113C	F418	E/V-149-F418	X-2046	E/V-123-F400C	123-F400C
F113D	F419	E/V-149-F419	X-2046	E/V-123-F400D	123-F400D
F113E	F420	E/V-149-F420	X-2046	E/V-123-F400E	123-F400E
F113F	F421	E/V-149-F421	X-2047	E/V-123-F400F	123-F400F
F113G	F422	E/V-149-F422	X-2046	E/V-123-F400G	123-F400G
F113H	F423	E/V-149-F423	X-2047	E/V-123-F400H	123-F400H
F113J	F424	E/V-149-F424	X-2046	E/V-123-F400J	123-F400J
F113K	F425	E/V-149-F425	X-2046	E/V-123-F400K	123-F400K
F113L	F426	E/V-149-F426	X-2046	E/V-123-F400L	123-F400L
F113M	F427	E/V-149-F427	X-2046	E/V-123-F400M	123-F400M

* 123-F400A THRU M ARE DESIGNATED AS ISI 30A

NON-NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING AN CHANGES OR REVISIONS TO THIS DRAW MUST BE BROUGHT TO THE ATTENTION THE AUTOCAD SYSTEM ADMINISTRATOR ENSURE THAT THE FILE IS UPDATED

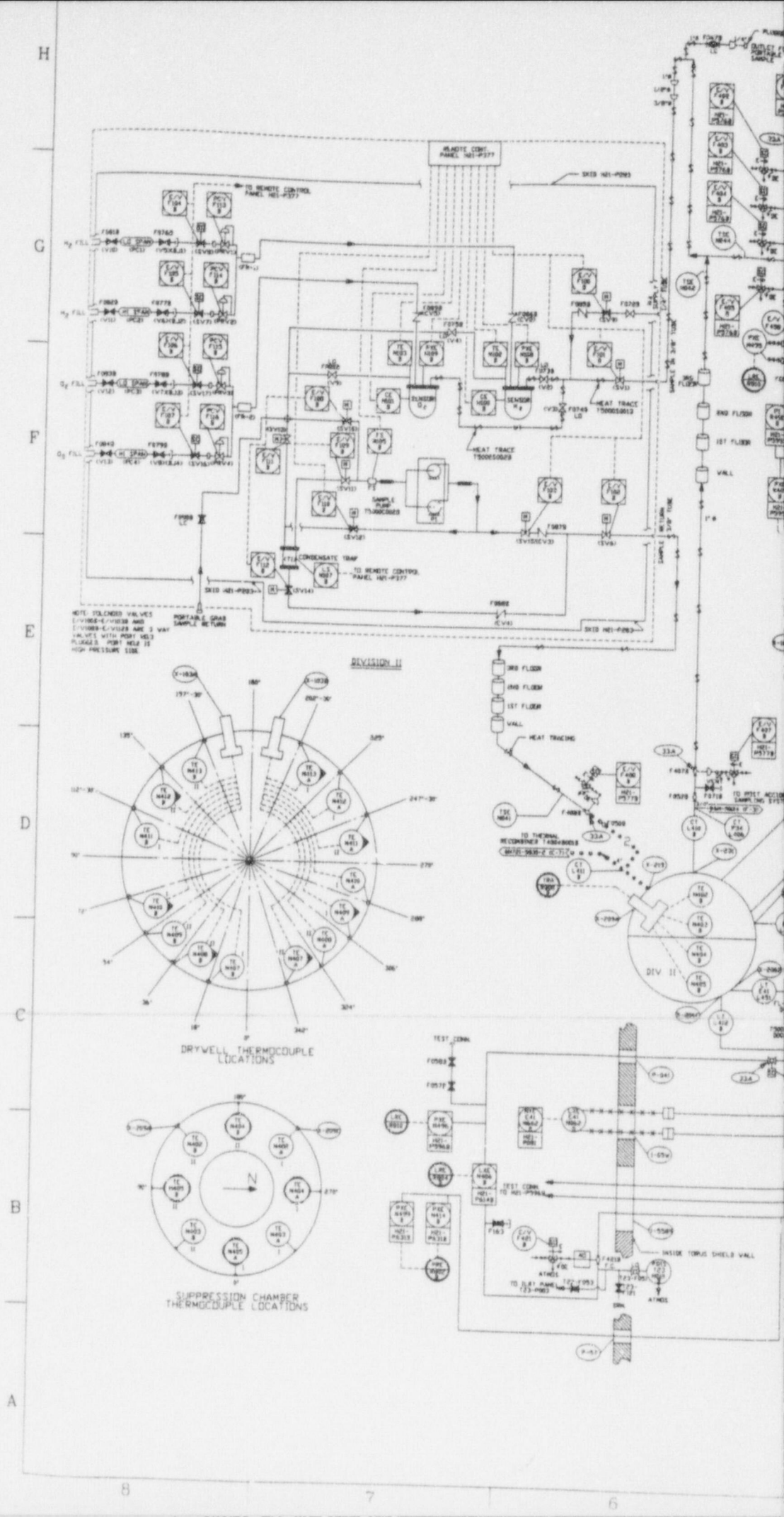
INC CODE	Detroit Edison	Fermi 2
S	ISI CLASSIFICATION BOUNDRY DRA NITROGEN INERTING SYSTEM ISI-T48-1	

THIS DRAWING WAS REFORMATTED BY AUTOCAD AT REVISION "E" AND PREVIOUS APPROVAL SIGNATURES ARE ON FILE OR RECORDED IN DOCUMENT CONTROL.

REVISION NO.	SIGN. DATE	DESCRIPTION
E		INCORPORATE CHANGES PER CP 1063

PREPARED BY	DATE		
CHECKED BY	DATE		
SUPERVISOR GRADE	DATE		
SUPERVISOR DISCIPLINE	DATE		
DESIGN LEAD	DATE		
SUPERVISOR DISCIPLINE	DATE		
SUPERVISOR GRADE	DATE		
SUPERVISOR DISCIPLINE	DATE		

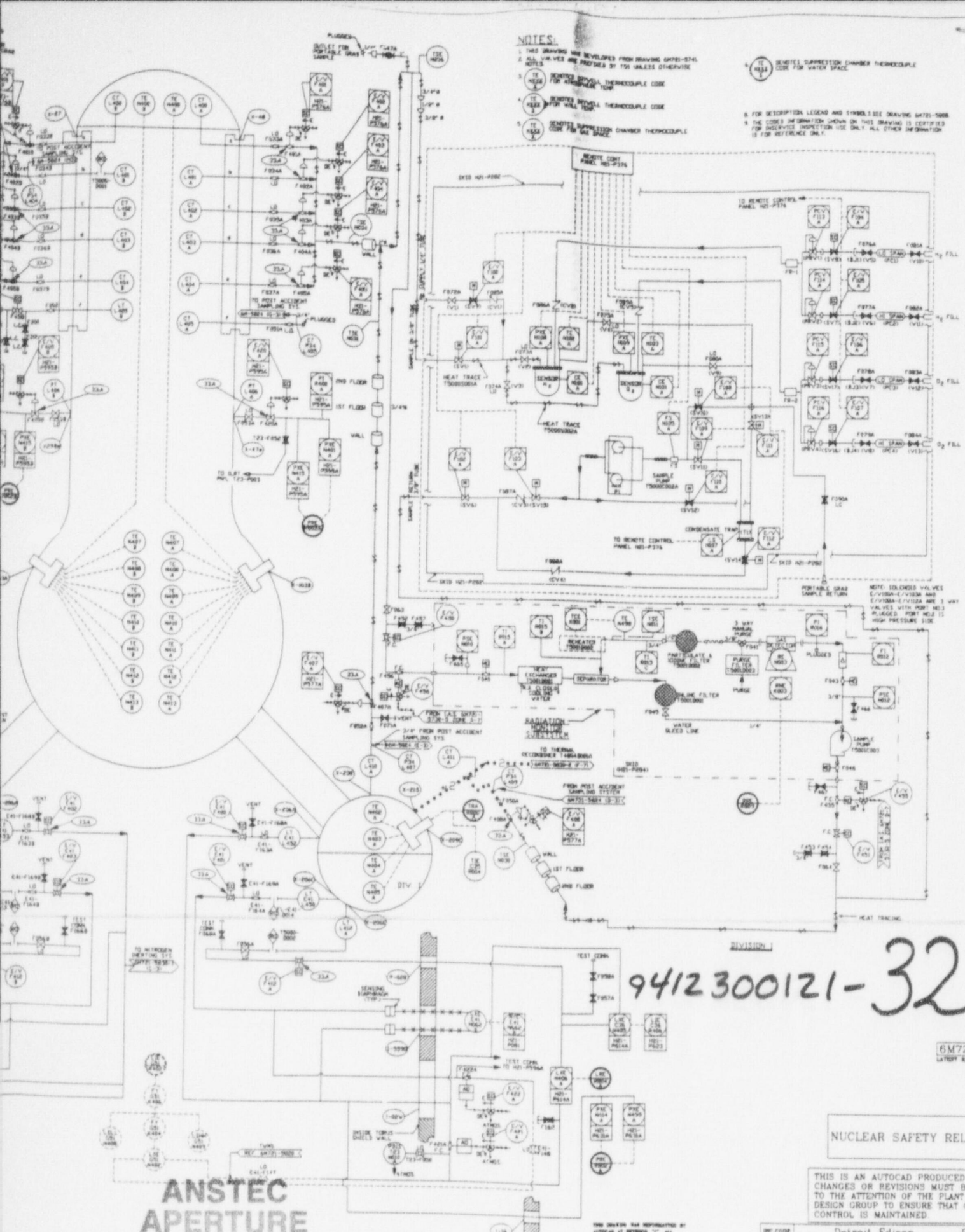
NITROGEN INERTING SYS. ISI



DIVISION II
DRYWELL THERMOCOUPLE LOCATIONS
SUPPRESSION CHAMBER THERMOCOUPLE LOCATIONS
DIV II
HEAT TRACING
CONDENSATE TRAP
SAMPLE PUMP
TO REMOTE CONTROL PANEL H21-P377
PORTABLE GRAB SAMPLE RETURN
TEST CONN.
INSIDE TORUS SHIELD WALL
ATMOS

NOTES:

1. THIS DRAWING WAS DEVELOPED FROM DRAWING 6M721-5741.
2. ALL VALVES ARE PROTEUS 31 TSO UNLESS OTHERWISE NOTED.
3. REMOTE WELL THERMOCOUPLE CODE FOR ATMOSPHERE TEMP.
4. REMOTE WELL THERMOCOUPLE CODE FOR WALL TEMP.
5. REMOTE SUBMERSION CHAMBER THERMOCOUPLE CODE FOR GAS SPACE.
6. REMOTE SUBMERSION CHAMBER THERMOCOUPLE CODE FOR WATER SPACE.
8. FOR DESCRIPTION LEGEND AND SYMBOLS SEE DRAWING 6M721-5008.
9. THE CODES INFORMATION SHOWN ON THIS DRAWING IS CERTIFIED FOR INSERVICE INSPECTION USE ONLY. ALL OTHER INFORMATION IS FOR REFERENCE ONLY.



9412300121-32

6M721-5831
LATEST REVISION G

NUCLEAR SAFETY RELATED

THIS IS AN AUTOCAD PRODUCED DRAWING CHANGES OR REVISIONS MUST BE BROUGHT TO THE ATTENTION OF THE PLANT ENGINEERING DESIGN GROUP TO ENSURE THAT CONFIGURATION CONTROL IS MAINTAINED

Detroit Edison Fermi 2

ISI CLASSIFICATION BOUNDARY DRAWING
PRIMARY CONTAINMENT
MONITORING SYSTEM
ISI T50-1

PRIM CNTM MON SYSTEM ISI

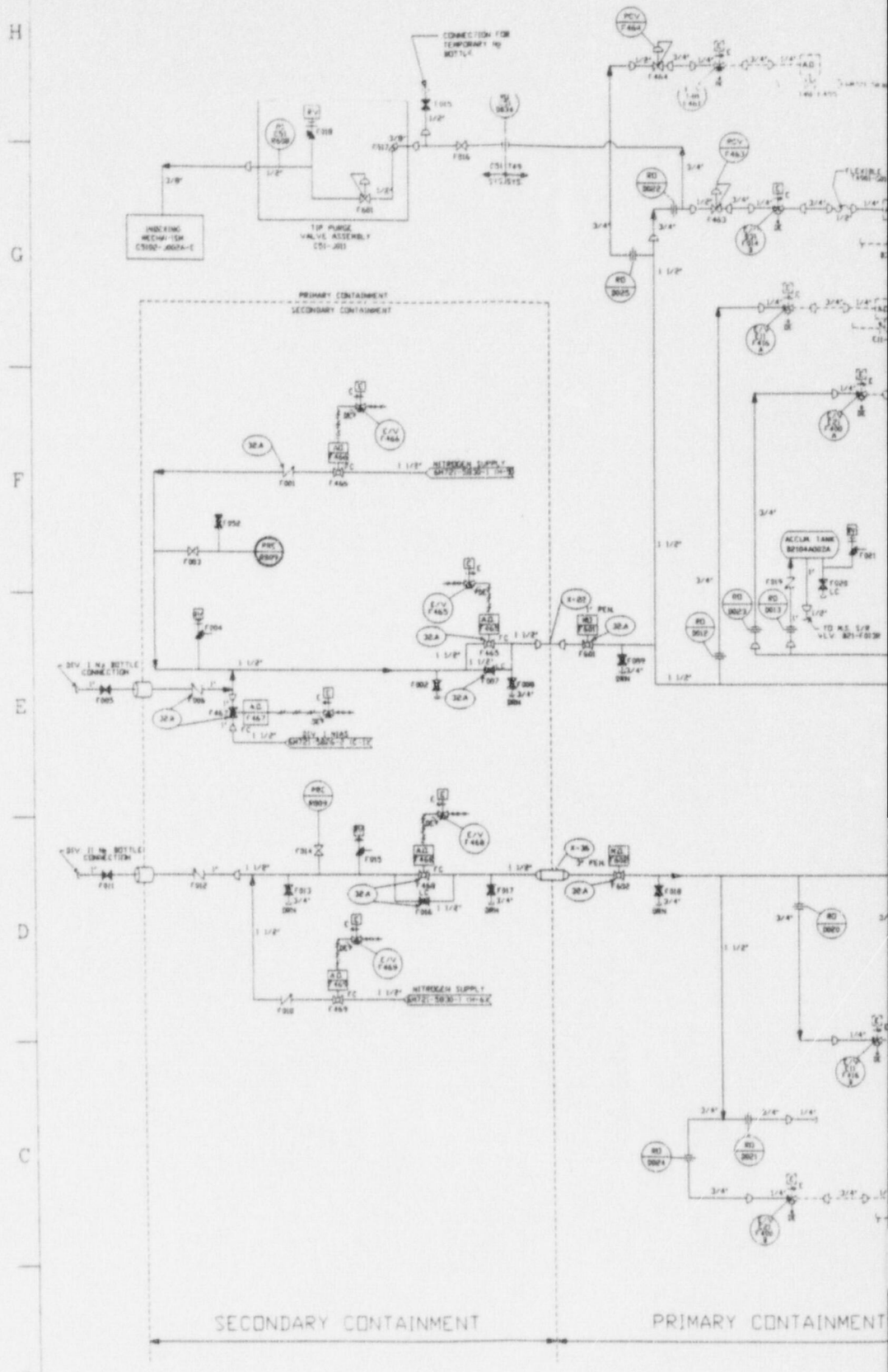
T5000

DDDMEC

6M721-5831 G

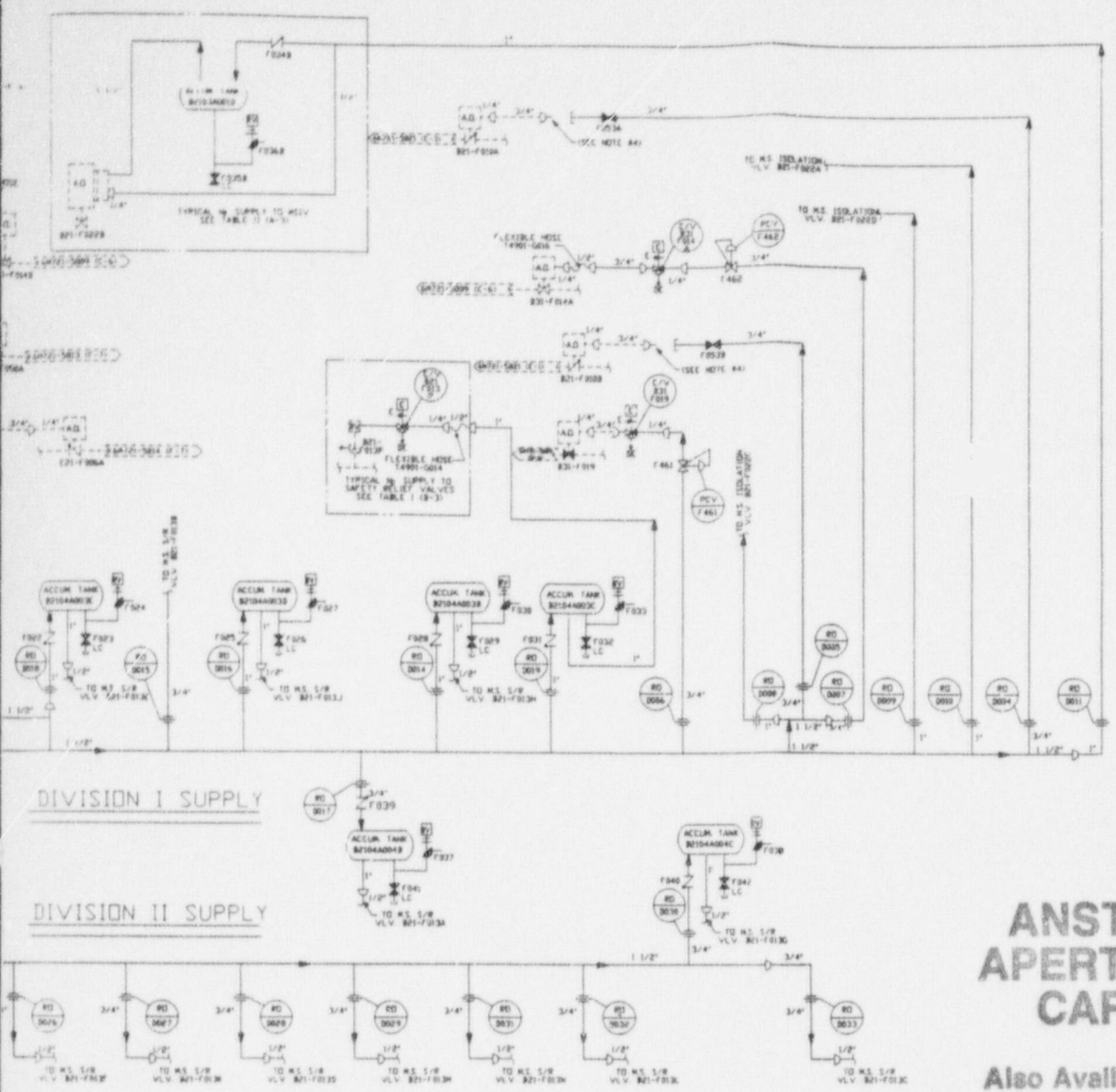
ANSTEC APERTURE CARD

Also Available on Aperture Card


CONNECTION FOR TEMPORARY N2 BOTTLE
INDEXING MECHANISM
TIP PURGE VALVE ASSEMBLY
PRIMARY CONTAINMENT
SECONDARY CONTAINMENT
NITROGEN SUPPLY
ACCUM. TANK
DIV. I N2 BOTTLE CONNECTION
DIV. II N2 BOTTLE CONNECTION
SECONDARY CONTAINMENT
PRIMARY CONTAINMENT

NOTES

1. FOR DESCRIPTION, LEGEND AND SYMBOLS SEE DRAWING 6M721-5899
2. THE COLOR INFORMATION SHOWN ON THIS DRAWING IS [illegible]
3. [illegible]
4. SUPPLY CONNECTION FOR ISI-PLP ACTUATOR TESTING



ANSTEC APERTURE CARD

Also Available on Aperture Card

TABLE I

	AUTOMATIC DEPRESSURIZATION SYSTEM (ADS)					LOW-LOW SET (LLS)		PREMPT RELIEF TRIP (PRT)							
SAFETY RELIEF VALVE NO. B21-	F013F	F013E	F013H	F013J	F013P	F013G	F013A	F013H	F013H	F013F	F013G	F013L	F013C	F013K	F013J
DATAPOD NO. (V-V B21-	F013F	F013E	F013H	F013J	F013P	F013G	F013A	F013H	F013H	F013F	F013G	F013L	F013C	F013K	F013J
FLEXIBLE HOSE NO. T49D1-	G008	G009	G012	G011	G014	G007	G013	G001	G015	G003	G005	G002	G006	G004	G011

TABLE II

MSIV NO. B21-	F002B	F002C	F002A	F002D
CHECK VALVE T49-	F034B	F034C	F034A	F034D
DRAIN T49-	F035B	F035C	F035A	F035D
RELIEF T49-	F036B	F036C	F036A	F036D
ACCUM. TANK	B21D1 A003B	B21D1 A003A	B21D1 A003C	B21D1 A003D
STEAM LINE	B	C	A	D

6M721-5856
LATEST REVISION E

9412300121-33

NUCLEAR SAFETY RELATED

THIS IS A CCG PRODUCED DRAWING ANY CHANGES OR REVISIONS TO THIS DRAWIN MUST BE BROUGHT TO THE ATTENTION THE AUTOCAD SYSTEM ADMINISTRATOR T ENSURE THAT THE FILE IS UPDATED

THIS DRAWING WAS REPRODUCED BY AUTOCAD AT REVISION 5. ALL PREVIOUS APPROVAL SIGNATURES ARE ON FILE ON MICROFILM IN DOCUMENT CONTROL.

CNC CODE S	Detroit Edison Fermi 2
	ISI CLASSIFICATION BOUNDARY DRAW PRIMARY CONTAINMENT PNEUMATIC SUPPLY SYSTEM ISI-T49-1
	PRIM CONTAIN PNEU SUPPLY ISI T49-01
	DDDMEC

E REVISED PER ARN-13456-1, REV 0

6M721-5856