CONTAINMENT VESSEL INTEGRATED LEAK RATE TEST

DAVIS-BESSE NUCLEAR POWER STATION UNIT 1

TOLEDO EDISON COMPANY

CONTAINMENT VESSEL

INTEGRATED LEAK RATE TEST

DAVIS-BESSE NUCLEAR POWER STATION UNIT NO. 1

TOLEDO EDISON COMPANY

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Date: December 22, 1976

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REPORT SUMMARY AND CONCLUSIONS

The leak rate testing performed in September 1976 on the containment vessel at the Davis-Besse Nuclear Power Station Unit 1 has shown that the actual leakage from the containment vessel, when it is pressurized to the peak calculated pressure, is less than the design leakage of the vessel which is half the maximum allowable leakage assumed in safety analyses. These results are well within Appendix J of 10 CFR 50 requirements and the containment vessel is therefore assessed as being fully capable of performing its intended function in the operation of Unit 1.

The final containment vessel leakage rate determined by this test was 0.08815 ± 0.02318 percent per 24 hours by weight.

This report includes the procedures used to perform the integrated leak rate test, the test results and data, the process and instrumentation diagrams of the systems which penetrate the containment vessel (Attachment A), and the results of the local leak rate testing (Attachment B).

In conjunction with the leak rate testing, the structural integrity test was successfully completed, but is not a part of this report. After the completion of the structural integrity test, which pressurized the containment vessel to 45 psig, the containment vessel was depressurized to 32 psig for 24 hours prior to performing the containment vessel leak rate test.

Figure 1 shows a time history of the containment vessel pressure throughout the testing performed on the vessel.

The test procedures and attachments which are included in this report were developed to conform to the requirements of Appendix J of 10 CFR 50. The procedures identify the test acceptance criteria, the test prerequisites, the leakage rate measurement equipment, the pressurization system, the ventilation and cooling system requirements, and the valve position schedule. Appendix H of the "Containment Vessel Overall Leakage Rate Test Procedure" is supplemented with a summary of the changes and exceptions to the test procedure required during the performance of the test.

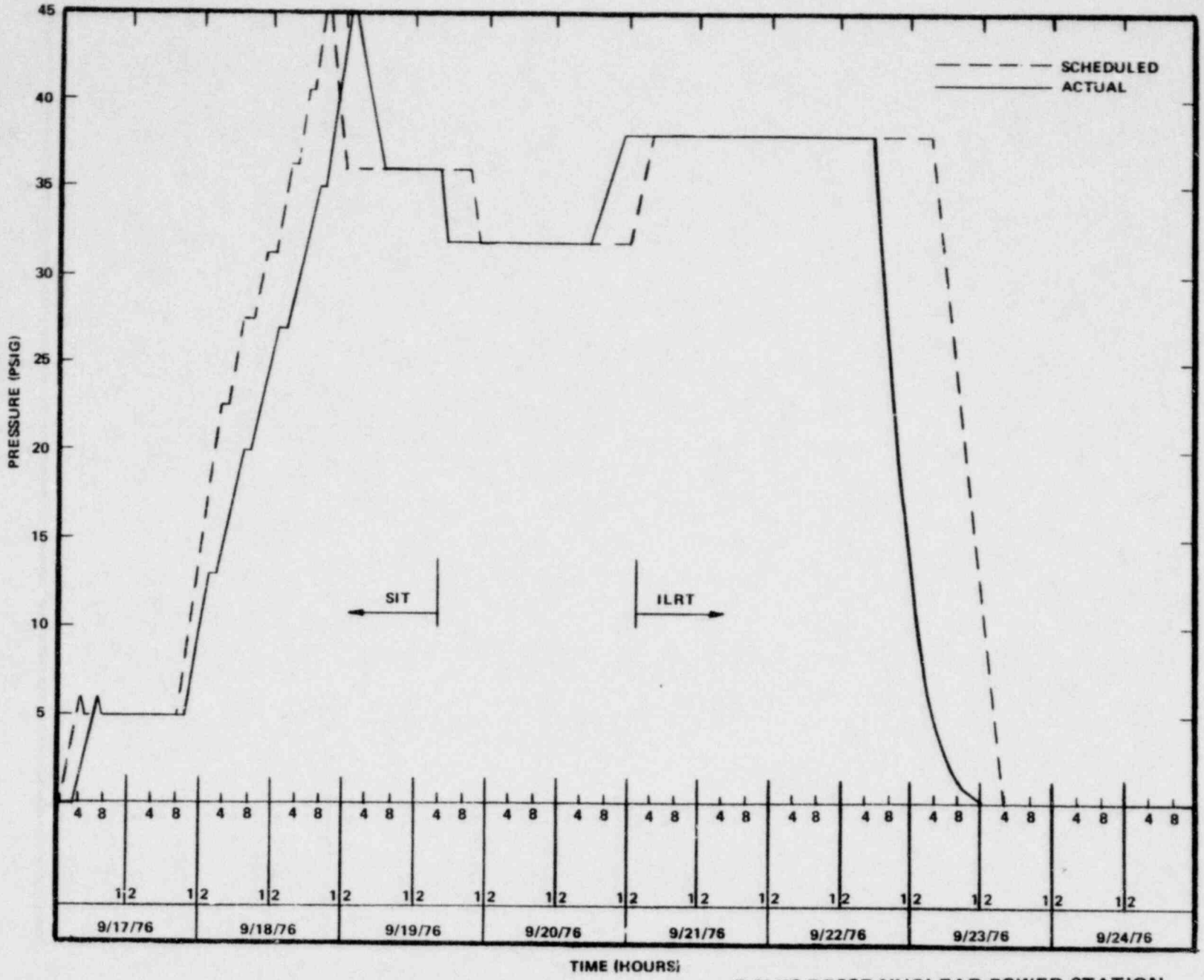
During the integrated leak rate test, the station computer was used to record data and verify a program which would be used on future tests to calculate the leak rate. However, the official data was that taken manually and recorded on the Chicago Bridge and Iron data sheets.

Following the integrated leak rate test, a 12-hour verification test was performed by imposing a known leakage on the containment through an orifice. Since the resulting leak rate minus the imposed leak rate agreed within one fourth of the allowable leak rate to the measured leak rate, the leakage measurement system was considered acceptable.

Local leak rate testing was required on seven penetrations following performance of the ILRT. Penetrations 3,6,10,13,26, and 44a had not been local leak rate tested prior to the ILRT due to late equipment deliveries and late system completion. Penetration 53 could not be closed using the normal closure method because the operator on valve MU-66B failed when it was actuated for

the test. This valve operator failure was reported to Region III of the NRC as a potential significant deficiency on September 20, 1976. An interim report on this deficiency was submitted to Region III on October 25, 1976, followed by the final report on December 3, 1976. The final report concluded that the corrective actions which have been taken assure that MU-66B and valves of a similar type will perform their intended function. All seven penetrations have been local leak rate tested since the ILRT, as indicated in Attachment B.

Adding the combined leakage rates of the seven penetrations which were local leak rate tested after the ILRT to the measured leakage rate results in a total leak rate of 0.08906 ± 0.02318 percent per 24 hours by weight which is not significantly larger than the measured leakage rate and is still well within the acceptance criteria. The final maximum leakage rate is, therefore, $0.08906 + 0.02318 = 0.11224$ percent per 24 hours by weight.



DAVIS-BESSE NUCLEAR POWER STATION

SIT AND ILRT TEST SCHEDULE

FIGURE 1

CONTAINMENT VESSEL

OVERALL LEAKAGE RATE TEST PROCEDURE

DAVIS-BESSE NUCLEAR POWER STATION

UNIT ONE

TOLEDO EDISON COMPANY

OAK HARBOR, OHIO

BECHTEL JOB 7749

CONTENTS

I. GENERAL

The purpose of this procedure is to establish the criteria and detailed procedure for conducting tests to obtain integrated leak rate data on the containment vessel and to perform the structural integrity test.

The following is a list of applicable documents:

1. Davis-Besse Nuclear Power Station Unit 1 FSAR

2. Davis-Besse Technical Specifications

3. 10 CFR Part 50, Appendix J

4. ANSI Standard ANSI N45.4-1972

5. TECo Nuclear Quality Assurance Manual

6. Davis-Besse Nuclear Power Station Unit 1, Containment Vessel Local Leak Rate Test, Test Procedure TP 150.03

II. RESPONSIBILITIES

1.0 BECHTEL CONSTRUCTION

1.1 Complete construction of systems required for this test. These systems include:

1.1.1 Containment boundary

1.1.2 Containment penetrations

1.1.3 Containment isolation valves

1.1.4 Containment ventilation systems

1.1.5 Personnel and emergency locks and equipment hatch

1.2 Turnover the control of the required systems to test personnel. (Ref. Appendix J) System turnover must be done with sufficient lead time to allow verification of proper system operation prior to the start of the integrated leak rate test. These systems include:

1.2.1 Containment penetrations

1.2.2 Containment isolation valves

1.2.4 Personnel and emergency locks and equipment hatch

1.2.5 ILRT instrumentation

1.2.6 Station computer

1.3 Insure containment cleanliness.

1.4 Install containment closures (equipment hatch, etc.)

1.5 Remove all portable equipment not able to withstand test conditions.

1.6 Verify proper operation and position indication (local and remote) of any remotely operated containment isolation valves as requested by the TECo Test Leader.

1.7 Clear applicable safety and test tags as required by test personnel.

1.8 Fabricate and/or install permanent or temporary foundations, brackets, etc., as required for test equipment.

1.9 Install test equipment and verify proper operation.

1.10 Provide manpower per Appendix J.

1.11 Review and approve ILRT and OLRT procedures.

1.12 Verify proper containment ventilation system operation.

1.13 Verify proper operation of all instrumentation and equipment utilized for the ILRT.

1.14 Complete integrated leak rate test preparation.

1.15 Conduct valve lineup and vent or fill the system, as required, per Appendix B for systems under control of construction.

1.16 Restore systems after completion of test per Appendix K.

2.0 TECo

2.1 Position valves as required for local leak testing for systems under control of TECo.

2.2 Review and approve ILRT and OLRT procedure.

2.3 Conduct valve lineup and vent or fill the system, as required, per Appendix B for systems under control of TECo.

2.4 Provide manpower per Appendix J.

2.5 Verify proper operation and position indication (local and remote) of all remotely operated containment isolation valves under administrative control of TECo.

2.6 Clear applicable safety and test tags as required by ILRT personnel.

2.7 Verify proper operation of all instrumentation and equipment utilized for ILRT. including the station computer.

2.8 Procure LLRT equipment.

2.9 Review valve lineups as shown in Appendix B to insure compliance with post LOCA plant status, any special operational requirements and Appendix J to 10 CFR Part 50.

2.10 Assist in the preparation of the final report.

2.11 Verify that calibration documentation is provided on site for ILRT instrumentation.

2.12 Conduct local leak rate testing.

2.13 Witness Integrated Leak Rate Test.

2.14 Analyze and evaluate data.

2.15 Verify proper containment ventilation system operation.

2.16 Restore systems after completion of test per Appendix K.

2.17 Prepare results of tests for final report per Appendix J to 10CFR Part 50.

2.18 Operate station computer.

3.0 CHICAGO BRIDGE AND IRON COMPANY

3.1 Procure ILRT equipment specified in Appendices C and D.

3.2 Verify operation of all instrumentation and equipment utilized for ILRT.

3.3 Provide sample set of data for computer program check out.

3.4 Provide input concerning the pressurizing equipment.

3.5 Analyze and evaluate data.

3.6 Prepare VCI, VST, VOT, and VLT procedures.

3.7 Assist in the preparation of the final report per Appendix J to 10 CFR Part 50.

3.8 Perform VCI, VST, VOT, and VLT tests on containment vessel.

3.9 Provide manpower per Appendix J.

4.0 BECHTEL ENGINEERING

4.1 Provide recommended ILRT valve lineups.

4.2 Provide local leak rate test piping system boundary sketches.

4.3 Provide equipment protection list.

4.4 Identify isolation valves and boundaries which must be local leak rate tested (Type B and Type C) as specified in Appendix J to 10 CFR Part 50.

4.5 Provide current listing of containment penetrations by name and number.

4.6 Provide recommended containment fan adjustments and operating modes for operation during ILRT (Appendix E).

4.7 Review ILRT procedure.

4.8 Prepare OLRT procedure.

4.9 Assemble and reproduce final report to be submitted as required per Appendix J to 10CFR Part 50.

5.0 TECo QA/QC

Provide coverage as deemed necessary by TECo QAM.

III. SCOPE

1.0 The test objective is to measure leak rates for comparison with criteria set forth in Appendix A.

1.1 To measure the leak rate, Lam, at peak test pressure (Pa).

1.2 To obtain a calculated leakage rate with a statistically determined 95 percent confidence interval such that the calculated leakage rate at the 95 percent confidence level does not exceed the acceptance criteria.

1.3 To compare the local leak rates to the local leak rate and filtration by-pass leak rate limits.

2.0 Each phase of the test procedure detailed in Section VI is to be performed in the sequence shown and the necessary data gathered before a new phase is initiated.

3.0 THE INTEGRATED LEAK RATE TEST METHOD

3.1 Measurements of absolute pressure, dry bulb temperature and dewpoint temperature (water vapor pressure) within the containment are required.

3.2 The procedure requires verification of the integrated leak rate measurement system by use of precise measurements of a flow causing a change in the weight of air in the containment that is approximately equal to the allowable leakage rate.

3.3 Formulas used in computing the integrated leak rate are based on the formulas found in ANSI N45.4-1972 "Leakage Rate Testing of Containment Structures for Nuclear Reactors".

3.4 Additional reference material includes Appendix J to 10 CFR Part 50, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors", and also Paragraph 3.5.

3.5 Additional reference material includes U.S. Nuclear Regulatory Commission Regulatory Guide 1.68, "Preoperational and Initial Startup Test Program for Water-Cooled Power Reactors."

IV. TEST EQUIPMENT

Additional test equipment and instrumentation is required over and above that which is a part of permanent plant equipment. The following is an abbreviated list of the additional equipment required and the permanent plant equipment utilized for the test. Detailed specifications and equipment arrangements are a part of Appendices C and D and LLRT Procedure TP 150.03 (see page 1, Item 6).

1.0 PRESSURIZATION SYSTEM

- 1.1 Portable air compressors
- 1.2 Aftercooler and air dryer
- 1.3 Temporary piping, instrumentation, and valves
- 1.4 Blowdown silencer
- 1.5 Instrument air and nitrogen

2.0 INTEGRATED LEAK RATE MEASUREMENT SYSTEM

- 2.1 Absolute pressure sensors
- 2.2 Dewpoint temperature sensors
- 2.3 Dry bulb temperature sensors
- 2.4 Flowmeters
- 2.5 Station computer
- 2.6 Barometer
- 2.7 Psychrometer.

3.0 LOCAL LEAK DETECTION AND MEASUREMENT INSTRUMENTS AND EQUIPMENT

- 3.1 Pressure and temperature sensors
- 3.2 Flowmeters
- 3.3 Relief valve
- 3.4 Pressure regulators.

V. PRECAUTIONS AND NOTES

1.0 PRE-TEST SAFETY PRECAUTIONS

1.1 Equipment Protection

Equipment (hermetically sealed or closed systems) inside the containment has been either removed or otherwise protected against the external pressure or differential pressure of 125% of design pressure, as listed in Appendix B.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.2 Compressed Gas Sources

All vessels containing construction supplies of compressed gases have been removed from the containment prior to pressurization. Any permanent vessels that must be pressurized must be made leak tight. All sources of pressurized gas into the containment must be isolated.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.3 Containment Ambient Temperature

At least one system or component that could be operated to maintain containment ambient temperature above 60 F during the overload test shall be available for this purpose.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

2.0 ACCESS CONTROL DURING TESTING

2.1 Access to that portion of the plant affected by the ILRT is restricted during this test. (Ref. Appendix I)

2.2 Administrative controls have been established to prevent invalidation of the ILRT due to altering of the containment isolation boundary.

Completed: _____
(Signature/Date) (BCM Access Control Coordinator)

2.3 Barriers and/or guards have been utilized to maintain the access control boundaries. (Ref. Appendix I)

Completed: _____
(Signature/Date) (BCM Access Control Coordinator)

2.4 Access control is the responsibility of the designated Access Control Coordinator. The Access Control Coordinator may authorize access to anyone whose name is not included on the list prepared per Sheet I-3. Authorization must be in writing and signed by the Access Control Coordinator or his designated alternate.

2.5 Prior to commencing the ILRT a list of persons authorized unlimited access during the ILRT shall be compiled by the Access Control Coordinator and reviewed by the ILRT Test Supervisor. Appendix I, Sheet I-3 provides the guide to prepare the list.

2.6 Any special control requirements associated with the containment vessel overload test (VOT by CB&I).

2.7 Access control areas applicable to this ILRT are shown in Appendix I.

VI. PROCEDURE

1.0 PHASE 1 - TEST PREPARATION

Steps need not be performed in the sequence as itemized below

1.1 Schedule

Establish a detailed time scaled test schedule in conjunction with the Containment Vessel Overload Test (Ref. Appendix A).

1.2 Prerequisites to Test Preparation

1.2.1 Completion of substantially all local leak tests. Review test results to assure compliance with TP 150.03 (see Page 1).

Completed: _____ _____
(Signature/Date)(TECO Test Leader)

1.2.2 Removal or venting of items listed in Appendix B.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.2.3 Verification that permanent and temporary systems and equipment to be utilized during the test are operational.

a. Containment air cooler fans

Completed: _____ _____
(Signature/Date) (TECO Test Leader)

b. Cooling water to supply air aftercooler

Completed: _____
(Signature/Date) (TECO Test Leader)

c. Air compressors

Completed: _____
(Signature/Date) (BCM Test Supervisor)

d. Air dryers including cooling water supply

Completed: _____
(Signature/Date)(TECO Test Leader)

e. Containment recirculation fans, if available, except during overload test.

Completed: _____
(Signature/Date)(TECO Test Leader)

1.2.4 Block out safety feature actuation system and high pressure alarm (PAH-P310, PAH-P311).

Completed: _____
(Signature/Date) (TECo Test Leader)

1.2.5 Construction complete on systems required for this test. These systems include:

a. Containment boundary

Completed: _____
(Signature/Date) (BCM Test Supervisor)

b. Containment penetrations

Completed: _____
(Signature/Date) (BCM Test Supervisor)

c. Containment isolation valves

Completed: _____
(Signature/Date) (BCM Test Supervisor)

d. Containment ventilation and cooling systems

Completed: _____
(Signature/Date) (BCM Test Supervisor)

e. Personnel and emergency locks and equipment hatch

Completed: _____
(Signature/Date) (BCM Test Supervisor)

f. Permanent or temporary foundations, brackets, etc. as required for ILRT instrumentation or equipment.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.2.6 Turn over of systems to test personnel completed. System turnover must be done with sufficient lead time (at least two weeks) to allow verification of proper system operation prior to the start of the integrated leak rate test. These systems include:

a. Containment penetrations

Completed: _____
(Signature/Date) (BCM Test Supervisor)

b. Containment isolation valves

Completed: _____
(Signature/Date) (BCM Test Supervisor)

c. Containment ventilation and cooling systems

Completed: _____
(Signature/Date) (BCM Test Supervisor)

d. Personnel and emergency locks and equipment hatch

Completed: _____
(Signature/Date) (BCM Test Supervisor)

e. Station computer

Completed: _____
(Signature/Date) (TECO Test Leader)

f. Temporary or permanent foundations, brackets, etc. as required for ILRT instrumentation and equipment.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.2.7 Dewater all low points and sumps which are not necessary water seals.

Completed: _____
(Signature/Date (BCM Test Supervisor)

1.3 Integrated Leak Rate Measurement System Installation

1.3.1 Verify that the system installation is in accordance with Appendix C.

Completed: _____
(Signature/Date) (TECO Test Leader)

1.3.2 All ILRT instrumentation functionally checked after final installation to verify proper measurement of required variables (at least one week prior to ILRT).

Completed: _____
(Signature/Date) (TECO Test Leader)

1.3.3 All instrumentation required by Appendix C will be calibrated and documented calibration data provided prior to commencing of ILRT.

Completed: _____
(Signature/Date) (TECO Test Leader)

1.4 Pressurization System Installation and Checkout

1.4.1 Verify that the system installation is in accordance with Appendix D.

Completed: _____
(Signature/Date) (TECO Test Leader)

1.4.2 Identify permanently installed valves and system controls that must be operated as a part of the pressurization system shown in Appendix D and Appendix F and verify proper operation.

Completed _____
(Signature/Date) (TECO Test Leader)

1.4.3 Checkout system without pressurizing containment.

a. Blowdown pressurization system to valves which isolate the containment from the pressurization system during test (See Valve Position Schedule, Appendix F).

Completed: _____
(Signature/Date) (TECO Test Leader)

b. Verify that condition of pressurizing gas as to oil and moisture content is satisfactory (See Appendix D).

Completed: _____
(Signature/Date) (TECO Test Leader)

c. Verify that the air intake is not located near the exhaust of any machinery.

Completed: _____
(Signature/Date) (TECO Test Leader)

1.5 Containment Inspection

1.5.1 A general inspection of the accessible interior and exterior surfaces of the containment structures and components shall be performed prior to the ILRT to uncover any evidence of structural deterioration which may affect either the containment's structural integrity or leaktightness.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

1.5.2 If there is any evidence of structural deterioration, the ILRT shall not be performed until corrective action is taken in accordance with repair procedures, nondestructive examinations, and tests as specified in the construction code under which rules the containment was built.

1.5.3 Verify that the system has been filled or vented (see Appendix B).

Completed: _____
(Signature/Date)(Teco Test Leader)

1.6 Containment Closure

1.6.1 Closure of containment isolation valves for the test shall be accomplished by same method that would cause closure as a result of the postulated accident and without any preliminary exercising or adjustments (e.g., no tightening of valve after closure by valve motor). Repairs of maloperating or leaking valves shall be made as necessary. Information on any valve closure malfunction or valve leakage that requires corrective action before the test shall be included in the report submitted to the Nuclear Regulatory Commission. Information will be maintained by the organization which controls the valve.

1.6.2 Verify that all valves are positioned for initial pressurization in accordance with Appendix F and Appendix B.

Completed: _____
(Signature/Date)(TECO Test Leader)

1.7 Access Control

1.7.1 Establish access control per Appendix I.

Completed: _____
(Signature/Date) (BCM Access Control Coordinator)

1.8 Manpower Assignments

1.8.1 Personnel assignments made in accordance with manpower assignment chart per Appendix J.

Completed: _____
(Signature/Date) (BCM Test Supervisor)

2.0 PHASE 2 - CONTAINMENT VESSEL OVERLOAD AND ILRT TESTS PER CB&I PROCEDURES

3.0 PHASE 3 - POST TEST ACTIVITIES

3.1 Perform activities per Appendix K.

APPENDIX A

APPENDIX A

INITIAL INTEGRATED LEAK RATE TEST CRITERIA

Pressures		
Design Pressure	(Pd)	36.0 psig
125% Design Pressure	(Ps)	45.0 psig
Peak Test Pressure	(Pa)	38.0 psig
Leak Rates		
Maximum allowable leakage rate (percent/24 hrs. by weight) at pressure Pa as specified for preoperational tests in the technical specification, and as specified for periodic tests in the operating license.	(La)	0.50*
Total measured containment leakage rate (percent/24 hrs.) at pressure Pa, obtained from testing the containment with components and systems in the state as close as practicable to that which will exist under design basis accident conditions (e.g., vented, drained, flooded or pressurized).	(Lam)	
Temperature		
Containment Ambient Temperature Limits		40-120 F
Volume		
Containment Free Air Volume		2,834,000 cu. ft.

*0.5 percent/24 hrs. is the technical specification value for La. For this pre-operation test only, the specified allowable leakage rate at pressure Pa is 0.25 percent/24 hrs.

Acceptance Criteria

1. For the peak pressure test Lam at the 95 percent confidence level shall be less than 0.25 percent/day.

2. For future periodic tests, Lam at the 95 percent confidence level shall not exceed 0.75 La.

3. Appendix J to 10 CFR Part 50

4. ANSI N45.4 - 1972

Test Sequence and Duration

Per CB&I Procedures and shown on Page A-3.

NOTE: 1. DEPRESSURIZATION IS NOT TO EXCEED 20 PSIG/HOUR.

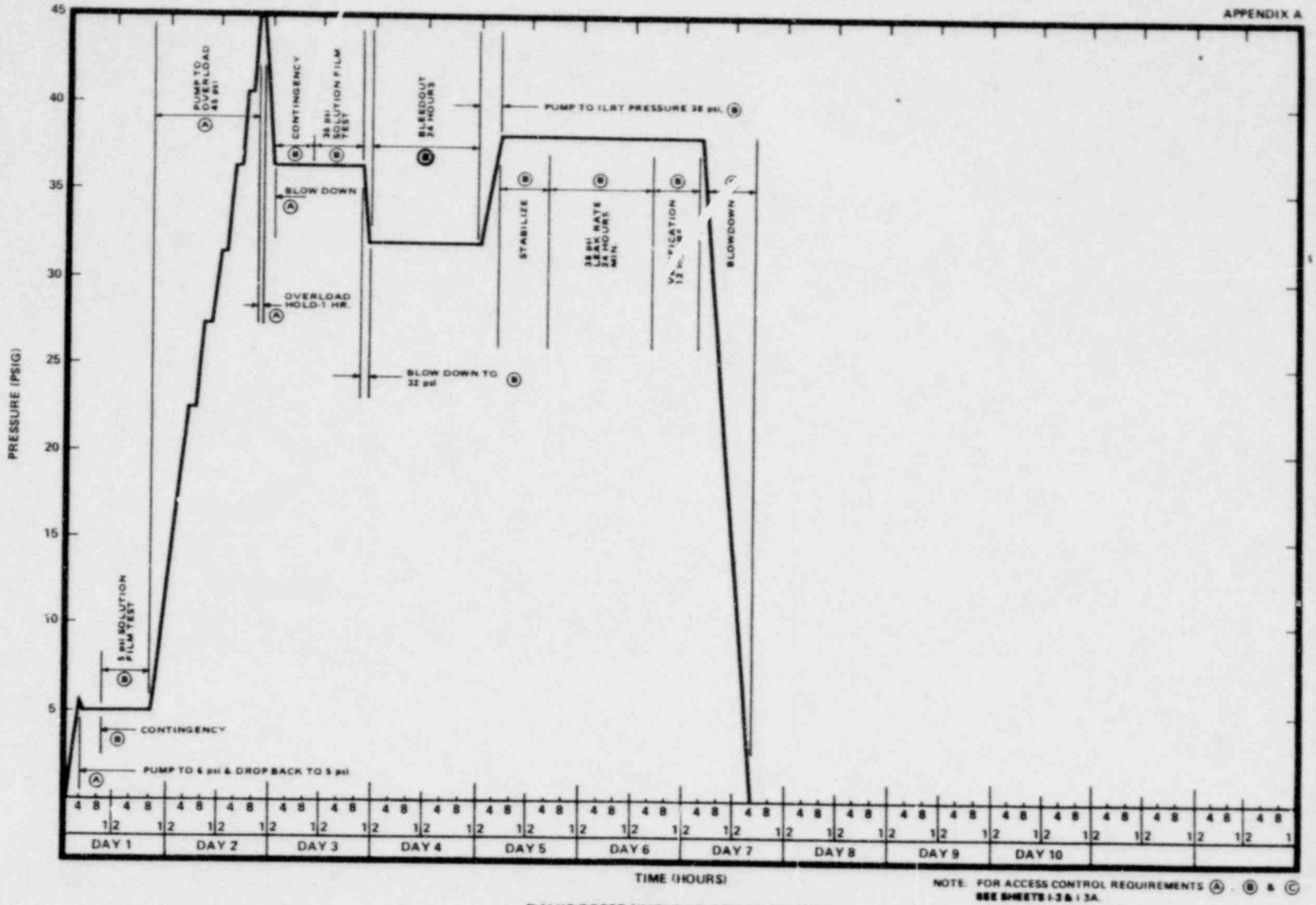
2. CONTAINMENT ATMOSPHERE STABILIZATION

Once the containment is at test pressure, the containment atmosphere shall be allowed to stabilize for at least four hours. The atmosphere is considered to be stabilized when:

a. The latest rate of change of the weighted average of contained air temperature (averaged over the last hour) does not deviate by more than 0.5 F from the average rate of change of the weighted average of contained air temperature over the last three hours.

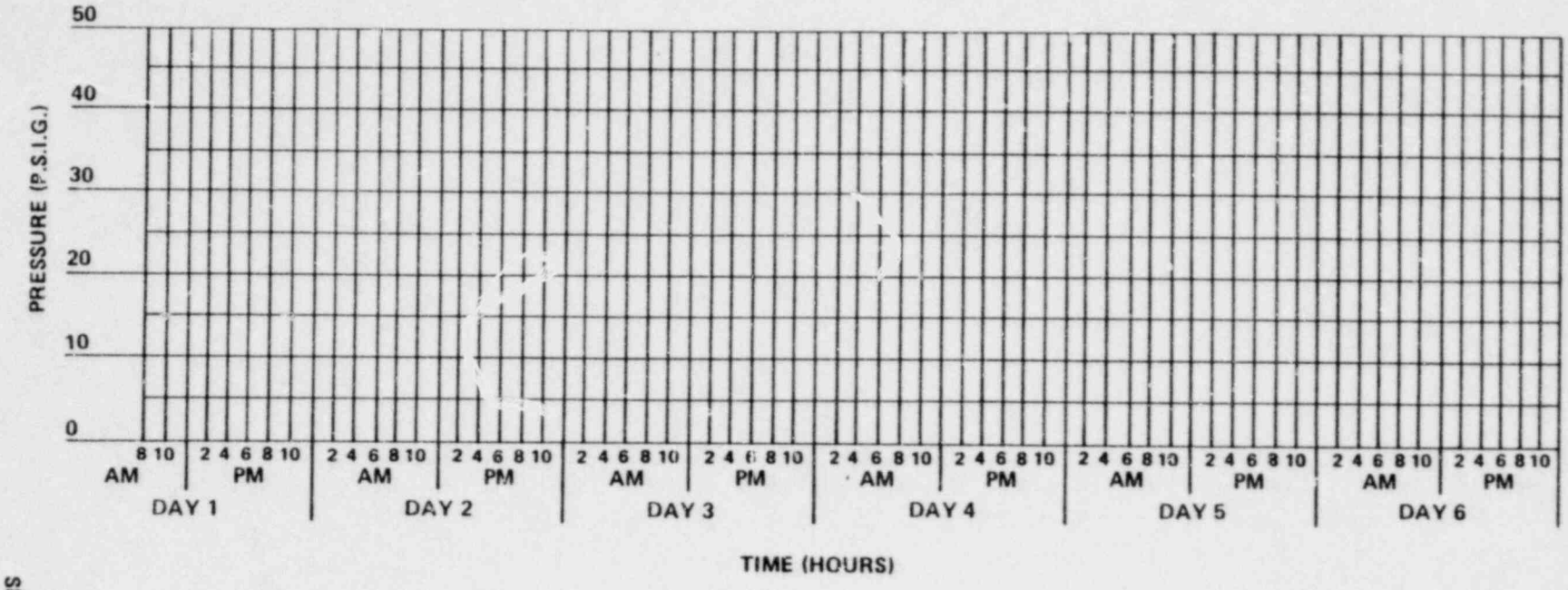
b. The rate of change of temperature changes less than 0.5 F/hour/hour averaged over the last two hours.

c. The containment atmosphere has been at Pa (plus 0.5 psi, minus 0 psi) for at least four hours.



NOTE: FOR ACCESS CONTROL REQUIREMENTS Ⓐ, Ⓑ & Ⓒ SEE SHEETS I-3 & I-3A.

DAVIS-BESSE NUCLEAR POWER STATION
SIT AND ILRT SCHEDULE



SHEET A-4

APPENDIX A

DAVIS-BESSE NUCLEAR POWER STATION
INTEGRATED LEAK RATE TEST
ACTUAL TEST RESULTS

APPENDIX B

APPENDIX B

SCHEDULE OF CONTAINMENT EQUIPMENT

AND VALVE CONDITIONS

I. General Comments

A. Any instruments, portable equipment, monitoring equipment, etc., which cannot withstand an external or differential pressure of 45.0 psig must be removed from containment or placed in a condition to prevent damage.

B. In general, valves in piping systems associated with the containment vessel will be positioned such that valve lineups correspond to the lineup occurring subsequent to the postulated loss of coolant incident. Closure of containment vessel isolation valves for the test shall be accomplished by the same method that would cause closure as a result of the postulated incident.

C. System valve lineups are listed on Sheets B-2 thru B-48 below.

D. All systems normally filled with water subsequent to a loss of coolant incident are filled with water for the ILRT. (See Sheets B-48, B-49 and B-50).

E. Systems which will be drained of water as a result of a loss of coolant incident should be drained for the ILRT unless plant operational requirements dictate otherwise. (See Sheets B-50, B-51).

F. System valve position during normal station at full load operation is shown on P&IDs. Post-test valve checklist is in Appendix K.

G. The normally closed isolation valve, which will be opened intermittently during normal operation but will close as a result of LOCA, should be opened and closed once, within a month, prior to ILRT. Those valves are identified on the following valve lineup sheets by a cross symbol "+."

H. TECo test leader will be responsible to add Tag No. on the valve and breaker lineup sheets when performing the valve lineup.

I. At the discretion of the TECo test leader, vent and drain valve positions may be changed. These changes will be itemized in Appendix H.

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
AF 608		C	36	
BE 1160		O	--	
SS 607		C	2	
MS 611		C	58	
BE 1294		O	--	
MS 611A		C	58	
BE 1295		O	--	
FW 612		C	58	
BE 1159		O	--	
SP 17B1		C*	40	
SP 17B2		C*	40	
SP 17B3		C*	40	
SP 17B4		C*	40	
SP 17B5		C*	40	
SP 17B6		C*	40	
SP 17B7		C*	40	
SP 17B8		C*	40	
SP 17B9		C*	40	
ICS 11B		C*	40	
MS 107A		C	40	
BF 1188		O	--	
SS 79		O	18	
SS 80		O	18	
SS 81		O	18	
SS 82		C	18	

*Installed and closed or blanked

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007) (Cont'd)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MS 106		C	40	
BE 1184		O	--	
MS 101		C	40	
MS 101A		C	40	
MS 394		C	40	
MS 26		C	40	
MS 912		O	40	
MS 916		O	40	
MS 913		O	40	
MS 917		O	40	
MS 2847		C	40	
MS 853		C	40	
NN 70		C	40	
MS 875		O	40	
MS 34		C	40	
MS 39		C	40	
SS 88		O	2	
SC 75		C	59	
MS 743		C	38	
SS 84		O	2	
SS 85		O	2	
SS 86		O	2	
SS 87		C	2	

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007) (Cont'd)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
FW 26		C	38	
MS 703		O	40	
SS 686		C	2	
SS 598		C	18	
MS 603		C	57	
BF 1111		O	---	
MS 603A		C	57	
BF 1108		O	--	
FW 60[illegible]		C	37	
BF 1117		O	--	
SP 17A1		C*	39	
SP 17A2		C*	39	
SP 17A3		C*	39	
SP 17A4		C*	39	
SP 17A5		C*	39	
SP 17A6		C*	39	
SP 17A7		C*	39	
SP 17A8		C*	39	
SP 17A9		C*	39	
ICS 11A		C*	39	
MS 106A		C	40	
BE 1271		O	--	
SS 685		C	18	

*Installed and closed or blanked

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007) (Cont'd)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MS 107		C	39	
BF 1124		O	--	
MS 100		C	39	
MS 100A		C	39	
MS 375		C	39	
- (Penetration 59) Blind Flanges Installed				
MS 29		C	39	
MS 919		O	39	
MS 915		O	39	
MS 918		O	39	
MS 914		O	39	
MS 700		O	39	
MS 876		O	39	
MS 2848		C	39	
MS 877		C	39	
MS 125		C	39	
MS 121		C	40	
NN 72		C	39	
SS 83		O	18	
MS 741		C	37	
FW 157		C	37	
AF 599		C	35	
BF 1118		O	--	

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007) (Cont'd)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MS 3687A		0	39	
MS 3687B		0	39	
MS 3687C		0	39	
MS 3687D		0	39	
MS 3687E		0	39	
MS 3687F		0	39	
MS 3687G		0	39	
MS 3687H		0	39	
MS 3687K		0	39	
MS 3687L		0	39	
MS 3687M		0	39	
MS 3687N		0	39	
MS 3689A		0	40	
MS 3689B		0	40	
MS 3689C		0	40	
MS 3689D		0	40	
MS 3689E		0	40	
MS 3689F		0	40	
MS 3689G		0	40	
MS 3689H		0	40	
MS 3689K		0	40	
MS 3689L		0	40	

STEAM GENERATOR-SECONDARY SYSTEM (M-003, 007) (Cont'd)

Penetrations: 2, 18, 35, 36, 37, 38, 39, 40, 57, 58 & 59

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MS 3689M		O	40	_____
MS 3689N		O	40	_____
Penetrations 37, 38, 39 and 40 - the sleeve drain valves are closed (see Sect. B-III, item 17).				_____
Penetrations 57 and 58 - the chemical cleaning connections are blanked				_____

MAKE-UP WATER TREATMENT SYSTEM SHEET 2 (M-010B)

Penetrations: 21

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DW 6831A		C	21	_____
DW 6831B		C	21	_____
DW 534		O*	21	_____
DW 532**		O*	21	_____
DW 509		C	21	_____
DW 533		C	21	_____
DW 147**		O*	21	_____

* The screwed cap on test connection is also removed.
** Either DW532 or DW 147 may be open

STATION AND INSTRUMENT AIR SYSTEM (M-015)

Penetrations: 42A & 43A

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
SA 2010		C	42A	
IA 2011		C	43A	
SA 507		O*	42A	
IA 505		O*	43A	
SA 503		O*	42A	
IA 503		O*	43A	
SA 501		C	42A	
IA 500		C	43A	
IA 504		C	43A	
IA 2019		O	43A	
SA 2132		O	42A	
SA 504		C	42A	

* The screwed cap on test connection is also removed.

NITROGEN SUPPLY SYSTEM (M-019)

Penetrations: 44B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
NN 61		C	44B	_____
NN 60		C	44B	_____
NN 59		O*	44B	_____
NN 236		C	44B	_____
NN 56		O*	44B	_____
NN 40C		C	44B	_____
NN 933		O	44B	_____
NN 57		C	44B	_____

* The screwed cap on the test connection is also removed.

CONTAINMENT AND PENETRATION ROOMS SHEET 1 (M-029A)

Penetrations: 33, 34, 51, 67 & 69

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 5005		C	33	
CV 5006		C	33	
CV 5007		C	34	
CV 5008		C	34	
CV 5037		C	51	
BF 1151		O	--	
CV 5038		C	51	
BE 1170		O	--	
CV 5090		C	67	
BF 1110		O	--	
CV 5065		C	69	
BE 1113		O	--	
CV 125		O	33	
CV 56		O	34	
CV 180		C	33	
CV 267		C	67	
CV 268		O	67	
CV 200		C	67	
CV 266		O	69	
CV 265		C	69	

NOTE: All registers, dampers in the duct systems must be open per Paragraph 8 of page B-53.

CONTAINMENT AND PENETRATION ROOMS SHEET 1 (M-029A), (Cont'd.)

Penetrations: 33, 34, 51 67 & 69

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 201		C	69	
CV 199		O*	69	
CV 5000		O	--	
CV 5014D		O	--	
CV 181		C	34	
CV 57		C	51	
CV 198		O*	67	
CV 60		O	51	
CV 625		O	51	
CV 61		C	51	
CV 324		O	51	

*The screwed cap on the test connection is also removed.

CONTAINMENT AND PENETRATION ROOMS SHEET 2 (M-029B)

Penetrations: 8A-J, 17, 42B, 43B, 71A, 71B, 72A, 68B, 72C, 73A, 73B, 73C, 74A & 74B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 5070		C	8F	
BE 1137		O	--	
CV 5071		C	8G	
BE 1138		O	--	
CV 5072		C	8H	
BE 1139		O	--	
CV 5073		C	8I	
BE 1140		O	--	
CV 5074		C	8J	
BE 1141		O	--	
CV 5075		C	8A	
BF 1180		O	--	
CV 5076		C	8B	
BF 1181		O	--	
CV 5077		C	8C	
BF 1182		O	--	
CV 5078		C	8D	
BF 1183		O	--	
CV 5079		C	8E	
BF 1184		O	--	
CV 343		V***	17	

***Varies during test since this valve is on the leak rate test connection and is open during pressurization and closed during leak rate measurements.

CONTAINMENT AND PENETRATION ROOMS SHEET 2 (M-029B) (Cont'd)

Penetrations: 8A-J, 17, 42B, 43B, 71A, 71B, 72A, 68B, 72C, 73A, 73B, 73C, 74A & 74B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 5010E		C	42B	
YF 205		O	--	
CV 5011E		C	43B	
YE 205		O	--	
CV 2000B		O	71A	
BF 1140		O	--	
CV 5010A		C	71B	
YF 201		O	--	
CV 5011A		C	71B	
YE 201		O	--	
CV 2001B		O	72A	
BE 1123		O	--	
CV 5011B		C	68B	
YE 202		O	--	
CV 5010B		C	68B	
YF 202		O	--	
CV 624B		O	72C	
BF 1160		O	--	
CV 2002B		O	73A	
BF 1144		O	--	
CV 5011C		C	73B	
YE 203		O	--	

CONTAINMENT AND PENETRATION ROOMS SHEET 2 (M-029B) (Cont'd)

Penetrations: 8A-J, 17, 42B, 43B, 71A, 71B, 72A, 68B, 72C, 73A, 73B, 73C, 74A & 74B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 5094		O	73A	
CV 5010C		C	73B	
YF 203		C	--	
CV 645B		O	73C	
BE 1145		O	--	
CV 2003B		O	74A	
BE 1124		O	--	
CV 5011D		C	74B	
YE 204		O	--	
CV 5010D		C	74B	
YF 204		O	--	
CV 434		O*	42B	
CV 537		O	17	
CV 536		C	17	
CV 344		O*	17	
CV 308		C	73C	
CV 645A		O	73C	
CV 645C		O	73C	
CV 113		C	73A	
CV 4912		C	73C	
(Penetration 17) Blind flange removed, spool piece upstream of CV 343 installed and CB&I temporary piping installed.				

*The screw cap on test connection shall be removed.

CONTAINMENT AND PENETRATION ROOMS SHEET 2 (M-029B) (Cont'd)

Penetrations: 8A-J, 17, 42B, 43B, 71A, 71B, 72A, 68B, 72C, 73A, 73B, 73C, 74A & 74B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 2002		O	73A	
BF 1144		O	--	
CVNI 15-4		O	73A	
CV 112		C	74A	
CV 2003		O	74A	
CVNI 15-3		O	74A	
CV 436		C	17	
CV 430		O*	71B	
CV 111		C	71B	
CV 110		C	68B	
CV 431		O*	68B	
CV 313		O	43B	
CV 312		C	43B	
CV 120		C	43B	
CV 435		O*	43B	
CV 311		C	74B	
CV 433		O*	74B	
CV 315		O	42B	
CV 314		C	42B	
CV 119		C	42B	

*The screw cap on test connection shall be removed.

CONTAINMENT AND PENETRATION ROOMS SHEET 2 (M-029B) (Cont'd)

Penetrations: 8A-J, 17, 42B, 43B, 71A, 71B, 72A, 68B, 72C, 73A, 73B, 73C, 74A & 74B

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CV 432		O*	73B	
CV 118		C	73B	
CV 624A		O	72C	
CV 624C		O	72C	
CV 310		C	72C	
CV 116		C	72A	
CV 2001		O	72A	
CVNI 15-1		O	72A	
CV 115		C	71A	
CV 2000		O	71A	
CVNI 15-2		O	71A	
CV 400		C	8A	
CV 401		C	8B	
CV 402		C	8C	
CV 403		C	8D	
CV 404		C	8E	
CV 405		C	8F	
CV 406		C	8G	
CV 407		C	8H	
CV 408		C	8I	
CV 409		C	8J	

*The screw cap on test connection shall be removed.

REACTOR COOLANT SYSTEM (M-030)

Penetrations: 1 & 16

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
RC 240A		C+	1	
BE 1181		O	--	
RC 240B		C+	1	
BF 1128		O	--	
RC 170		O	1	
RC 52		O*	1	
RC 54		O*	1	
RC 53		C	1	
RC 44		O	16	
RC 45		O	16	
RC 43		O	16	
RC 4		O	16	
RC 42		O	16	
RC 60		O	16	
RC 88		O	16	
RC 197		O	16	
SF 457		C (Note)	1	
RC 239A		O	1	
BF 1126		O	--	

*The screwed cap on test connection is also removed.
+Cycle valve (open then close) once prior to ILRT.
Note: This valve is shown on P&ID M42A.

MAKEUP AND PURIFICATION SYSTEM (M-031)

Penetrations: 14, 52, 53, 54, 55, & 56

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 2A		C	14	
BE 1171		O	--	
MU 3		C	14	
MU 77		O	14	
MU 80		C	14	
MU 329		C	52	
MU 66A		C	52	
MU 328		C	53	
MU 66B		C	53	
MU 327		C	54	
MU 66C		C	54	
MU 326		C	55	
MU 66D		C	55	
MU 246		O*	52	
MU 234		O*	52	
MU 247		O*	53	
MU 235		O*	53	
MU 248		O*	54	
MU 236		O*	54	
MU 249		O*	55	
MU 237		O*	55	

* The screwed cap on test connection is also removed.

MAKEUP AND PURIFICATION SYSTEM (M-031) (Cont'd)

Penetrations: 14, 52, 53, 54, 55 & 56

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 228		C	52-55	
MU 33		C	52-55	
MU 212		O*	52-55	
MU 32		C	52-55	
MU 38		C	56	
MU 59A		C	56	
BE 1174		O	--	
MU 59B		C	56	
BE 1175		O	--	
MU 59C		C	56	
BE 1177		O	-	
MU 59D		C	56	
BE 1178		O	--	
MU 250		O*	56	
MU 251		O*	56	
MU 252		O*	56	
MU 253		O*	56	
MU 267		O*	56	
MU 268		C	56	
MU 269		C	56	

* The screwed cap on test connection is also removed.

MAKEUP AND PURIFICATION SYSTEM (M-031) (Cont'd)

Penetrations: 14, 52, 53, 43, 55 & 56

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 81		O	14	
MU 79		C	14	
MU 310		O	14	
MU 78		O	14	
MU 309		C	56	
MU 266		C	56	
MU 254		O	56	
MU 255		O	56	
MU 256		O	56	
MU 257		C	56	
MU 258		O	56	
MU 259		O	56	
MU 260		O	56	
MU 261		O	56	
SS 25		C	14	
MU 82		C	14	
MU 83		C	14	
MU 4		C	14	
BE 2259		O	--	
MU 84		C	14	
MU 85		O	14	

MAKEUP AND PURIFICATION SYSTEM (M-031) (Cont'd)

Penetrations: 14, 52, 53, 54, 55 & 56

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 6		C	14	
MU 241		C *	55	
MU 451		O	55	
MU 450		O	54	
MU 240		C	54	
MU 239		C	53	
MU 238		C	52	
MU 217		C	52-55	
MU 229		C	52-55	
MU 219		C	52-55	
MU 3971		O (Note)	52-55	
BE 1127		O	--	
MU 211		C	52-55	
MU 58B		C	52-55	
MU 213		C	52-55	
MU 452		C	52-55	
MU 210		O	52-55	
MU 209		O	52-55	
MU 31A		O	52-55	
MU 31B		O	52-55	

*The screwed cap is also removed.
NOTE: MU 3971 is open from 4"-HCC-124 to MU pump suction.

MAKEUP AND PURIFICATION SYSTEM (M-031)(Cont'd)

Penetrations: 14, 52, 53, 54, 55 & 56

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 208		C	52-55	
MU 439		C	52-55	
MU 26		O	52-55	
MU 216		C	52-55	
MU 214		O	52-55	
MU 215		O	52-55	
MU 19		C	52-55	
MU 19A		O	52-55	
MU 19B		O	52-55	
MU 178		C	52-55	
MU 200		C	52-55	
MU 199		O	52-55	
MU 198		O	52-55	
MU 205		O	52-55	
MU 202		O	52-55	
MU 206		O	52-55	
MU 203		O	52-55	
MU 479		O	56	
MU 25A		O	52-55	
MU 25B		O	52-55	
MU 194		C	52-55	
MU 193		C	52-55	

MAKEUP AND PURIFICATION SYSTEM (M-031) (Cont'd)

Penetrations: 14, 52, 53, 54, 55 & 56

VALVE	TAC NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
MU 192		C	52-55	
MU 190		O	52-55	
MU 191		O	52-55	
SS 18		C	52-55	
MU 467		C	52-55	
MU 444		C	52-55	
MU 195A		C	52-55	
MU 67A		C	52-55	
MU 67B		C	52-55	
MU 299		C	52-55	
MU 218		O	52-55	
MU 220		O	52-55	
MU 222		O	52-55	
MU 242		O*	52	
MU 243		O*	53	
MU 244		O*	54	
MU 245		O*	55	
MU 1A		C	14	
MU 1B		C	14	

*Valve stop is retracted.

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

Note: The valve lineup is to simulate HPI operation after LOCA and decay heat removal operation under normal cooldown mode.

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
HP 2A		O	19	
BF 1139		O	--	
HP 2B		O	20	
BF 1141		O	--	
HP 2C		O	50	
BE 1103		O	--	
HP 2D		O	22	
BE 1105		O	--	
DH 1A		O	27	
BF 1136		O	--	
DH 1B		O	28	
BE 1106		O	--	
DH 12		O	29	
BE 1183		O	--	
DH 11		O	29	
BF 1130		O	--	
DH 21		C	29	
DH 23		C	29	
DH 1517		O	29	
BE 1126		O	--	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033)(Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 1518		O	29	
BF 1129		O	--	
DH 9A		C	30	
BF 1142		O	--	
DH 9B		C	31	
BE 1112		O	--	
DH 87		C	49	
DH 88		C	49	
DH 89		O*	49	
DH 85		O*	49	
MU 276		C (Note)	29	
MU 274		C (Note)	29	
DH 2735		C	74C	
BE 1155		O	--	
DH 2736		C	74C	
BF 1125		O	--	
DH 98		O*	74C	
DH 7A		C	30	
BF 1148		O	--	
DH 7B		C	31	
BE 1157		O	--	

*The screwed cap on test connection is also removed.
Note: Valves MU 276 and MU 274 are shown on P&ID M031.

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 20		C	29	
(Penetration 30, 31) Removed blind flanges on 18"-HCB-1 containment vessel emergency sump recirculation line.				
DH 99		C	74C	
DH 100		C	74C	
DH 155		C	27	
CF 46		C	27	
DH 74		C	27	
DH 156		C	27	
CF 45		C	27	
DH 72		C	27	
DH 2882A		O	27	
DH 65		C	27	
DH 2AB		O	27	
DH 2AA		0	27	
DH 158		C	27	
DH 63		C	19	
DH 62		C	19,20,27	
DH 60		C	19,20,27	
DH 13A		C	19,20,27	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033)(Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 52		C	19,20,27	
DH 14A		O	19,20,27	
DH 1514		C	19,20,27	
DH 1516		C	19,20,27	
DH 54		O	19,20,27	
DH 178		O	74C	
DH 160		C	19,20,27	
DH 1511		O	19,20,27	
DH 1555		C	19,20,27	
DH 46		C	19,20,27	
DH 161		C	19,20,27	
DH 44		O	19,20,27	
DH 40		C	19,20,27	
DH 17		C	19,20,27	
DH 38		C	19,20,27	
DH 18		C	19,20,27	
DH 5A		O	19,20,27	
DH 56		C	19,20,27	
DH 1538		O	29,30	
DH 36		C	29,30	
DH 162		C	30	
DH 164		C	30	
DH 152		C	31	
DH 153		C	30	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 163		C	31	
DH 2734		C	30	
BF 1134		O	--	
DH 32		C	27	
DH 175		C	29	
DH 34		C	29	
DH 174		C	29	
DH 30		C	29	
DH 28		C	29	
DH 25		C	29	
DH 4908A		O	29	
DH 4908B		O	29	
CF 37		C	28	
CF 38		C	28	
DH 4909A		O	29	
DH 4909B		O	29	
DH 75		C	28	
DH 177		C	28	
DH 73		C	28	
DH 2882B		O	28	
DH 66		C	28	
DH 2BB		O	28	
SF 115 (Note)		C	29	

Note: Valve SF 115 is shown on P&ID M-035.

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 28A		O	28	
DH 166		C	28	
DH 64		C	28	
DH 61		C	28	
DH 96		C	27,28	
DH 59		C	28	
DH 13B		C	28	
DH 14B		O	28	
DH 80		C	28	
DH 830		C	19,20,27	
BF 1185		O	--	
DH 831		C	28	
BE 1195		O	--	
DH 53		C	28	
DH 1553		O	28	
DH 1317		C	28	
DH 47		C	28	
DH 165		C	28	
DH 45		O	28	
DH 41		C	28	
DH 5B		O	28	
DH 57		C	28	
DH 70		C	27,28	
DH 71		C	27,28	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 39		C	28	
DH 15		C	28	
DH 16		C	28	
DH 1507		O	29,31	
DH 37		C	29,31	
DH 1504		C	28	
DH 55		O	28	
DH 1506		C	28	
DH 2733		C	31	
BE 1121		O	--	
DH 35		C	29	
DH 33		C	29	
DH 31		C	29	
DH 27		C	29	
DH 29		C	29	
DH 173		C	29	
DH 24		C	29	
DH 22		C	29	
DH 170		C	29	
DH 132		C	30	
DH 131		C	30	
WC 189 (Note)		C	29	

*The screwed cap on test connection is also removed.
Note: Valve WC 189 is shown on P&ID M-037A.

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 129		O	31	
DH 130		O	31	
DH 136		C	30,31	
DH 135		C	30,31	
DH 134		C	30,31	
HP 65		C	19,20	
HP 13		O	19,20	
HP 15		C	19,20	
HP 19		C	19,20	
HP 17		C	19,20	
HP 1520		O	19,20	
HP 21		C	19,20	
HP 5A		O	19,20	
HP 35		C	19,20,22,50	
HP 1556		O	19,20,22,50	
HP 25		O	19,20	
HP 27		C	19,20	
HP 66		C	19,20	
HP 3AB		O	19	
HP 3AA		O	19	
HP 3BB		O	20	
HP 3BA		O	20	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
HP 67		C	19	
HP 68		C	20	
HP 52		C	20	
HP 53		C	19	
HP 2883A		O	20	
HP 54		C	20	
HP 55		C	19	
HP 80		C	19	
HP 81		C	20	
HP 82		C	20	
HP 12		O	22,50	
HP 14		C	22,50	
HP 1519		O	22,50	
HP 18		C	22,50	
HP 16		C	22,50	
HP 5B		O	22,50	
HP 20		C	22,50	
HP 24		O	22,50	
HP 34		C	22,50	
HP 26		C	22,50	
HP 72		C	22	
HP 3CA		O	50	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
HP 3CB		O	50	
HP 3DA		O	22	
HP 3DB		O	22	
HP 44		C	50	
HP 2883B		O	50	
HP 69		C	50	
HP 70		C	22	
HP 45		C	22	
HP 46		C	50	
HP 47		C	22	
HP 77		C	50	
HP 78		C	50	
HP 75		C	22	
HP 76		C	22	
DH 84		C	49	
DH 133		C	49	
DH 86		C	49	
DH 83		C	49	
DH 167		C	49	
DH 168		C	49	
DH 169		C	49	
SS 14		C	27,28	

DECAY HEAT REMOVAL SYSTEM AND ECCS (M-033) (Cont'd)

Penetrations: 19, 20, 22, 27, 28, 29, 30, 31, 49, 50 & 74C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DH 67		C	28	
DH 68		C	28	
DH 69		C	27	
DH 77		O*	28	
HP 49		O*	22	
HP 48		O*	50	
HP 56		O*	20	
HP 57		O*	19	
DH 76		O*	27	
DH 79		O	30,31	
SS 13		C	30,31	
BW 30		C	30,31	
BW 7		C	30,31	

*Valve stop is retracted.

EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SPRAY AND CORE FLOODING SYSTEM (M-034)

Penetrations: 25, 26, 44A, 47A, 47B & 71C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CS 1531		O	25	
BF 1147		O	--	
CS 1530		O	26	
BE 1156		O	--	
SA 532		C	25	
SA 536		C	25	
SA 533		C	26	
SA 535		C	26	
CS 17		C	25	
CS 33		C	25	
CS 18		C	26	
CS 36		C	26	
CF 100		O	44A	
CF 49		O*	44A	
CF 1541		C+	44A	
CF 11		O*	44A	
CF 2A		C+	47A	

+ Cycle valve (open then close) once prior to ILRT.

* The screwed cap on the test connection is also removed.

EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SPRAY AND CORE FLOODING SYSTEM (M-034)(Cont'd)

Penetrations: 25, 26, 44A, 47A, 47B, & 71C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
BF 1121		O	--	
CF 1545		C+	47A	
CF 22		O*	47A	
CF 53		O*	47A	
CF 52		O*	47A	
CF 2B		C+	47A	
BE 1163		O	--	
CF 101		O	47B	
CF 104		O	47B	
CF 102		O*	47B	
CF 105		O*	47B	
CF 5A		C+	47B	
BF 1123		O	--	
CF 5B		C+	47B	
BE 1165		O	--	
CF 1542		C+	47B	
CF 25		O*	47B	
CF 103		O	71C	
CF 50		O*	71C	
CF 1544		C+	71C	

*The screwed cap on the test connection is also removed.
+Cycle valve (open then close) once prior to ILRT.

EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SPRAY AND CORE FLOODING SYSTEM (M-034) (Cont'd)

Penetrations: 25, 26, 44A, 47A, 47B, & 71C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CF 12		O*	71C	
CF 16		C	71C	
CS 1		O	25	
CS 2		O	26	
CS 3		C	25	
CS 4		C	26	
CS 1591		O	26	
CS 1592		O	25	
CS 5		C	25	
CS 6		C	26	
CS 7		C	25	
CS 8		C	26	
CS 21		C	26	
CS 22		C	25	
CS 1540		O	26	
CS 1548		O	25	
CS 11		C	25	
CS 12		C	26	
CS 13		O	25	
CS 14		O	26	
CS 26		C	25	

*The screwed cap is also removed.

EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SPRAY AND CORE FLOODING SYSTEM (M-034) (Cont'd)

Penetrations: 25, 26, 44A, 47A, 47B, & 71C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CS 27		C	26	
CS 1535A		O	25	
CS 1535B		O	25	
CS 1547A		O	26	
CS 1547B		O	26	
CS 28		C	26	
CS 50		C	25	
CS 51		C	26	
CS 52		C	26	
CS 29		C	26	
CS 19		O	25	
CS 20		O	26	
CS 31		C	25	
SA 118		C	26	
SA 117		C	25	
CS 1558		O	25	
CS 1559		O	26	
CF 58		C	47B	
CF 59		C	47B	

* The screwed cap is also removed.

EMERGENCY CORE COOLING SYSTEM, CONTAINMENT SPRAY AND CORE FLOODING SYSTEM (M-034) (Cont'd)

Penetrations: 25, 26, 44A, 47A, 47B, & 71C

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CF 51		C	47B	
CF 62		C	47B	
CF 24		C	47B	
CF 13		C	44A	
CF 60		C	44A	
CF 61		C	44A	
HP 61		C	44A	
NN 142		C	44A	
HP 60		C	71C	
NN 140		C	71C	
CF 14		C	71C	
SS 12		C	47A	
CF 23		C	47A	
CF 21		C	47A	
CF 55		C	47A	
CF 54		C	47A	
CF 15		O*	44A	

*Valve stop is retracted.

SPENT FUEL POOL COOLING SYSTEM (M-035)

Penetrations. 23, 24

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
Fuel Transfer Tube 1-1		Blind Flange Installed	24	
Fuel Transfer Tube 1-2		Blind Flange Installed	23	
SF 1		C	23	
SF 2		C	24	
SF 73		C	24	
SF 72		C	23	
SF 68		C	23	
SF 69		C	24	
SF 70		C	23	
SF 71		C	24	
SF 121		O*	24	
SF 122		O*	23	
SF 3956		C	24	
SF 3957		C	23	
SF 98		C	--	
SF 2656		C	--	

*The screwed cap is also removed.

COMPONENT COOLING WATER SYSTEM (M-036)

Penetrations: 3, 4 & 12

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CC 1411A		C	3	
BE 1176		O	--	
CC 1411B		C	3	
BF 1159		O	--	
CC 94		O*	3	
CC 92		C	3	
CC 1407A		C	4	
BE 1173		O	--	
CC 622		C	4	
CC 1407B		C	4	
BF 1158		O	--	
CC 111		O*	4	
CC 107		C	12	
CC 623		C	12	
CC 516		O	12	
CC 1567B		C	12	
BF 1176		O	--	
CC 1567A		C	12	
BE 1158		O	--	
CC 625		C	12	

*The screwed cap on the test connection is also removed.

COMPONENT COOLING WATER SYSTEM (M-036) (Cont'd)

Penetrations: 3, 4 & 1

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
CC 611		O*	12	
CC 615		O	3	
CC 618		O	4	
CC 110		C	4	
CC 650		C	4	
CC 651		C	4	
CC 5098		C	4	
BF 1119		O	--	
CC 5097		C	4	
BE 1227		O	--	
CC 624		C	4	
CC 514		C	12	
CC 517		C	12	
CC 515		C	12	
CC 608		C	3	
CC 95		C	3	
CC 612		C	3	

*The screwed cap on the test connection is also removed.

REACTOR COOLANT SYSTEM DETAILS (M-040A)

Penetrations: 16, 32, 41, 48 & 68A

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
RC 96		C	16	
RC 97		O*	16	
RC 1719A		C	16	
RC 1719B		C	16	
RC 100		O*	16	
RC 101		C	16	
RC 74		C	32	
RC 94		C	32	
RC 93		O*	32	
RC 1773A		C	32	
RC 1773B		C	32	
RC 95		O*	32	
RC 115		C	32	
RC 151		C	41	
RC 152		O*	41	
RC 232		C	41	
RC 111		O*	41	
RC 75		C	48	
RC 229B		C	48	
RC 76		O*	48	
RC 229A		C	48	
RC 81		0	16	
RC 82		0	16	
RC 83		0	16	

* The screwed cap on the test connection is also removed.

REACTOR COOLANT SYSTEM DETAILS (M-040A) (Cont'd)

Penetrations: 16, 32, 41, 48 & 68A

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
RC 78		O*	48	
RC 79		C	48	
SS 165		C	68A	
SS 166		O*	68A	
SS 235B		C+	68A	
SS 235A		C+	68A	
SS 93		O*	68A	
SS 472 (Note)		C	68A	
SS 809		O	68A	
PW 225B		C	41	
RC 180		O	16	
RC 102		C	48	
SS 168		C	68A	
SS 92		C	68A	
RC 112		C	41	
RC 77		C	48	
RC 150		C	16	
RC 99		C	16	
RC 3972		O	16	
RC 225A		C	41	

* The screwed cap on the test connection is also removed

+ Cycle valve (open then close) once prior to ILRT.
Note: Valve SS 472 is shown on P&ID M-42A.

SERVICE WATER SYSTEM (M-041)

Penetrations: 5, 6, 7, 9, 10 & 11

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
SW 1366		V***	5	
BE 1142		V***	--	
SW 1367		V***	7	
BF 1223		V***	--	
SW 1368		V***	6	
BE 1207		V***	--	
SW 1356		V***	9	
SW 1357		V***	11	
SW 1358		V***	10	

*** Valve operated as required to maintain proper containment atmosphere conditions during containment tests.

STATION DRAINAGE SYSTEMS (M-046)

Penetrations: 13

VALVE	TAG NO.	POSITION	PENET.	SIGNATURE/DATE (TECO Test Leader)
DR 2012A		C	13	
BE 1108		O	--	
DR 24		O*	13	
DR 2012B		C	13	
BF 1138		O	--	
DR 26		O*	13	
DR 28		C	13	
DR 25		C	13	
SS 76		C	13	
DR 27		C	13	
DR 2801A		O	13	
DR 2801B		O	13	
DR 23		O	13	

*The screwed cap on the test connection is also removed.

II SYSTEM STATUS

A. The following lines are water filled:

LINES	DRAWING	PENETRATIONS	SIGNATURE/DATE (TECO Test Leader)
Containment air cooling service water inlet & outlet lines (service water)	M-041	5, 6, 7, 9, 10, 11	_____
High pressure injection lines (demineralized or borated water)	M-033	19, 20, 22, 50	_____
Containment spray lines (demineralized or borated water)	M-034	25, 26	_____
Low pressure injection lines (demineralized or borated water)	M-033	27, 28	_____
Decay heat removal line (demineralized or borated water)	M-033	29	_____

B. The following normally water filled lines are (1) vented to the containment atmosphere and drained sufficiently to expose the inside containment isolation valve; and are (2) vented to the outside atmosphere and drained sufficiently to expose the outside containment isolation valve:

LINES	DRAWING	PENETRATION	SIGNATURE/DATE (TECo Test Leader)
Pressurizer sample line	M-030	1	_____
Component cooling water inlet & outlet	M-036	3, 4	_____
Component cooling water to control rod drives	M-036	12	_____
Containment vessel normal sump drain	M-046	13	_____
Letdown line to purification demineralizers	M-031	14	_____
Demineralized water	M-010B	21	_____
Reactor coolant system drain to R.C. drain tank	M-040A	32	_____
Pressurizer quench tank circulating inlet line	M-040A	41	_____
Core flooding tank sample line	M-034	47A	_____
Pressurizer quench tank circulating outlet line	M-040A	48	_____
Refueling canal fill line	M-033	49	_____

LINES	DRAWING	PENETRATION	SIGNATURE/DATE (TECO Test Leader)
Reactor coolant pump seal water supply & return lines	M-031	52, 53, 54, 55, 56	
Pressurizer quench tank sample line	M-040A	68A	

C The following lines are air or other gas lines and are vented inside and outside the containment to expose the inside containment isolation valve to containment air and the outside containment isolation valve to outside air:

LINES	DRAWING	PENETRATION	SIGNATURE/DATE (TECO Test Leader)
Containment vessel vacuum breakers	M-029B	8A-J	
Containment vessel equipment vent header	M-040A	16	
Containment vessel purge inlet & outlet	M-029A	33, 34	
Service air supply line*	M-015	42A	
Containment vessel air sample return	M-029B	42B, 43B	
Instrument air supply line*	M-015	43A	
Core flooding tank fill and N_2 supply lines*	M-034	44A, 71C	
Pressurizer quench tank N_2 supply line*	M-019	44B	

*Lined up to ensure no in-leakage of pressurized gases

LINES	DRAWING	PENETRATION	SIGNATURE/DATE (TECO Test Leader)
Core flood tank vent line	M-034	47B	
Hydrogen purge system exhaust	M-029A	51	
Hydrogen dilution system supply lines	M-029A	67, 69	
Containment air sample lines	M-029B	71B, 68B, 73B, 74B	

D. The following lines are associated with the secondary systems of the steam generators, shall not be vented to the containment vessel in any manner, and may be water filled. All valves and connections on the secondary side of the steam generators must be checked to assure that they are positioned to isolate the entire system from the containment. Penetrations and systems involved are as follows (see also Sheets B-2 and B-3):

LINES	DRAWING	PENETRATION	SIGNATURE/DATE (TECO Test Leader)
Main steam line	M-003, 007	39, 40	
Main feedwater line	M-007	37, 38	
Auxiliary feedwater line	M-007	35, 36	
Steam generator drain line	M-007	57, 58	
Secondary sampling line	M-007	2, 18	

III EQUIPMENT REQUIRING SPECIAL ATTENTION BEFORE PRESSURIZATION

1. Open the condensate drain on the cases of the Brooks Rotameters, MU-FE60 A, B, C, and D.

SIGNED/DATE (BCM Test Supervisor)

2. The following qualified Bailey BY transmitters are to be vented as follows:

   a. Open the internal equalizing valve of each transmitter.

   b. Remove the 3/8" plug in the bottom of each transmitter's housing.

   c. Verify that each amplifier package is vented through the 3/4" conduit connection on the side of its housing. This may be accomplished by blowing smoke through it.

LT-RC14-1	LT-SP9B-1
LT-RC14-2	LT-SP9B-2
LT-RC14-3	LT-SP9B-3
LT-SP9A-1	LT-SP9B-4
LT-SP9A-2	LT-SP9B-5
LT-SP9A-3	LT-CF3A-1
LT-SP9A-4	LT-CF3A-2
LT-SP9A-5	LT-CF3B-1
	LT-CF3B-2

SIGNED/DATE (BCM Test Supervisor)

3. Both cover plates of the nuclear instrumentation pre-amplifiers for source range detectors NE-NI-1 and NE-NI-2 should be removed.

SIGNED/DATE (BCM Test Supervisor)

4. The following Westinghouse Model 59 PM/PH pressure transmitters should have the connection to the bourdon tube opened. (This equalizes inside and outside pressures):

PT-RC2A1
PT-RC2A2
PT-RC2A3
PT-RC2A4
PT-RC2B1
PT-RC2B2
PT-RC2B3
PT-RC2B4

SIGNED/DATE (BCM Test Supervisor)

5. On the following Motorola pressure transmitters, v ify that the unused conduit connection is plugged:

PT-RC18A1
PT-RC18A2
PT-RC18A3
PT-RC18A4
PT-CF4A1
PT-CF4A2
PT-RC2A1
PT-RC2A2
PT-RC2A3
PT-RC2A4
PT-RC18B1
PT-RC18B2
PT-RC18B3
PT-RC18B4
PT-CF4B1
PT-CF4B2
PT-RC2B1
PT-RC2B2
PT-RC2B3
PT-RC2B4

SIGNED/DATE (BCM Test Supervisor)

6. Vent the pressurizer quench tank.

SIGNED/DATE (BCM Test Supervisor)

7. All panels on the reactor polar and reactor service cranes should be kept open during the tests.

SIGNED/DATE (BCM Test Supervisor)

8. All registers, dampers, etc., in the duct systems must be open to assure pressure equilization of ductwork and fan housings during the test.

SIGNED/DATE (BCM Test Supervisor)

9. For PT-616 and PT-618 (M-007) and PT-412 (M-030), equalize the pressure at the sensor by opening the vent valve and closing the instrument valve at the two-way valve manifold.

SIGNED/DATE (BCM Test Supervisor)

10. The following ITT Barton products should be vented by unscrewing bezel screws to relieve seal and then insert a thin spacer (approximately 1/8") to ensure a space between bezel and case:

FIS-4133 thru 4136
FIS-4233 thru 4236
FIS-4333 thru 4336
FIS-4433 thru 4436
LI-214
PDI-5055
PDI-5056
PDI-5057
PDI-5061
PDI-5062
PDIS-1629

SIGNED/DATE (BCM Test Supervisor)

11. The following pressure gauges are to be protected by loosening the screwed cover:

PI-2019
PI-2132
PI-1636
PI-640A
PI-3205

SIGNED/DATE (BCM Test Supervisor)

12. Vent the reactor coolant pump oil drain tanks.

SIGNED/DATE (BCM Test Supervisor)

13. All portable equipment removed or vented.

SIGNED/DATE (BCM Test Supervisor)

14. All vessels containing compressed gas removed.

SIGNED/DATE (BCM Test Supervisor)

15. Hydraulic snubbers vented.

SIGNED/DATE (TECo Test Leader)

16. Ensure that the pressure in electrical penetrations 101 and 102 is within 0 to 5 psig prior to ILRT.

SIGNED/DATE (TECo Test Leader)

17. All welds in penetrations 39 and 40, including the sleeve drain piping and valves, are solution film tested.

SIGNED/DATE (TECo Test Leader)

18. Remove the following components from service and vent:

PT	2000
PT	2001
PT	2002
PT	2003
PDT	645
PDIS	624
PS	NI15-1
PS	NI15-2
PS	NI15-3
PS	NI15-4

SIGNED/DATE (TECo Test Leader)

APPENDIX C

APPENDIX C

INTEGRATED LEAK RATE MEASUREMENT SYSTEM

1. Instrumentation required for leak rate measurement is listed in Section 5.0 of CB&I procedure VCI-70-6449.

2. The locations of the containment temperature sensors and dewpoint sensors are shown on page 11 of CB&I procedure VCI-70-6449.

APPENDIX D

PRESSURIZATION SYSTEM EQUIPMENT

The pressurization equipment is given on page 5 of CB&I procedure VCI-70-6449 (Section 5.3)

The valves and connecting tubing are in accordance with the sketch on page 4 of CB&I procedure VOT-70-6449.

Air dryer, if available, supplied by TECo.

AIR QUALITY

The air quality shall be checked hourly, when pressurizing system is in operation, at the test connection by blowing the air into a clean, dry, white cloth and by blowing the air onto the hand.

For the air to be satisfactory, no visible sign of water or oil shall be detected on the cloth. Additionally, the air shall feel dry and oil-free to the touch.

The quality of air and outside air conditions shall be recorded on Sheet G-4.

APPENDIX E

CONTAINMENT VENTILATING AND COOLING SYSTEM

The ventilation system is used to achieve proper mixing of air throughout the containment as is shown on drawing M-029A.

The containment air cooler systems will be operated at containment pressures up to and including 45 psig. Cooling water discharge isolation valves will be shut unless flow is required.

The two containment air cooler fans should be run at half speed during the ILRT.

Note: 1. Containment recirculation fans (C56-1 & 2) must not be used during overload tests.

2. The containment ventilation and cooling system are operated from the control room.

APPENDIX F

VALVE POSITION SCHEDULE

PHASE / VALVE*	1	1A	2, 3, 4	5	6	7	8	9	10	10A
1. Pump up vessel to 5 psig	O	O	O	O	C	C	C	O	C	C
2. Hold at 5 psig for solution film bubble test	O	O	O	C	C	C	C	O	C	C
3. Overload test pressurization	O	O	O	O	C	C	C	O	O	O
4. a) Hold at overload pressure @ 45 psig	O	O	O	C	C	C	C	O	O	O
b) Connect airlocks with the vessel	O	O	O	C	C	C	O	C	O	O
5. a) Pressure bleed off to code design pressure to 36 psig	O	O	O	C	C	O	O	C	O	O
b) Film bubble test @ 36 psig and airlock check	O	O	O	C	C	C	C	O	O	O
6. Depressurization to 85% of leak test pressure. Hold for 24 hours maximum	O	O	O	C	C	O	C	C	O	O
7. Pressurize to 38 psig	C	C	D	O	D	C	C	C	C	C
8. Hold @ 38 psig for ILRT	C	C	D	C	D	C	C	C	C	C
9. Reduce pressure to atmospheric	O	C	D	C	D	O	C	C	C	C

D = Disconnected
O = Open
C = Closed
* Valves listed are shown on page 4 of VOT-70-6449, see Sheet A-3 for test schedule.

APPENDIX G

SCHEDULE OF RECORDED DATA

Containment atmosphere conditons required to compute the containment vessel integrated leak rate are recorded automatically by the Davis-Besse Station computer according to the format below.

Containment atmosphere dry bulb temperature is sensed using twenty (20) resistance thermometers. Dry bulb temperature is transmitted directly to the station computer and CB&I instrumentation.

Containment atmosphere absolute pressure is sensed using a precision pressure gage. Pressure is recorded in PSIA. The recorded value must be corrected for a tube constant. This correction is made by the computer program.

Containment atmosphere dewpoint temperature is sensed using eighteen (18) sensors. The dewpoint readout is transmitted to the station computer and CB&I instrumentation. The computer corrects the containment atmosphere absolute pressure for water vapor pressure.

The meters for the verification flow systems are located in the penetration room. Readings are recorded directly from the integral digital display.

To measure instrument room temperature, a standard Fahrenheit thermometer is located in the penetration room.

To measure atmosphere conditions, a mercury barometer and psychrometer are located beyond the 600 foot exclusion radius, near the air compressors.

During overload and solution film testing, vessel pressure will be monitored using pressure gages, reading in PSIG, located near the air compressors and mounted as shown in VOT-70-6449. Atmospheric temperature readings will be taken from the psychrometer.

The station computer printout format is shown on sheet G-1a. Manual recording shall be performed concurrently with the Station computer, on Sheet G-2, G-3, G-4, & G-5.

A plot of weighted average dry bulb temperature with respect to time is shown on Sheet G-6.

STATION COMPUTER PRINTOUT FORMAT

TECO D-B UNIT 1 INTEGRATED LEAK RATE TEST DATA DATE 99/99/99 PAGE 999

	1	2	3	4	5	6	7	8	9	10	Press (A)	Press (B)	Time
Air Temp	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99	99.999	99.999	HH:MM:SS
	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99	999.99			
Dewpoint Temp	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99				
	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99				

TEMP (R) = 999.999 AVG DPT = 99.99 PV = 9.999 LEAKAGE = 99.9999% A = 99.999

H = 99.99 N = 999 H-BAR = 99.999 M-BAR = 99.999 S2 = 9.99999 LM = 99.999-99.999 L = 99.999

DATE _____

JOB NO. _____

SHEET NO. _____

I L R T RECORDED DATA
TEMPERATURE DATA, °F

APPENDIX G

WEIGHTING FACTORS		0.667												0.333									INI-TIALS	REMARKS
DATE	TIME	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	. 5	T16	T17	T18	T19	T20	WTD AVG.		

_____

(SIGNATURE/DATE) (TECo TEST LEADER)

_____

(SIGNATURE/DATE) (CB & I REPRESENTATIVE)

NOTE:

1. DATA IS RECORDED HOURLY CONSISTANT WITH SHEET G-4
2. FOR TEMPERATURE INSTRUMENT, SEE CB&I'S PROCEDURE VCI - 70 - 6449

DATE _____

JOB NO. _____

SHEET NO. _____

I L R T RECORDED DATA

DEWPOINT DATA

APPENDIX G

WEIGHTING FACTORS		1.0																			INI-TIALS	REMARKS
DATE	TIME	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	WTD. AVG.		

_____

(SIGNATURE/DATE) (TECo TEST LEADER)

_____

(SIGNATURE/DATE) (C[illegible] & I REPRESENTATIVE)

NOTE:

1. DATA IS RECORDED HOURLY CONSISTANT WITH SHEET G-4
2. FOR TEMPERATURE INSTRUMENT, SEE CB&I PROCEDURE VCI-70-6649

DATE

JOB NO.

SHEET NO.

I L R T RECORDED DATA

SUMMARY OF TEST DATA

APPENDIX G

DATE	TIME	PRESSURE - P					INLET AIR QUALITY (NOTE 1)	WTD. AVG. TEMP. T. °R (NOTE 4)	WTD. AVG. DEW POINT TEMP. DPT °F (NOTE 4)	WATER VAPOR PRESS. Pv PSI (NOTE 8)	VERIFICATION FLOW (NOTES 2&4)			INSTR. ROOM TEMP. °F (NOTE 5)	BARO-METRICS PRESS "Hg (NOTE 6)	PSYCHROMETER °F (NOTE 6)		OUTS. SHELL TEMP. t_1/t_2 °F (NOTE 7)	INITIALS	REMARKS
		QM READING x M + C				DIAL GAUGE PSIA					METER #1 SCFM	METER #2 SCFM	TOTAL L'_o SCFM			DBT	WBT			
		#1 QPS °C		#2 QPS °C																
		M=	C=	M=	C=															
		QM RDG	PSIA	QM RDG	PSIA															

(SIGNATURE/DATE) (TECo TEST LEADER)

(SIGNATURE/DATE) (CB & I REPRESENTATIVE)

NOTE:

1. RECORDED ONLY DURING PRESSURIZATION PHASES
2. RECORDED ONLY DURING VERIFICATION FLOW PHASES
3. DATA IS RECORDED HOURLY
4. FOR INSTRUMENT SEE CB&I PROCEDURE VCI-70-6449
5. INSTR. ROOM TEMP. INSTRUMENT IS CB&I EQUIPMENT
6. FURNISHED BY TECO
7. INSTALLATION AND READINGS AT THE DISCRETION OF CB&I
8. CALCULATED BY STATION COMPUTER USING DPT

DATE _____

JOB NO. _____

SHEET NO. _____

CONTAINMENT VESSEL
RECORDED DATA
OVERLOAD & SOLUTION FILM TESTS

APPENDIX G

DATE	TIME	VESSEL PRESSURE, PSIG			ATMOS. TEMP., F	INLET AIR QUALITY	INITIALS	REMARKS
		GA. #1	GA. #2	REC.				

NOTE:

1. FOR FREQUENCY OF DATA RECORDING SEE 2.7 OF VOT-70-6449.
2. THEROMETER TO MEASURE ATM. TEMPERATURE IS CB&I EQUIPMENT WHICH IS NOT LISTED IN THE CB&I PROCEDURE.

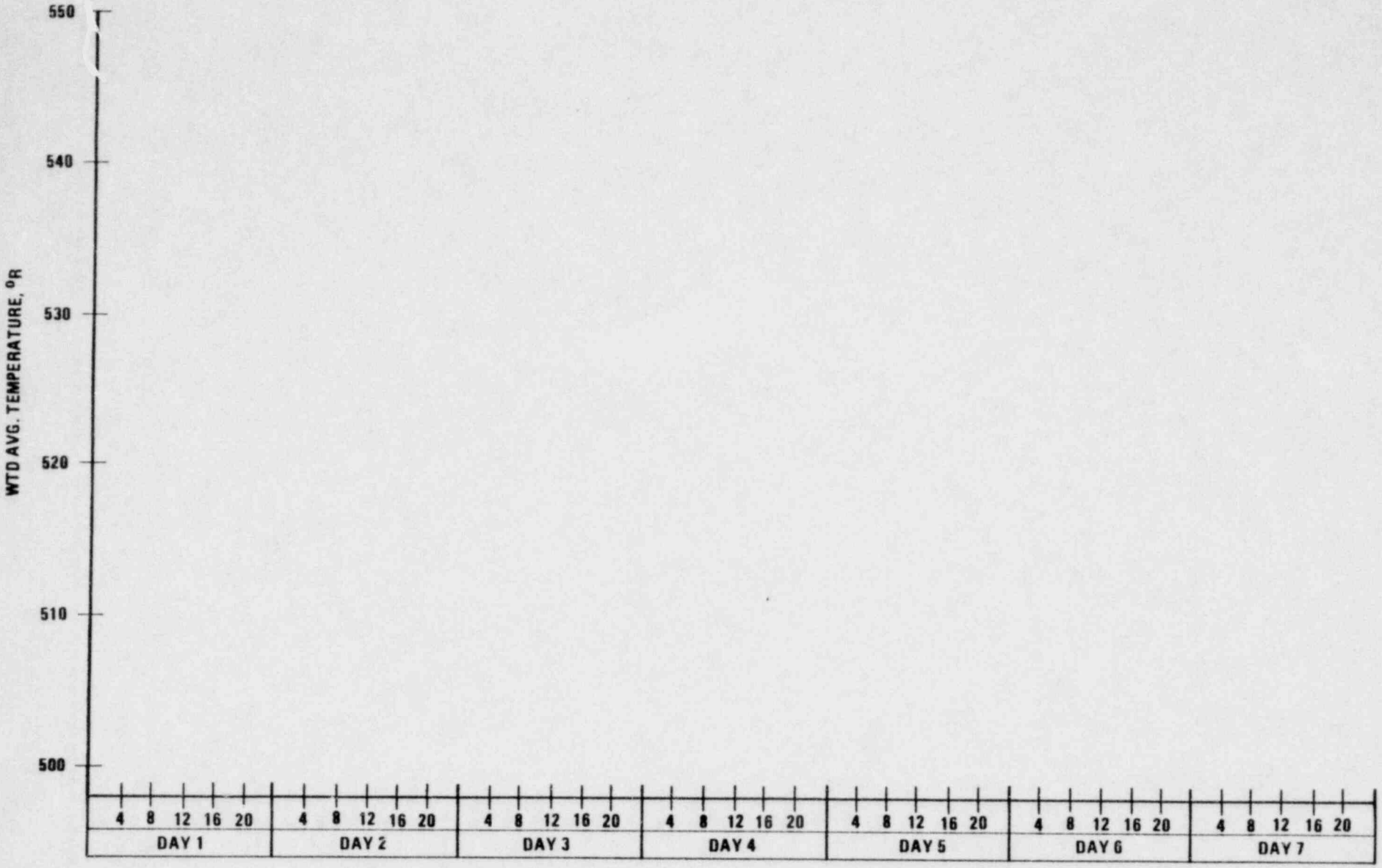
_____

(SIGNATURE/DATE) (TECo TEST LEADER)

_____

(SIGNATURE/DATE) (CB & I REPRESENTATIVE)

ILRT RECORDED DATA
WEIGHTED AVERAGE DRYBULB TEMPERATURE
WITH RESPECT TO TIME



SIGNATURE/DATE (TECo TEST LEADER)

APPENDIX H

APPENDIX H

CONTAINMENT VESSEL OVERALL LEAKAGE RATE TEST - TEST CHANGE PROCEDURE

I. PURPOSE

To provide a means to amend the test procedure as required and to provide a summary sheet on which to list test exceptions.

II. CONTROL OF CHANGES TO OLRT TEST PROCEDURE

A. Responsibilities

1. It is the responsibility of the TECO ILRT Test Leader or his designated alternate to keep an updated copy of the latest revision, including changes.

B. Document

1. All exceptions or additions shall be documented on the attached form, OLRT (Sheet H-2). Other required documentation, such as Field Change Notice, etc., will be written as required.

2. All exceptions will be reviewed and approved by the TECO Test Leader, BCM Test Supervisor, GPDE Representative, PE&C Representative, TECO QA, and CB&I Test Director (where applicable).

3. All exceptions and associated disposition will be listed on Sheet H-3.

4. All exceptions and additions will be transmitted with the test documentation.

5. All exceptions and additions will be kept with the updated copy of the OLRT procedure.

6. Upon completion of the OLRT, all exceptions and additions shall be incorporated in the final revision of the test procedure, or a copy of each shall be included in the final report.

APPENDIX H

EXCEPTION OR ADDITION TO OVERALL LEAKAGE RATE TEST PROCEDURE
(FORM OLRT-1)

NO._____ EXCEPTION_____

ADDITION_____

REASON:_____

_____

_____

REQUIRED ACTION:_____

_____

_____

_____

_____

EFFECTED SECTION:_____

OTHER DOCUMENTATION:_____

ORIGINATOR _____

APPROVED _____
TECO Test Leader

APPROVED _____
TECO QA

APPROVED _____
BCM Test Supervisor

APPROVED _____
CB&I Test Director

APPROVED _____
PE&C Representative

APPROVED _____
GPDE Representative

APPENDIX H

OLRT TEST EXCEPTIONS

Exceptions are listed on an "as-occurring" basis.

NO.		EXCEPTION	DISPOSITION
1a.	Page B-22	MU 219, 3971, BE 1127	Delete (a) (Notes on H-6)
		MU 210, 209, 31A	Delete (a)
		MU 31B	Delete (a)
1b.	Page B-23	MU 26, 216, 214	Delete (a)
		MU 19, 19A, 19B	Delete (a)
		MU 178, 200, 199	Delete (a)
		MU 198, 205, 202	Delete (a)
		MU 206, 203, 25A	Delete (a)
		MU 25B, 194, 193	Delete (a)
1c.	Page B-24	MU 192, 190, 191	Delete (a)
		MU 467, 444, 195A	Delete (a)
		MU 67A, 67B, 299	Delete (a)
		MU 218, 220, 222, SS 18	Delete (a)
		BF 1237 & BF 1238	Include controls for breakers
1d.	Page B-32	DH 130	Change positon to close
1e.	Page B-35	DH 79, SS 13, BW 30, BW 7	Delete; control is not required
1f.	Page B-38	CF 1544 must be exposed to test pressure	Delete CF 16
1g.	Page B-24	MU158-Pos.C-Pen.-56	Add (b)
		MU182-Pos.C-Pen.-56	Add (b)
		MU230-Pos.C-Pen.-52 (Tag No. 386)	Add (b)
		MU231-Pos.C-Pen.-53 (Tag No. 387)	Add (b)
		MU232-Pos.C-Pen.-54 (Tag No. 388)	Add (b)
		MU233-Pos.C-Pen.-55 (Tag No. 389)	Add (b)
		SS15-Pos.C-Pen.-56	Add (b)
		MU273-Pos.O-Pen.-56	Add (b)
		MU161-Pos.C-Pen.-56	Add (b)
		SS22-Pos. C-Pen.-56	Add (b)
		MU177-Pos.C-Pen.-56	Add (b)
		MU13B-Pos.C-Pen.-56	Add (b)
1h.	Page B-11	Outer manway at Penn. 33	Open to ensure a leakage path per NRC request
		Outer manway at Penn. 34	

APPENDIX H

OLRT TEST EXCEPTIONS

Exceptions are listed on an "as-occurring" basis.

NO.	EXCEPTION		DISPOSITION
1i.	Page B-15	Penn. 17 is required for pressurizing the containment	Change CV 344 and CV 537 from O to C
1j.	Page B-27	Penn. 30 & 31 requires venting	Leave blind flanges and open valves DH 150 and DH 151
1k.	Page 11-	Paragraph 1.2.6	Delete parenthetical phrase "at least two weeks"
1l.	Page 14 -	Paragraph 1.6.1	Change 1st sentence to: "Closure of containment isolation valves for the test shall be accomplished by actuator that would close valve as result of postulated..."
2.	Page B-52	Item III-2a: The internal equalizing valve of each BY transmitter need not be opened.	Delete step III-2a of Appendix B
3.	Page B-15	Valve CV 113 is used for CBI instrumentation during the test	Change valve position from "C" to "O"
4.	Page B-23	Valve MU 479 should be closed to keep water from the outboard side of valve MU 38	Change valve position from "O" to "C"
5.		Changes to valve lineup	
5a.	Page B-2	BE 1295 is not working properly	Manually close MS 611A
5b.	Page B-32	Seals on HPI pump 1-2 are not installed	Change valves HP 13 and HP 25 from "O" to "C"
5c.	Page B-4	BF 1111 is not working properly	Manually close MS 603
5d.	Page B-12	Instrument lines for shield building differential pressure do not penetrate the containment and need not be controlled	Valves CV 5000C and CV 5014D are not tagged or signed off

APPENDIX H

OLRT TEST EXCEPTIONS

Exceptions are listed on an "as-occurring" basis.

NO.	EXCEPTION	DISPOSITION
5e.	Page B-31 DH-132 is required for venting	Change valve position from "C" to "O"
5f.	Procedure Page 12, Item 1.3.2: ILRT instrumentation was checked in less than one week prior to ILRT	Delete the phrase "...(at least one week prior to ILRT)."
5g.	Page B-29 Flow transmitters FT 4908 and FT 4909 are not installed	Change DH 4908A, B and DH 4909A, B positions from "O" to "C"
5h.	Page B-31 Venting is required outboard of DH 9A	Change DH 132 position from "C" to "O"
5i.	Page B-36 Valve CS 18 is not installed yet. A spool piece is in its place	No tag or sign-off required for CS 18
5j.	Page B-43 Venting is required outboard of valve C 93	Change CC 95 position from "C" to "O"
5k.	Page B-32 Venting is required outboard of DH 9A	Change DH 134 and DH 135 positions from "C" to "O"
6.	A means for recording deficiencies encountered during the test is required per NCR-129-76	Pages H-1 and H-2 are revised to include the word "deficiency" wherever the word "exceptions" appears, except for Sheet H-1, Item II.B.3.
7.	Procedure Page 13, Item 1.4.3b: Moisture was detected in an air sample.	The line was vented until no moisture could be detected. Final air sample was dry and oil-free.

APPENDIX H

OLRT TEST EXCEPTIONS

Exceptions are listed on an "as-occurring" basis.

NO.	EXCEPTION		DISPOSITION
8.	Appendix E	Both the containment air coolers and the containment recirculation fans drew excessive current during testing above atmospheric pressure	The containment air coolers and containment recirculation fans were not run during the ILRT
9.	Vessel Test Instructions, VCI-70-6449, Item 5.1.1: The 6-inch pressure gauges used had 1.0 psig divisions instead of 0.5 psig divisions. This was used only during overload testing.		Change "0.5" to "1.0"
10.	Vessel Test Instructions, VCI-70-6449, Item 5.2.3.2 should reflect actual conditions		Add "Micron Filter No. 6323G6Y or equivalent" to Item 5.2.3.2.
		VCI-70-6449, Item 5.2.4.4: Micron filters restricted too much flow during checkout of verification system prior to ILRT.	Revise Item 5.2.4.4 to read "Two Hoke metering valves"
		VCI-70-6449, Item 5.2.4.2: Brooks Model 5821 power supply failed prior to ILRT and was replaced by an equivalent power supply	Add "...or equivalent power supply" to Item 5.2.4.2
		The yoke on valve MU 66B (seal injection line) broke while being stroked. The valve leaked by the seat. The vent valve was closed and the valve isolated for the ILRT.	Repair MU 66B and perform LLRT after ILRT

Notes:

(a) These valves are not required for venting, are not part of the containment pressure boundary, and are not required for decay heat removal.

(b) A boundary is required for venting downstream of MU 38.

APPENDIX I

APPENDIX I

ACCESS CONTROL

I. Access Control requirements are described previously in the test procedure and on Sheets I-2 and I-3. Restricted areas generally are:

1. Containment
2. All penetration rooms and connecting hallways or stairs
3. Data acquisition and processing areas
4. 600 foot radius during VOT and initial pressurization.

II. The restricted areas are shown in Figures I-1 through I-8 (Sheets I-4 through I-11).

CONTAINMENT VESSEL INTEGRATED LEAKAGE RATE TEST (ILRT) ACCESS CONTROL REQUIREMENTS

I. PURPOSE

To define the Access Control Requirements necessary to assure the integrity of the Primary Isolation Boundary (Containment Vessel) during the performance of the Integrated Leakage Rate Test (ILRT).

II. GENERAL

A. Access to those areas of the plant impacted by the ILRT, or those areas of the plant whose alteration would impact the ILRT, will be restricted during certain ILRT phases. Specific areas of restriction include, but are not necessarily limited to, those listed below:

1. The containment vessel and annulus
2. Electrical penetration room 402
3. Data acquisition and processing areas
4. Air compressors area
5. Blowdown area
6. Control room

B. Barriers, locks, and/or guard personnel will be utilized to maintain access control boundaries.

III. ACCESS

A. Access to controlled areas shall be limited to personnel named on the current, approved access lists. These lists shall be maintained and approved by the ILRT Access Control Coordinator.

B. The following guide will be used in determining the access lists.

1. Unlimited Access
   a. Shift personnel
   b. Refuel floor personnel
   c. ILRT test and support personnel named by the ILRT Test Supervisor
   d. Key Construction Supervision
2. Limited Access
   a. Construction personnel for cleanup and painting only
   b. Maintenance and instrument personnel as required by ILRT Test Supervisor
   c. Construction supervision with permission from ILRT Test Supervisor
   d. NRC Inspectors

C. Access to the areas specified by ILRT Test Supervisor will be limited to personnel on approved access lists supplied by the ILRT Access Control Coordinator. Personnel will sign an access list on entry and exit to the areas specified.

D. Work which must be performed in the controlled areas during the time that access control is in effect must be approved by the ILRT Access Control Coordinator prior to the work starting. The person desiring the work shall describe the work to be performed, the area affected, the time required and the people involved by name in a letter addressed to the ILRT Access Control Coordinator. The Access Control Coordinator shall denote approval by signing and dating the letter along with any special instructions. The supervisor of the work crew must have a copy of the letter with him at all times he is in the access control area. These requirements are in addition to any other work approvals required.

E. Personnel will not be allowed to be in controlled areas during the time pressure is being increased above a previous pressure in the containment vessel.

IV. ACCESS CONTROL REQUIREMENTS

The following defines the access control requirements during all phases of the tests.

(A) 1). All unauthorized persons must maintain a minimum clearance in all directions from the vessel of 1200 ft. while pressure is being increased above 5 psig for the first time until the overload pressure test has been successfully completed.

2). Persons authorized in writing by Chicago Bridge & Iron Company and Bechtel Company and Toledo Edison Company may be admitted to the area defined in (1) above. Authorized employees of CBI, Bechtel, TECO, and authorized inspection personnel will be permitted at the locations of the controlling valves and gages approximately 600 feet from the outside of the vessel.

3). No one will be permitted within 600 feet of the vessel while the pressure is being increased above 5 psig for the first time or while the pressure exceeds the design pressure.

4). If there is any urgent need that authorized employees of CBI Company inspect the vessel while the pressure is being increased above 5 psig for the first time or while the vessel pressure exceeds the design pressure, the following precautions are to be observed.

a). For vessel pressures at or below 36 psig reduce the pressure 1 psi before approaching the vessel.

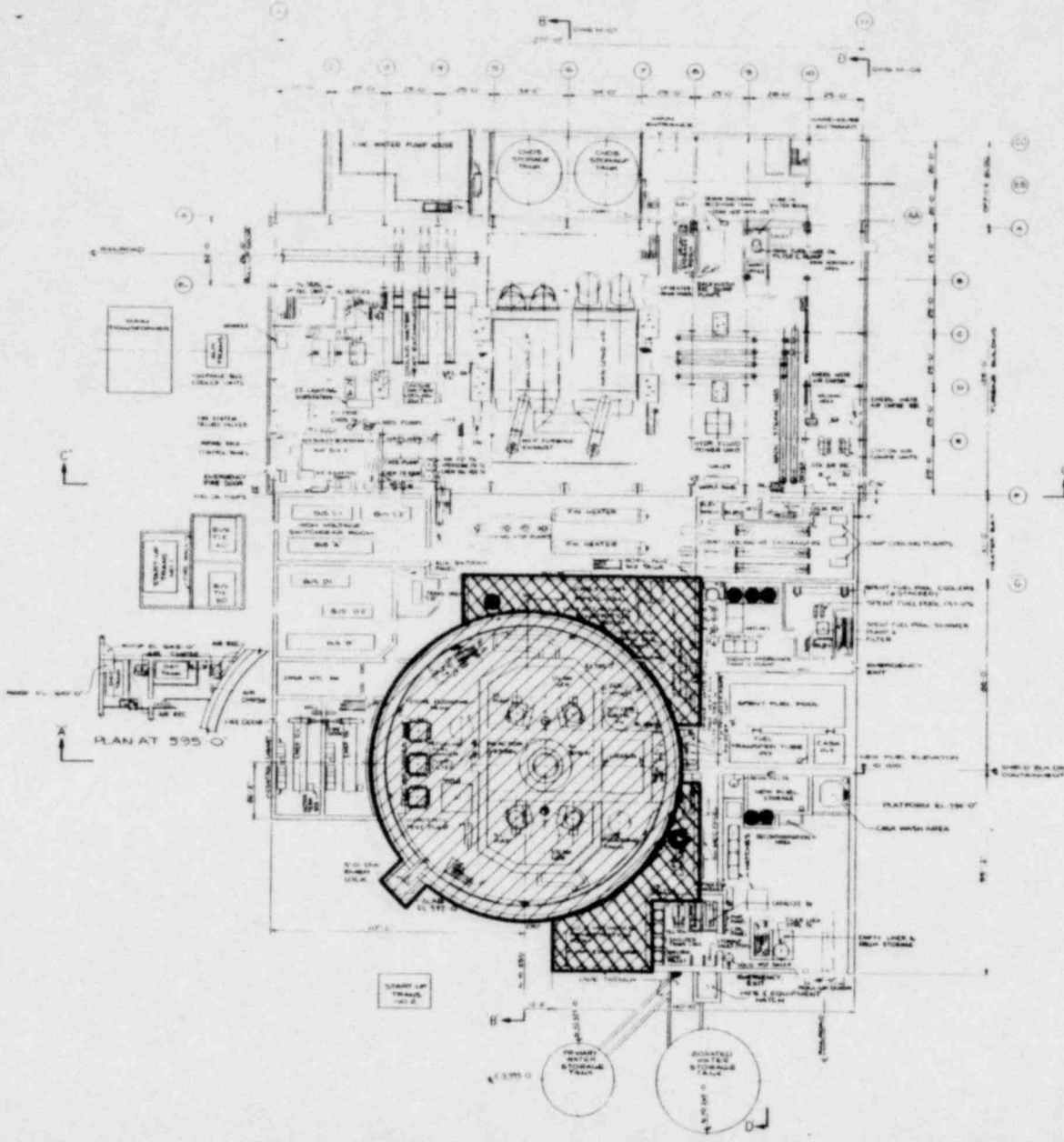
b). For vessel pressures above 36 psig reduce the pressure to 36 psig.

5). Enforcement of the above clearance requirements shall be a joint responsibility of Bechtel, Chicago Bridge & Iron Company and Toledo Edison Company.

(B) During the leakage rate test of the vessel, only authorized personnel shall be allowed on or adjacent to the vessel and instruments. Work performed within the indicated pressure boundaries shall be on a controlled basis.

(C) No restrictions.

The access control requirements (A), (B) & (C) are marked on ILRT Schedule, Sheet A-3.



N

APPENDIX I

FIGURE I-1

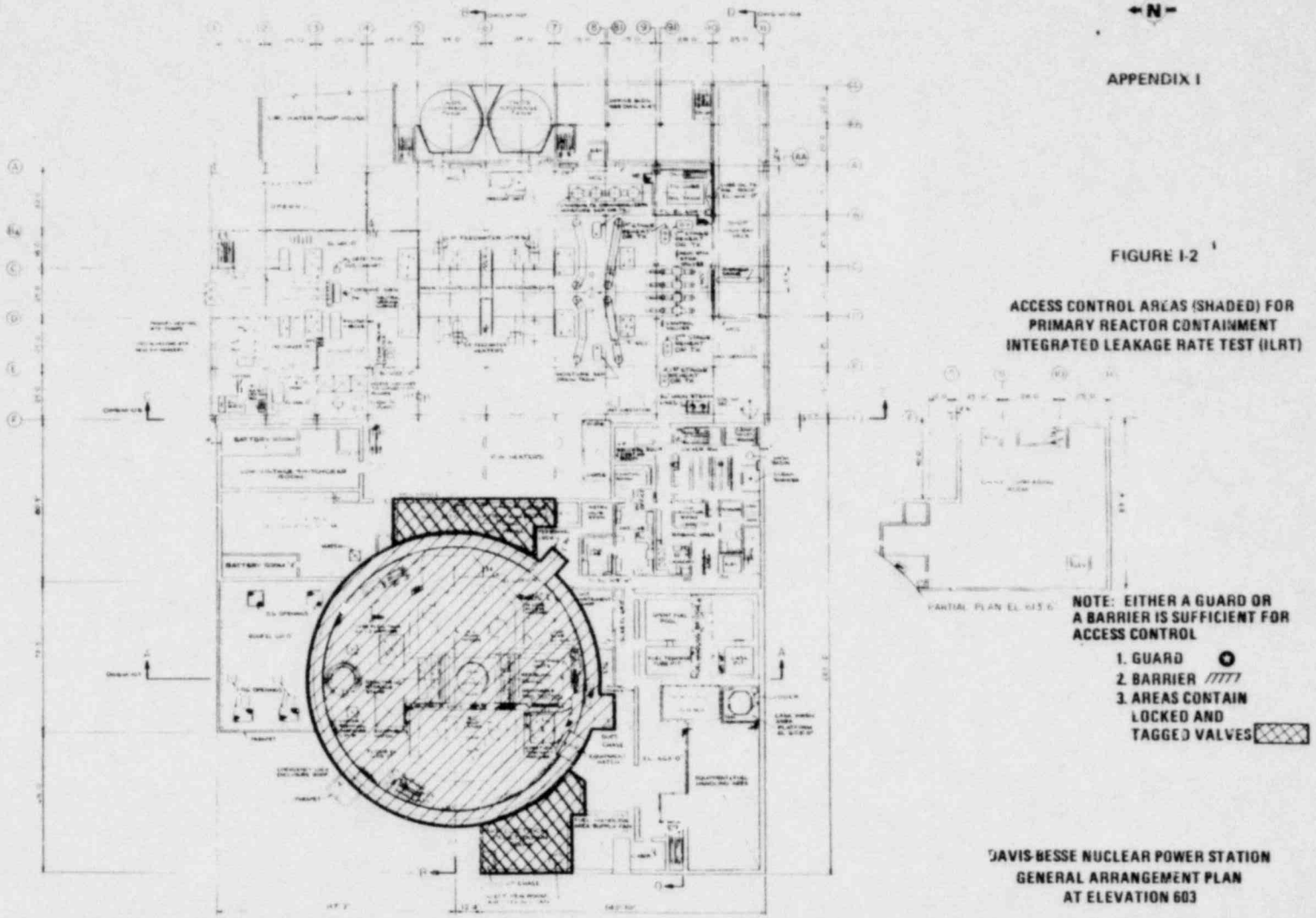
ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. LOCKED CLOSED
4. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT GRADE PLAN
AT ELEVATION 585

SHEET I-4



APPENDIX I

FIGURE I-2

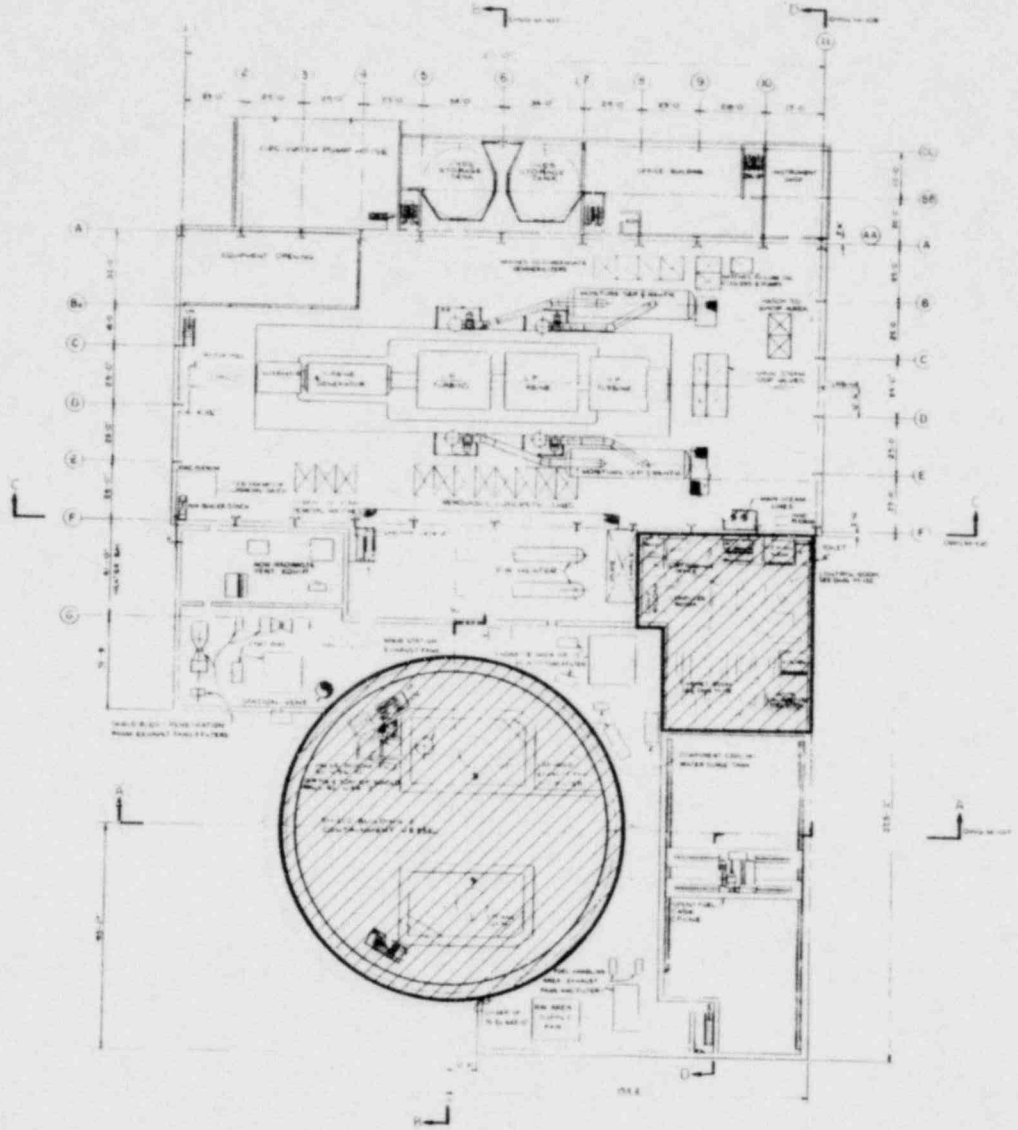
ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT PLAN
AT ELEVATION 603

SHEET I-6



-N-

APPENDIX I

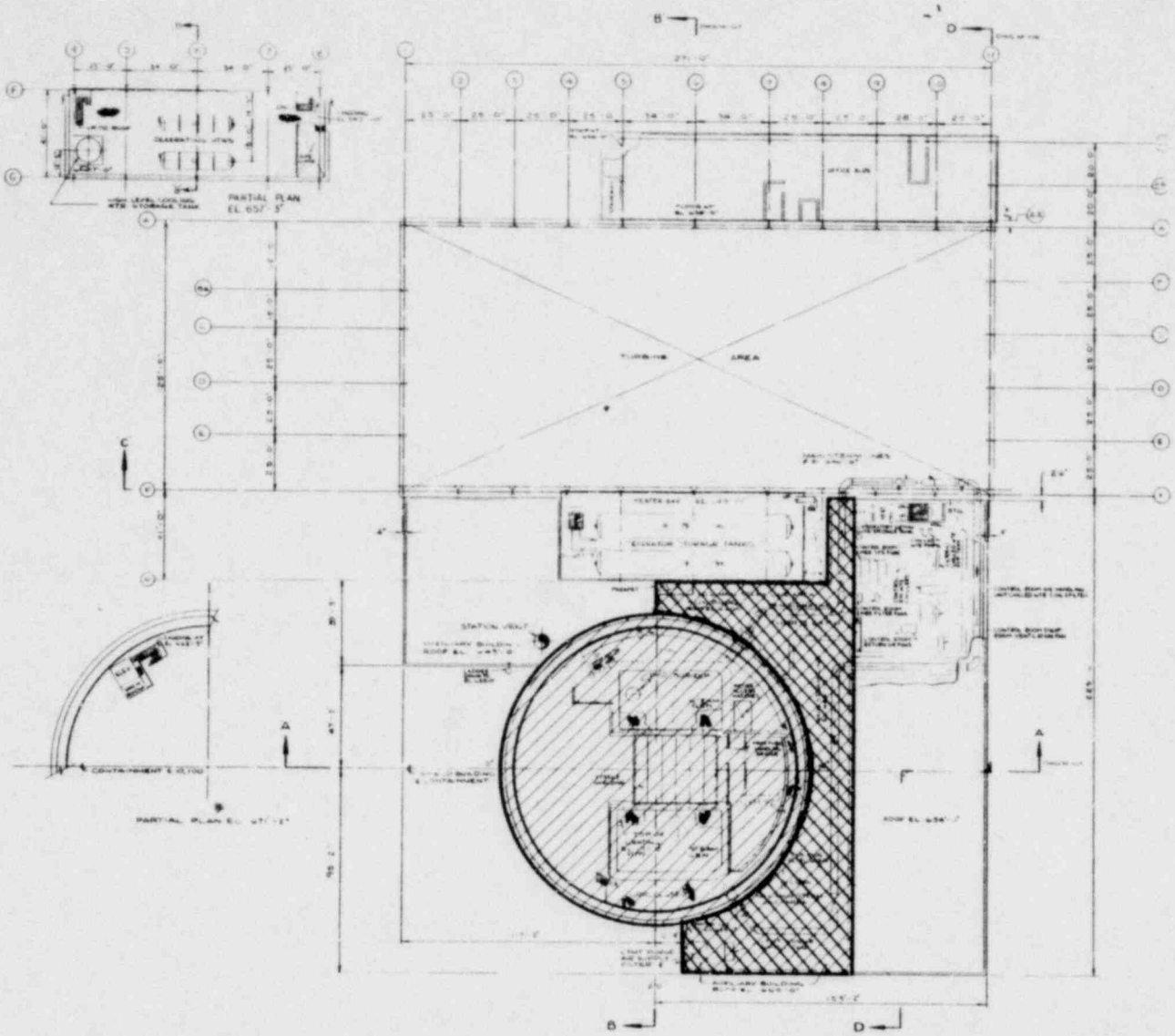
FIGURE I-3

ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATETEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT TURBINE FLOOR PLAN
AT ELEVATION 623



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APPENDIX I

FIGURE I-4

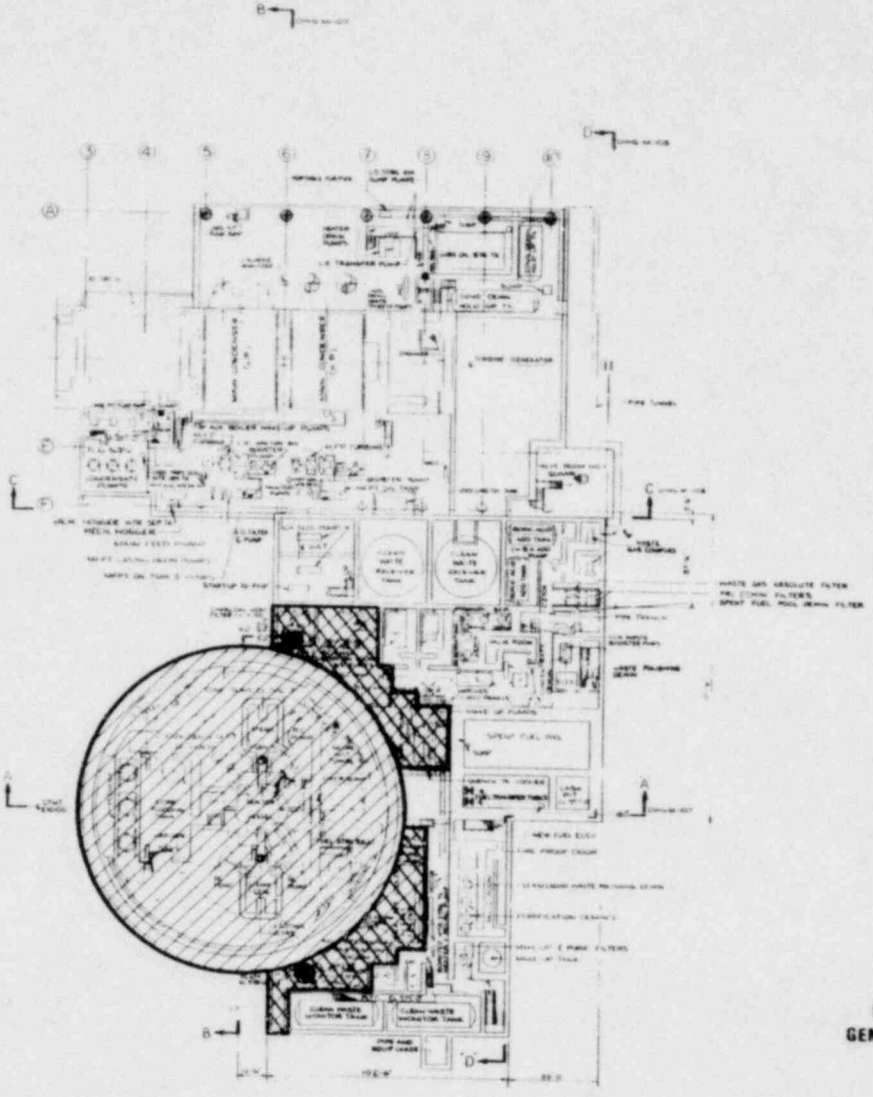
ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT PLAN
AT ELEVATION 643

SHEET I-7



-N-

APPENDIX I

FIGURE I-5

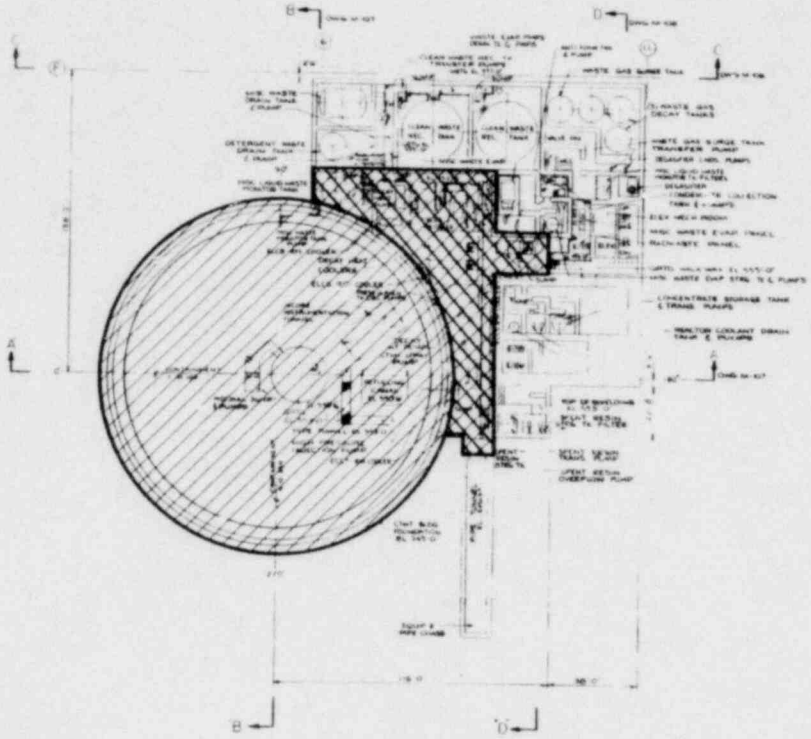
ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT BELOW GRADE PLAN
AT ELEVATION 567

SHEET I-8



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APPENDIX I

FIGURE I-6

ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

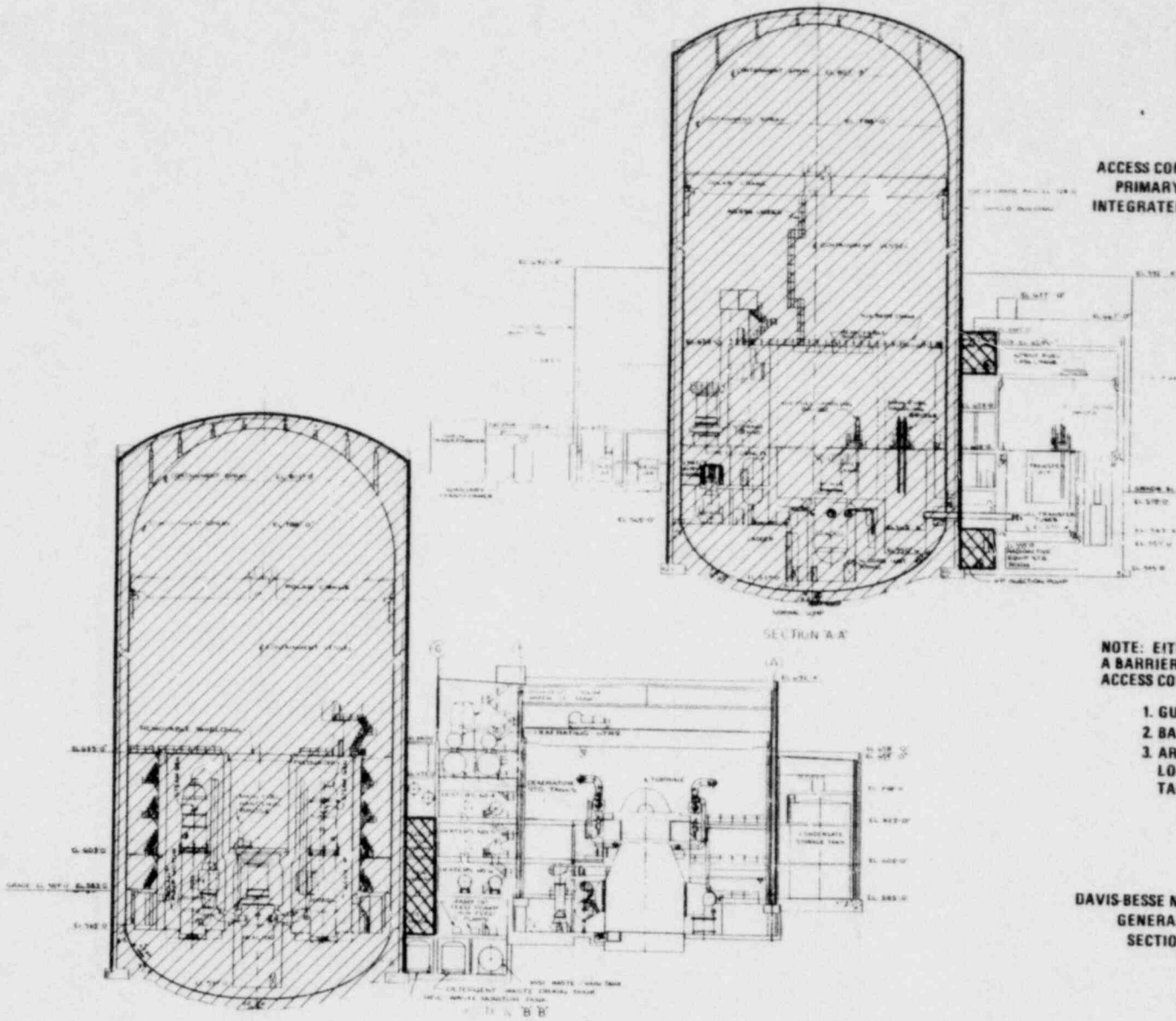
1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT BELOW GRADE PLAN
AT ELEVATION 545

SHEET 1-9

FIGURE I-7

ACCESS CONTROL AREAS (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)



NOTE: EITHER A GUARD OR A BARRIER IS SUFFICIENT FOR ACCESS CONTROL

1. GUARD
2. BARRIER
3. AREAS CONTAIN LOCKED AND TAGGED VALVES

DAVIS-BESSE NUCLEAR POWER STATION
GENERAL ARRANGEMENT
SECTIONS A-A AND B-B

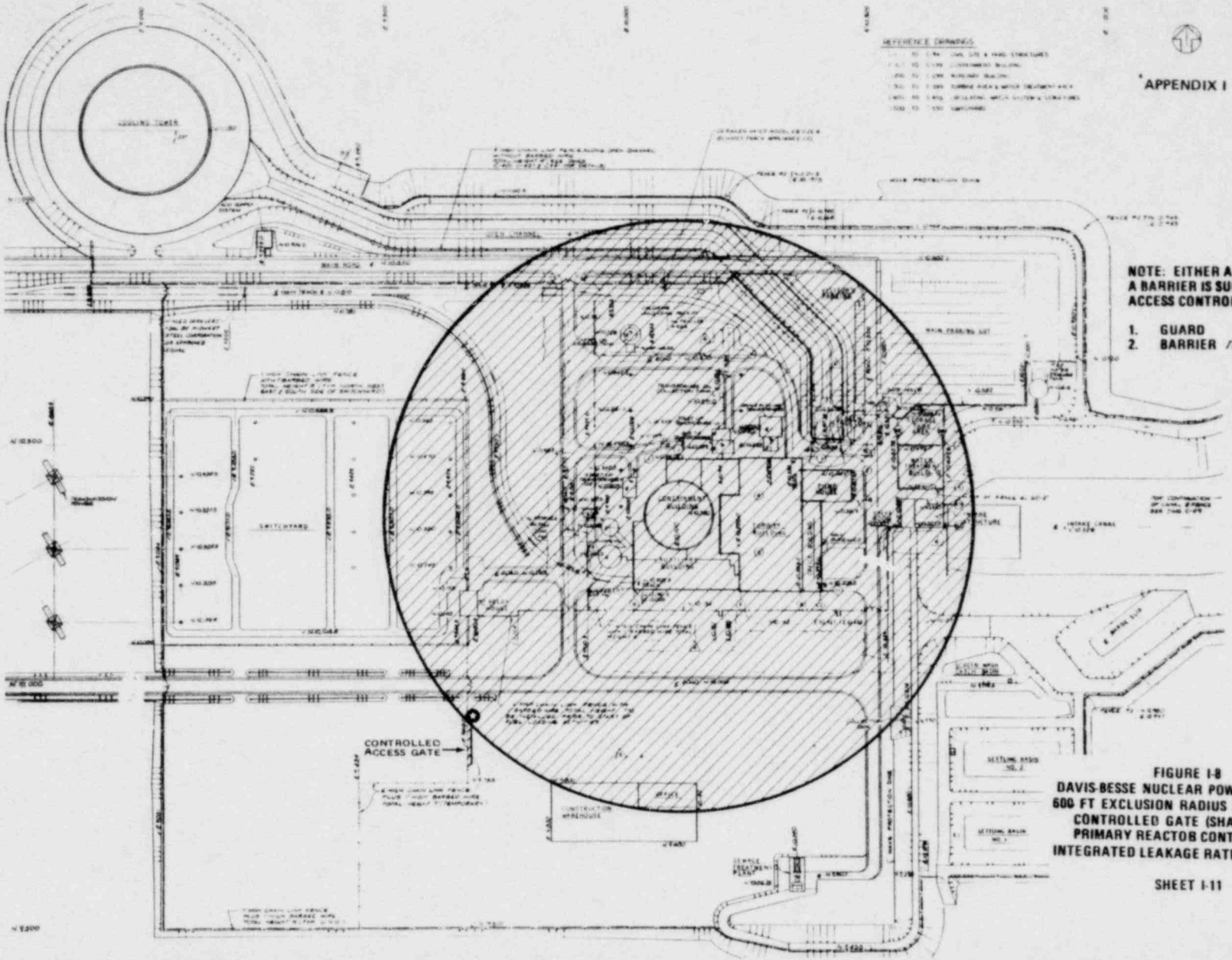


FIGURE I-8
DAVIS-BESSE NUCLEAR POWER STATION
600 FT EXCLUSION RADIUS AND ACCESS CONTROLLED GATE (SHADED) FOR PRIMARY REACTOR CONTAINMENT INTEGRATED LEAKAGE RATE TEST (ILRT)

APPENDIX J

APPENDIX J

OLRT MANPOWER REQUIREMENTS AND ORGANIZATIONAL CHART

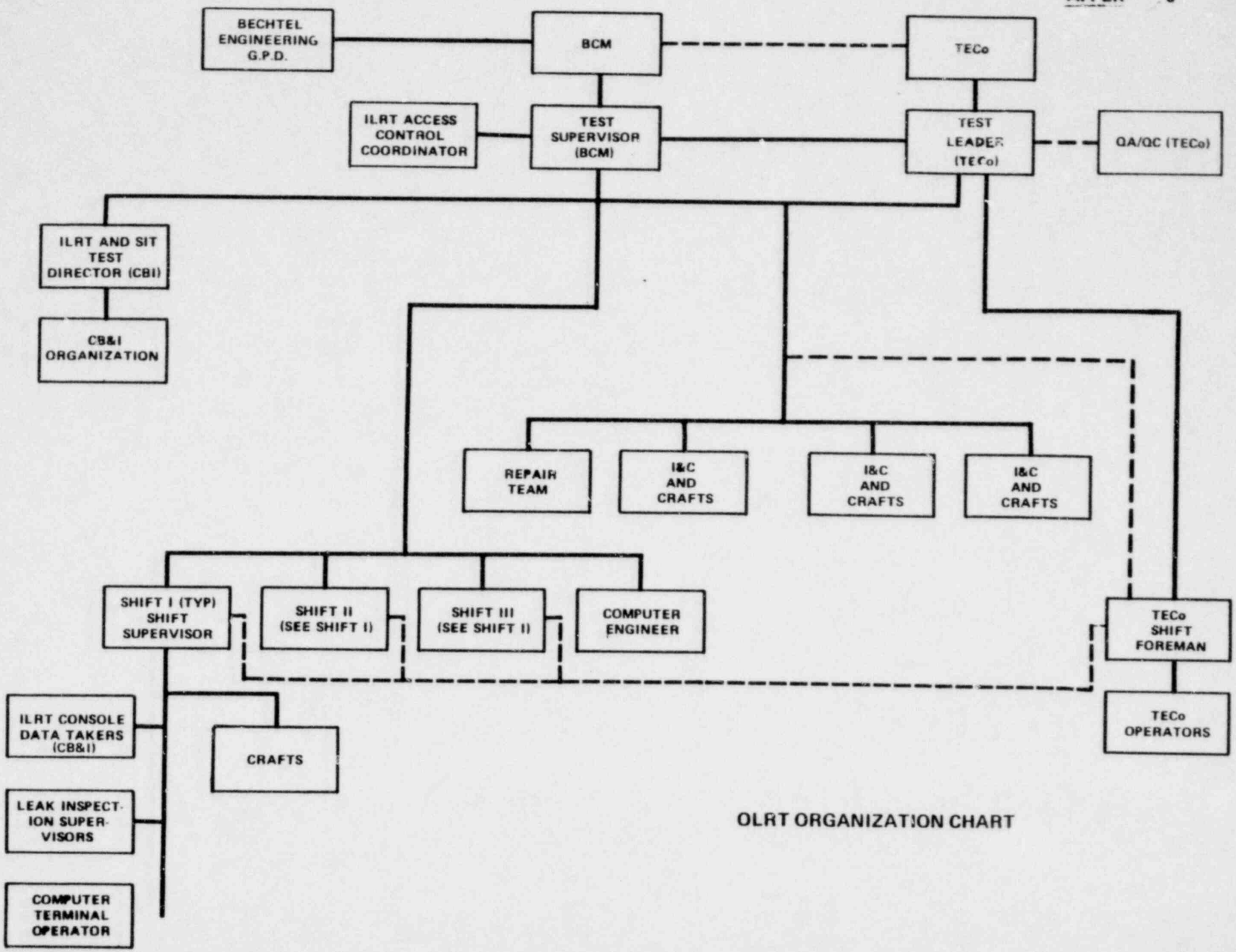
I. Generally, manpower requirements to complete the OLRT are met by the following three sources:

A. Toledo Edison Company operation
   1. Valve lineups
   2. Operators
   3. Leak surveys
   4. Computer engineer
   5. Computer terminal operators
   6. Local leak tests
   7. Test leader
   8. Shift foreman

B. Bechtel Construction
   1. Local leak test supervisor
   2. Valve lineups
   3. Access Control Coordinator
   4. Test supervisor
   5. Shift supervisors
   6. Leak surveys
   7. Craft support

C. Chicago Bridge and Iron Company
   1. ILRT Test director with overall responsibility for ILRT.
   2. SIT Test director

The organizational chart is shown on Sheet J-2.



OLRT ORGANIZATION CHART

APPENDIX K

APPENDIX K

POST TEST CHECKLIST

Signature/Date (TECO Test Leader) _____

1.	Return those items listed on Page B-27 to normal.	_____
2.	Close DW 532, DW 534	_____
3.	Close SA503, SA507, IA503, IA505	_____
4.	Close NN56, NN59	_____
5.	Close RC52, RC54	_____
6.	Close MU77, MU80, MU234, MU235, MU236, MU237, MU246, MU247, MU248 MU249	_____
7.	Close DH85, DH89, DH98	_____
8.	Close CF11, CF12, CF22, CF25, CF49, CF50, CF53, CF102, CF105	_____
9.	Close CC94, CC96, CC109, CC111, CC516, CC611	_____
10.	Close RC76, RC78, RC93, RC95, RC97, RC100, RC111, RC152, SS93, SS166	_____
11.	Return other valves to as found condition as directed by the shift foreman.	_____
12.	General inspection to determine the integrity of the containment and equipment therein.	_____

CHICAGO BRIDGE & IRON COMPANY

Location Birmingham Engineering

VESSEL TEST INSTRUCTIONS

DAVIS - BESSE
NUCLEAR POWER STATION
UNIT NO. 1

PREPARED FOR

BECHTEL COMPANY

PREPARED BY

CHICAGO BRIDGE & IRON COMPANY

SUBJECT	MADE BY	CHKD BY	REV			CHARGE NO.
Vessel Test Instructions	CRS			BY		70-6449
	DATE	DATE		CHKD		
				DATE		SHT OF

064
Rev 5-70

CHICAGO BRIDGE & IRON COMPANY

Location Birmingham Engineering

TABLE OF CONTENTS

SUBJECT	MADE BY	CHKD BY	REV			CHARGE NO.
Vessel Test Instructions	CRS			BY		70-6449
	DATE	DATE		CHKD		
				DATE		SHT OF

CBI

IDENTIFICATION VCI- 70-6449

TITLE VESSEL CONTRACT INSTRUCTION FOR STRENGTH, LEAK AND LEAKAGE RATE TESTING

PAGE NO. 1 OF 11

PRODUCT CONTAINMENT VESSEL

REV. NO. 4

CUSTOMER BECHTEL COMPANY FOR TOLEDO EDISON

BY CRS DATE 7/16/76

REVIEWED	OB ENGR	BHAM ENGR	GEN WELD	INSP TEST	CORP NU QA	REG CONST QA	REG MFG QA				BY	DATE
	GRM	RLB CRS		CNS CEH	FCC	WRW				PREPARED CHECKED AUTHORIZED TYPED	CRS WWL LKH SDC	9/27/72 9/27/72 7/30/76 5/5/76

1.0 SCOPE

This vessel contract instruction (VCI) outlines the test sequence and specifies the contract requirements and the instrumentation for field testing of the containment vessel for this contract. It provides the chronological listing of all preparations, examinations, and tests necessary to perform the overload test as specified by the Code and the leak and/or leakage rate test (s) as specified by the contract specification.

2.0 REFERENCES

2.1 Contract Specifications: Bechtel Company 7749-C-37

2.2 ASME Boiler and Pressure Vessel Code, Section III, Subsection B, 1968 Edition, with Summer 1969 Addenda.

2.3 Applicable CBI testing procedures attached and used to perform the required tests:

2.3.1 Vessel Solution Film Test Procedure VST-70-6449

2.3.2 Vessel Overload Test Procedure VOT-70-6449

2.3.3 Vessel Leakage Rate Test Procedure VLT-70-6449

3.0 PERSONNEL

3.1 The Project Foreman, or his delegate, shall be responsible for the test(s) performed under this procedure.

3.2 Regional Construction personnel shall conduct the ASME Code overload test and solution film test performed under this procedure. The project welding and Quality Assurance supervisor or his delegate shall witness, evaluate and assist in conducting the tests.

3.3 Regional Construction personnel shall conduct the leakage rate test performed under this procedure. Houston Welding Services Inspection & Testing Personnel shall witness and assist in conducting the leakage rate test.

4.0 DESIGN AND TEST CONDITIONS

4.1	Design Internal Pressure	36 psig
4.2	Overload Pressure	45 psig
4.3	Leakage Rate Test Pressure	38 psig
4.4	Specified lowest service metal temperature	30°F
4.5	Specified Allowable Leakage Rate	0.25% per 24 hr.

5.0 APPARATUS

5.1 Vessel Overload Test and Solution Film Test (CBI Equipment)

5.1.1 Two 6"Ø dial gages graduated over a range of 100 psig. ±.25% accuracy with .5 psig divisions and calibration traceable to NBS.

5.1.2 One 12"Ø recording gage graduated over a range of 100 psig. ± .5% accuracy with 1 psig divisions and calibration traceable to NBS.

NOTE: All gages shall be calibrated against a standard dead-weight tester or a calibrated master gage in accordance with the Construction Quality Assurance Program for Nuclear Vessels and Parts.

5.1.3 Detector Solution

Seamtest Concentrate as manufactured by Winton Products Company.

5.1.4 Valves, piping, hose in accordance with sketch on page 4 of VOT-70-6449.

5.2 Vessel Leakage Rate Test

NOTE: The external portions of the TE Co Acquisition equipment will be rack mounted and provided with terminals for parallel hook-up to the customer's computer and CBI readout instrumentation. (The equipment listed in Section 5.2 will remain the property of TE Co at the conclusion of the ILRT).

5.2.1 Temperature Sensing System

5.2.1.1 Twenty (20) Burns platinum RTD (Resistance temperature detector) sensors model number P4A1-5 1/2-3A (Special Accuracy). Each RTD will have a manufacturer's documented three point calibration traceable to NBS.

5.2.1.2 CTE RTD conditioner with circuitry for each of the twenty (20) temperature sensors. Conditioner will have a documented manufacturer's calibration over the range of 0-120F. Calibration traceable to NBS.

Output from each of the conditioning circuits will have a range of 0 to 100 mv for a temperature range of 0°F to 120°F, ie 1 mv per 1.2°F, with an accuracy of ±.1°F or better from 50°F to 100°F and ±.25°F or better from 0°F to 120°F.

5.2.2 Dew Point Sensing System

5.2.2.1 Twenty (20) CTE dewpoint probes. Two of these will be spares. Each dewpoint probe will have a manufacturers documented three point calibration over a range of 0°F to 100°F. Calibration traceable to NBS.

5.2.2.2 Three CTE Model 6MA-2-AH moisture analyzer conditioning circuitry units with six (6) channels per unit. Each analyzer unit will have a manufacturers documented calibration over the range of 0°F to 100°F. Calibration traceable to NBS.

Analyzer output will have a linear range of 0 to 100 mv; ie 1 mv per 1°F and an accuracy of ±1.0°F or better with the analyzer instrumentation at a temperature of +60°F to +100°F.

*5.2.2.3 CTE Dew Point Calibration System consisting of:
a) Sampling chamber
b) Sampling pump
c) Ice bottle

5.2.3 Pressure Sensing System

5.2.3.1 Mensor Standard Reading Dual Quartz Manometer with a linear range of 0 to 60 psia for each sensor. One sensor unit is for standby.

20 point calibration traceable to NBS for each channel.

0 to 100 millivolt analog output equivalent to 0 to 60 psia for each channel, ie 1 millivolt per 0.6 psia. Zero & Span adjustments for zero volts at zero counts and 100 millivolts at 100,000 counts.

For millivolt outputs Mensor calibration accuracy is ±20 microvolts plus resolution. Resolution is 16 microvolts (16 counts). Repeatability is 16 microvolts.

For standard digital readouts, Mensor calibration accuracy is ±0.01% of reading ±.002% full scale. Resolution and repeatability is ±.0005% full scale.

Two thermometers.

*5.2.3.2 Standby pressure dial gage. Wallace and Tiernan 8 1/2"Ø absolute pressure gage model 61A-1A-0100; range 0 - 100 psia, accuracy .066% of full scale. Documented calibration traceable to NBS.

* These items will not be panel mounted.

5.2.4 Verification System

**5.2.4.1 Two Brooks model 5812 thermal mass flowmeter sensors, each with a minimum range of 0-14 SCFM (totaling 0-28 SCFM) for air at ambient temperature and pressure of 40 psig.

Conversion circuit for parallel millivolt signals of 6 mv per 1 SCFM.

Documented calibration over the range of the flowmeter at pressures of 19 psig and 38 psig. Calibration traceable to NBS.

Accuracy, including linearity, ±1% of full scale when operating at 70°F ±10°F.

5.2.4.2 One Brooks model 5821 blind power supply with interconnecting cable.

5.2.4.3 One Brooks model 5839 Digital Display with two station selector switch.

*5.2.4.4 Two Hoke metering valves #2335F4Y with micrometer handwheel #2300K-1 & micron filter #6323G6Y or equal.

5.3 Pressurizing Equipment (Rental Equipment)

4 5.3.1 6-Atlas Copco Diesel Driven Centrifugal Compressors.

*These items will not be panel mounted.
**These items will not be mounted in the bottom rear of the panel.

Each equipped with air inlet filters that will remove 99.6% of all particles to 15 microns.

5.3.2 Tube and shell type after-coolers rated to give an air discharge temperature within 10°F of the service water temperature. Adams Model SAF-472 or equal.

5.3.3 Valves and connecting tubing in accordance with sketch on Page 4 of Procedure VOT-70-6449.

6.0 CLEARANCE RULES AND PRECAUTIONARY MEASURES FOR SAFETY OF PERSONNEL AND EQUIPMENT DURING ASME CODE OVERLOAD TEST

6.1 All unauthorized persons and all movable equipment subject to damage must maintain a minimum clearance in all directions from the vessel of 1200 ft. while pressure is being increased above 5 psig for the first time until the overload pressure test has been successfully completed.

6.2 Persons authorized in writing by Chicago Bridge & Iron Company and Bechtel Company and Toledo Edison Company may be admitted to the area defined in 6.1 above. Authorized employees of CBI, Bechtel, TECO, and authorized inspection personnel will be permitted at the locations of the controlling valves and gages approximately 600 feet from the outside of the vessel.

6.3 No one will be permitted within 600 fe of the vessel while the pressure is being increased above 5 psig for the first time or while the pressure exceeds the design pressure.

6.4 If there is any urgent need that authorized employees of CBI Company inspect the vessel while the pressure is being increased above 5 psig for the first time or while the vessel pressure exceeds the design pressure, the following precautions are to be observed.

6.4.1 For vessel pressures at or below 36 psig reduce the pressure 1 psi before approaching the vessel.

6.4.2 For vessel pressures above 36 psig reduce the pressure to 36 psig.

6.5 Enforcement of the above clearance requirements shall be a joint responsibility of Bechtel, Chicago Bridge & Iron Company and Toledo Edison Company.

7.0 TEST AREAS

(4) 7.1 Accessible circumferential and longitudinal welds as defined in Reference 2.2.

7.2 Welds in penetrations including test covers.

7.3 Insert to shell welds.

7.4 Equipment door gaskets.

7.5 Personnel Lock door gaskets.
- 7.5.1 Interior door.
- 7.5.2 Exterior door.

7.6 Emergency lock door gaskets.
- 7.6.1 Interior door.
- 7.6.2 Exterior door.

7.7 Emergency air flange on locks.

8.0 TEST SEQUENCE AND REQUIREMENTS

8.1 Overload and solution film test.

8.1.1 Perform the closure gasket interspace test per procedure VST-70-6449.
Test pressure = 38 psig
Test areas : 7.4, 7.7

8.1.2 Prepare the vessel for test per Paragraphs 2.1 thru 2.6 of Procedure VOT-70-6449.

8.1.3 Install the instrumentation in accordance with Section 2.0 of VLT-70-6449.

(4) NOTE: THE INSTRUMENTATION IS LISTED IN SECTION 5.0. PAGE 11 OF THIS PROCEDURE SHOWS THE LOCATION OF THE INSTRUMENTATION.

8.1.4 Perform a solution film test of the containment vessel per procedure VST-70-6449.

Test pressure = 5 psig
Test area : 7.0 from outside (see note)

NOTE: AFTER TEST OF INTERIOR DOOR OF LOCK(S), CLOSE EXTERIOR DOOR AND EQUALIZING VALVE OF LOCK(S). OPEN LOCK(S) INTERIOR EQUALIZING VALVE TO INCREASE PRESSURE IN LOCK(S) TO VESSEL PRESSURE. CLOSE LOCK(S) INTERIOR EQUALIZING VALVE. TEST EXTERIOR DOOR OF LOCK(S). AFTER TEST OF EXTERIOR DOOR OF LOCK(S), VENT LOCK(S) TO ATMOSPHERE BY OPENING EXTERIOR EQUALIZING VALVE. CLOSE EXTERIOR EQUALIZING VALVE OF LOCK(S). OPEN VALVES 10 AND 10A BEFORE PROCEEDING TO 8.1.5.

8.1.5 Perform the vessel overload test per procedure VOT-70-6449 Paragraph 2.7 through Paragraph 4.2.

8.1.6 Perform solution film test on the vessel per procedure VST-70-6449.

Test pressure = 36 psig
Test area : 7.0 from outside (see note)

NOTE: AFTER TEST OF INTERIOR DOOR OF LOCK(S), CLOSE EXTERIOR DOOR AND EXTERIOR EQUALIZING VALVE OF LOCK(S). OPEN LOCK(S) INTERIOR EQUALIZING VALVE TO INCREASE PRESSURE IN LOCK(S) TO VESSEL PRESSURE. CLOSE LOCK(S) INTERIOR EQUALIZING VALVE. TEST EXTERIOR DOOR OF LOCK(S). AFTER TEST OF EXTERIOR DOOR OF LOCK(S), VENT LOCK(S) TO ATMOSPHERE BY OPENING EXTERIOR EQUALIZING VALVE. OPEN EXTERIOR DOOR OF LOCK(S).

8.1.7 With valve 5 closed, open valve 7 as shown on VOT-70-6449 Page 4 and depressurize the vessel to 32 psig and hold for a minimum of 24 hrs.

8.1.8 Disconnect all overload test equipment except the Air Supply Line and valve 1, as shown on VOT-70-6449.

8.2 Leakage Rate Tests

8.2.1 With valves 1,7 and 8 closed, and valves 1A and 5 open; pressurize the vessel to 38 psig. Close valve 1A. <4>

8.2.2 Disconnect the air supply line and blank the valves used for the pneumatic test (1 & 1A) adjacent to the vessel. Test these valves for leakage with detector solution.

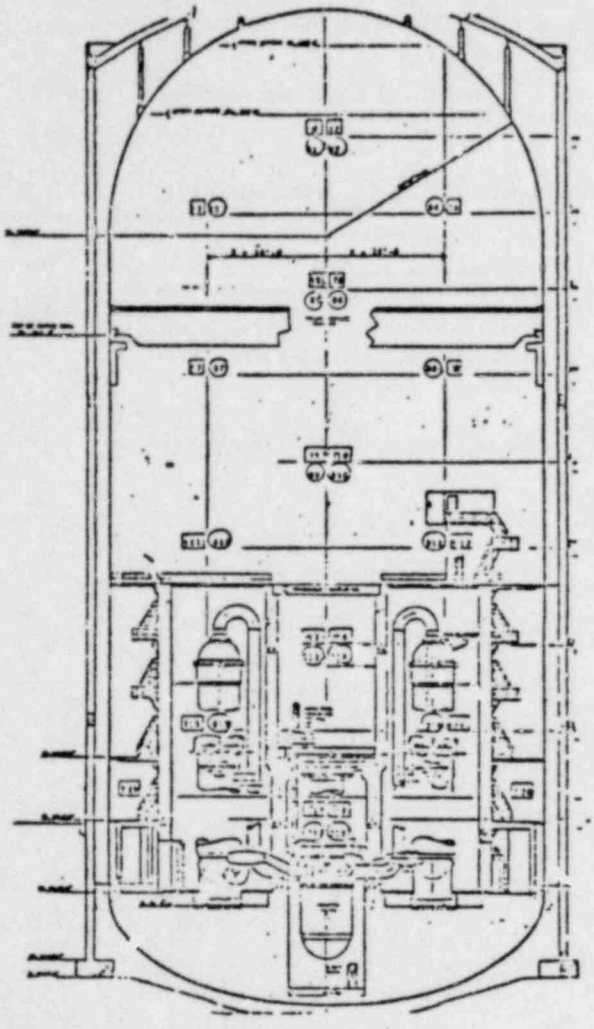
8.2.3 Perform the vessel leakage rate test per procedure VLT-70-6449.

NOTE: IF THE VESSEL PRESSURE EXCEEDS 40 PSIG DURING THE LEAKAGE RATE TEST, THE EXCESS PRESSURE ABOVE 40 PSIG MUST BE BLOWN OFF AND THE LEAKAGE RATE TEST RERUN. USE VALVE 1A FOR BLOWDOWN.

8.2.4 Reconnect the air supply line, open valve 1A and valve 7 to release pressure from the vessel until atmospheric pressure is reached.

8.2.5 Open a large enough connection in the vessel to prevent the formation of a vacuum. (Eg. open both personnel lock doors by violating the interlock)

8.2.6 Remove all temporary test equipment.



T Temperature Sensor (20)

D Dewpoint Temperature Sensors(18)

NOTES

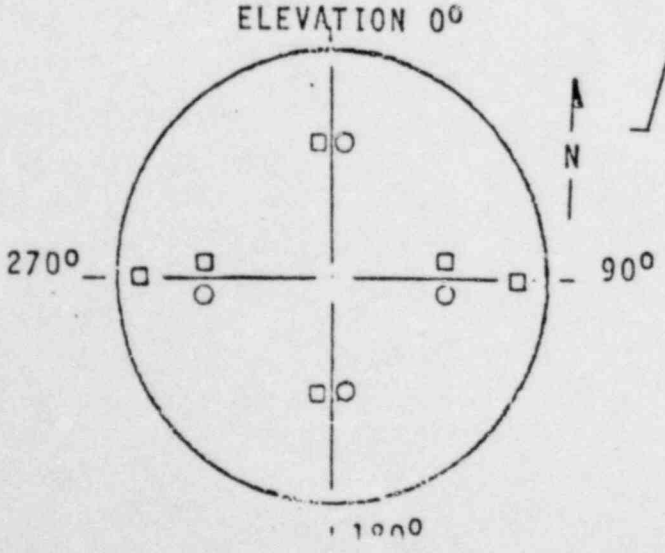
Dewpoint and Temperature Sensors at Radius 34'-0 to be suspended by wire rope sheaves attached to spray header at elev. 807'-8.

Common Junction to be accessible from floor at El. 603 between Az 90° and Az 180°.

Schematic Representation of Sensors

One T & one D to be located 180° apart at each elev. except 590

At 590 T 19 & T-20 to be located on 90° & 270° at a radius of 62'



CBI

IDENTIFICATION VST-70-6449

TITLE VESSEL SOLUTION FILM TEST PROCEDURE

PAGE NO. 1 OF 3

REV. NO. 3

PRODUCT CONTAINMENT VESSEL

CUSTOMER BECHTEL COMPANY FOR TOLEDO EDISON

BY CRS DATE 7/16/76

REVIEWED	OB ENGR	BHAM ENGR	GEN WELD	INSP TEST	CORP NU QA	REG CONST QA	REG MFG QA				BY	DATE
	GRM	RLB CRS		CEH	FCC	WRW				PREPARED	CRS	1/22/74
										CHECKED	WWL	1/22/74
										AUTHORIZED	LKH	7/30/76
										TYPED	SDC	5/5/76

1.0 SCOPE

This procedure applies to solution film testing of vessels and vessel components.

2.0 TEST PROCEDURE

2.1 Remove weld slag, dirt and debris from areas to be leak tested.

2.2 Pressurize the test areas to the required test pressure.

2.3 Apply a solution film in a continous film free of bubbles to all test areas.

2.4 Evaluation of Leaks:

2.4.1 Any leak detected that does not affect the structural integrity of the vessel as agreed between CBI, TECO,

and Bechtel, but which might prevent a successful Leakage Rate Test shall be temporarily sealed. An example is a leak in a temporary closure.

2.4.2 Any leak detected that affects the structural integrity of the vessel shall be repaired.

2.5 To make repairs to the vessel, personnel lock interior bulkhead or escape lock interior bulkhead, proceed as follows:

2.5.1 Release the pressure to atmosphere by opening the pressure release valve. (Valve 7, as shown on VOT-70-6449 page 4 when conducting vessel solution film test).

2.5.2 Immediately after the pressure has been released, open a large enough connection to prevent the formation of a vacuum in the vessel. (Eg open both personnel lock doors by violating the interlock).

2.5.3 Before making weld repairs or doing any work that might cause a spark, check vapor space to make sure that it is free from any explosive mixture.

2.5.4 Weld repairs are to be made and recorded in accordance with the Construction Quality Assurance Program.

2.5.5 Retest repaired areas and previously untested areas.

2.6 To make repairs to the personnel or escape lock, barrel or exterior bulkhead, proceed as follows:

2.6.1 With the interior door closed, close valve 8 and open valve 9, as shown on VOT-70-6449 page 4.

2.6.2 Before making weld repairs or doing any work that might cause a spark, check vapor space to make sure that it is free from any explosive mixture.

2.6.3 Weld repairs are to be made and recorded in accordance with the Construction Quality Assurance Program.

2.6.4 Retest repaired areas and previously untested areas.

3.0 ACCEPTANCE CRITERIA

3.1 No detectable leakage as outlined in Step 2.4.

4.0 DOCUMENTATION

4.1 The satisfactory completion of this test shall be recorded on tne Shop or Field QA Check List in accordance with the requirements of the applicable revision of the Construction or Shop Quality Assurance Prcgram.

CBI

IDENTIFICATION VOT-70-6449

TITLE VESSEL OVERLOAD TEST PROCEDURE

PAGE NO. 1 OF 4

PRODUCT NUCLEAR CONTAINMENT VESSEL

REV. NO. 2

CUSTOMER BECHTEL COMPANY FOR TOLEDO EDISON

BY CRS DATE 1/30/75

REVIEWED	OB ENGR	BHAM ENGR	GEN WELD	INSP TEST	CORP NU QA	REG CONST QA	REG MFG QA	B'HAM ENGR	B'HAM DESN		BY	DATE
	GRM			CNS	FCC	LRS		RLB	CRS	PREPARED	CRS	1/22/74
										CHECKED	WWL	1/22/74
										AUTHORIZED	LKH	5/5/76
										TYPED	SDC	5/5/76

1.0 SCOPE

This procedure describes the pneumatic overload test of the containment vessel.

2.0 TEST PROCEDURE

NOTE: IF THERE IS ANY POSSIBILITY OF THE VESSEL SURFACE TEMPERATURE DROPPING BELOW 30°F, CBI TESTING PERSONNEL SHALL INSTALL AT THEIR DISCRETION A MINIMUM OF TWO TEMPERATURE DEVICES TO MEASURE THE SHELL TEMPERATURE. SHOULD THE VESSEL TEMPERATURE BEGIN TO FALL DURING THE TEST, BLOWDOWN SHOULD BE STARTED IN TIME TO REDUCE THE VESSEL PRESSURE TO 14 PSI BEFORE THE VESSEL SHELL TEMPERATURE DROPS BELOW 30°F.

2.1 Connect air and gage lines with dial gages and recording gage, to the vessel as shown on Sheet 4. Before making final pressurizing connection, blow out pressurizing line to insure there are no standing pools of water or excessive debris in the pressurization line.

NOTE: THE CONTROLLING VALVES FOR THE AIR SUPPLY AND THE GAGES ON THE GAGE LINE ARE TO BE LOCATED AT A MINIMUM DISTANCE OF 600 FEET FROM THE OUTSIDE OF THE VESSEL (VALVES 2,3,4, 5,6,7,8,&9).

2.2 Open shutoff valves 1 & 1A: isolation valves 2,3, and 4; and air supply valve 5, and valve 9.

2.3 Close valves 6,7,8,10, and 10A

2.4 Close or blank all other connections in the vessel.

2.5 Close the interior door and interior door equalizing valve of the personnel lock and escape lock. Leave exterior door of locks open.

2.6 Before closing the last connection in the vessel, start pumping air to avoid the possibility of a vacuum occurring inside the vessel.

NOTE: MAINTAIN THE MANDATORY CBI SAFETY AND CLEARANCE RULES. (See VCI-70-6449 Section 6.0)

2.7 With valve 5 open pressurize the vessel to 22.5 psig. Then increase the vessel pressure in 4.5 psig increments until the required test pressure of 45 psig has been reached.

NOTE: AT THE BEGINNING OF PRESSURE INCREMENTS AND AT HOUR INTERVALS, THE PRESSURE READINGS OF THE DIAL AND RECORDING GAGES SHALL BE RECORDED ON THE TEST DATA SHEET. INCREMENT HOLDING TIME SHALL BE 10 MINUTES, OBSERVING THE VESSEL PRESSURE.

2.8 Close valve 5 and hold the 45 psig test pressure for 30 minutes, adding or releasing air to compensate for temperature variations. Open valve 5 to increase pressure or open valve 7 to decrease pressure.

2.9 Close valve 9 and open valve 8 to interconnect the locks with the vessel.

2.10 Hold the 45 psig test pressure for another 30 minutes, adding or releasing air to compensate for temperature variations, such that the 45 psig overload pressure is maintained for a total of not more than one hour. Open valve 5 to increase pressure or open valve 7 to decrease pressure.

2.11 Open blowoff valve 7 and reduce the pressure in the vessel and airlock(s) to the design pressure of 36 psig and hold for sufficient time to permit inspection of the air lock exterior bulkhead and door for visible permanent distortion. If any defects are detected, release pressure make the necessary corrections, and retest.

2.11.1 Weld repairs are to be made and recorded in accordance with the Construction Quality Assurance Program.

2.12 Close valve 8 and open valve 9 or the lock exterior equalizing valve. Reduce the pressure in the lock to atmospheric. Inspect the vessel and airlock interior bulkhead and door for visible permanent distortion. If any defects are detected, make the necessary corrections, and retest. (See VST 2.5 or 2.6 if repairs are required).

2.12.1 Weld repairs are to be made and recorded in accordance with the Construction Quality Assurance Program.

3.0 ACCEPTANCE CRITERIA

3.1 No visible, permanent distortion of the vessel as judged by the personnel under 4.1.

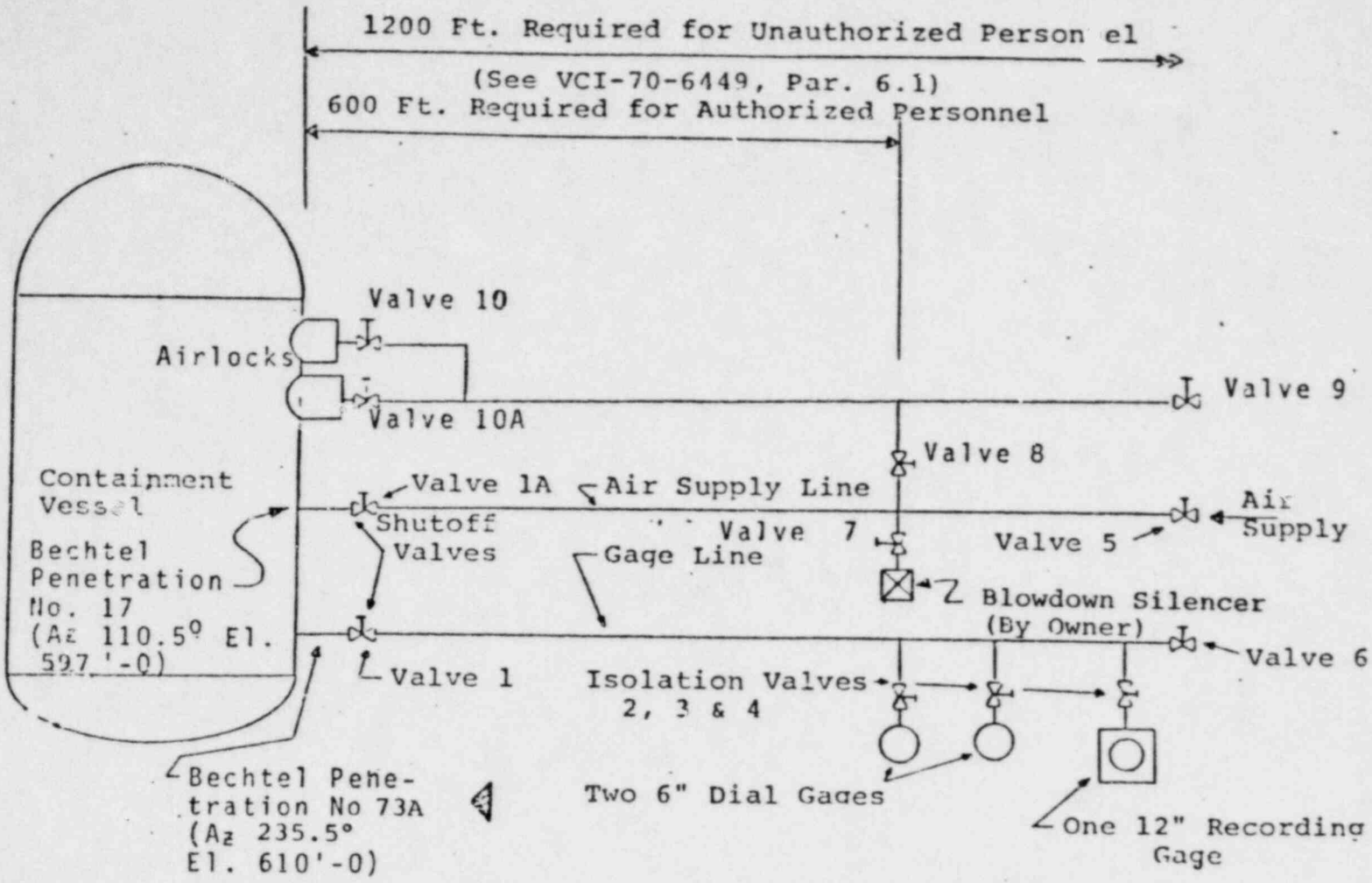
4.0 DOCUMENTATION

4.1 Mark the following data on the face of the recording chart:

Design Pressure	36 psig
Specified Test Pressure	45 psig
Contract Number	70-6449
Test Procedure Number	VOT-70-6449 Rev.
Date of Test:	

The CBI Project Foreman, the CBI Welding and Quality Assurance Supervisor, the Authorized Inspector and Customer's Inspector with their respective signatures.

4.2 The satisfactory completion of this test shall be recorded on the Field Quality Assurance Check List. The Authorized Inspector shall be requested to sign the Field Quality Assurance Check List to signify that the test has been completed to his satisfaction.



SCHEMATIC OVERLOAD TEST LAYOUT

TITLE	VESSEL OVERLOAD TEST PROCEDURE		IDENTIFICATION VOT-70-6449
PRODUCT	NUCLEAR CONTAINMENT VESSEL	PAGE NO. 4	OF 4
CUSTOMER	BECHTEL COMPANY FOR TOLEDO EDISON	REV. NO. 2	
		BY CRS	DATE 1/30/75

CBI

IDENTIFICATION VLT-70-6449

TITLE VESSEL LEAKAGE RATE TEST PROCEDURE

PAGE NO. 1 OF 4

PRODUCT CONTAINMENT VESSEL

REV. NO. 4

CUSTOMER BECHTEL COMPANY FOR TOLEDO EDISON

BY CRS DATE 7-16-76

REVIEWED	OB ENGR	BHAM ENGR	GEN WELD	INSP TEST	CORP NU QA	REG CONST QA	REG MFG QA				BY	DATE
	GRM	RLB CRS		CNS	FCC	LRS				PREPARED	CRS	9/27/72
										CHECKED	WWL	1/22/74
										AUTHORIZED	LKH	7/30/76
										TYPED	SDC	5/5/76

1.0 SCOPE

This procedure details the requirements of the leakage rate tests noted in VCI-70-6449.

2.0 EQUIPMENT INSTALLATION

2.1 Connect the temperature sensors to the data acquisition system through the vessel wall, check calibration at 32°F, and install the sensors in the locations shown on Page 11 of VCI-70-6449. (4)

2.2 Connect the dewpoint temperature sensors to the data acquisition system through the vessel wall, check calibration at 32°F, and install the sensors in the locations shown on Page 11 of VCI-70-6449. (4)

2.3 Connect the pressure sensing equipment to the vessel from the acquisition panel.

2.4 Connect the verification system.

3.0 TEST PROCEDURE

NOTE: DURING THE LEAKAGE RATE TEST OF THE VESSEL, ONLY AUTHORIZED PERSONNEL SHALL BE ALLOWED ON OR ADJACENT TO THE VESSEL AND INSTRUMENTS. NO WORK SHALL BE PERFORMED INSIDE THE CONCRETE SHIELD BUILDING OR ON PIPING, VALVES, AND INSTRUMENTATION WHICH FORM THE PRESSURE BOUNDARY OF THE CONTAINMENT SYSTEM. ENFORCEMENT OF THE ABOVE SHALL BE PER 6.5 OF VCI-70-6449.

IF THERE A POSSIBILITY OF THE VESSEL SURFACE TEMPERATURE DROPPING BELOW 30°F., CBI TESTING PERSONNEL SHALL INSTALL AT THEIR DISCRETION AT LEAST TWO TEMPERATURE DEVICES TO MEASURE THE SHELL TEMPERATURE.

SHOULD THE VESSEL TEMPERATURE START TO DROP DURING THE TEST, BLOWDOWN SHOULD BE STARTED IN TIME TO REDUCE THE VESSEL PRESSURE TO 14 PSIG BEFORE THE VESSEL SHELL TEMPERATURE DROPS BELOW 30°F. IF THE VESSEL PRESSURE EXCEEDS 40 PSIG DURING THE PEAK PRESSURE TEST, THE EXCESS PRESSURE ABOVE 40 PSIG MUST BE BLOWN OFF AND THE LEAKAGE TEST RERUN.

3.1 After vessel conditions have been allowed to stabilize a minimum of 4 hours, record the following data at hourly intervals:

(A) Vessel Absolute Pressure (psia) i.e. Quartz Manometer Reading
(B) Vessel Absolute Pressure (psia) i.e. W&T Gage Reading
(C) Individual Temperature Sensor Readings, T. (°F)
(D) Individual Dewpoint Sensor Readings, D. (°F)
(E) Ambient Temperature of Instrument Room, T_e (°F)
4 (F) Outside Temperature* and/or shell temperature Barometer Pressure

3.2 Calculate the following on an hourly basis:

(See Appendix for equations)

(A) Weighted Average Internal Air Temperature, T, (°R)

(B) Weighted Average Internal Dewpoint Temperature DPT, (°F)

*If deemed necessary by CBI Test Personnel.

(C) The partial pressure of water vapor, P_v, in PSIA at the average dewpoint temperature. Use standard steam tables to make this conversion.

3.3 Determine the measured percent leakage each hour with respect to the first set of containment test measurements taken after conditions within the vessel have been allowed to stabilize. Positive values indicate containment out leakage, negative values indicate containment in leakage.

(See Appendix for equations)

3.4 Perform a linear regression analysis and deviation analysis for the least mean square calculation using the point slope equation of a straight line.

(See Appendix for equations)

3.5 After a minimum test period of 24 hours calculate the 24 hour containment leakage rate, Lm, and submit it to the TE CO and Bechtel representatives at the site. The test will be concluded when resolution of test results are agreed upon by CBI, Bechtel, and TE Co.

(See Appendix for equations).

4 3.6 Open the metering valve from the flowmeter and establish a leakage rate (scfm) equivalent to 75% of the specified allowable leakage rate per 24 hours using a free vessel volume of 2,834,000 cu. ft. (See Appendix for equations).

3.7 Continue steps 3.1 through 3.4 and record the flowmeter reading hourly.

3.8 After a period of 10 to 12 hours calculate the average 24 hour leakage rate, Lo, through the flowmeter using the readings of the flowmeter as a function of time.

3.9 Determine L'm, the difference between the calculated composite leakage rate, Lc, during the verification test, and the imposed orifice (flowmeter) leakage rate, L_o.

4.0 ACCEPTANCE CRITERIA

4.1 The calculated 24 hour leakage rate at the peak leakage rate test pressure (Lm) shall demonstrate a 95 percent confidence that the calculated leakage is less than .25%/ 24 hrs.

4.2 The difference between the calculated 24 hour leakage rate, Lm, determined during the vessel test, and the calculated 24 hour leakage rate L'm determined during the verification test, shall be less than .25 La (or .25 Lt)

5.0 DOCUMENTATION

5.1 A Certified Test Report including test results, data, calculations, instrument calibration and test procedures will be submitted to the Engineer and owner within 30 days of completion of the test.

A.1 Definition of Symbols

P_1 = Total absolute pressure in containment structure at start of test (psia).

P_2 = Total absolute pressure in containment at end of measurement interval (psia).

P_{v1} = Water-vapor pressure at start of test (psia).

P_{v2} = Water-vapor pressure at end of measurement interval (psia).

P_{std} = Standard pressure (psia).

P'_t = Total absolute pressure in containment vessel at start of verification test.

P_t = Average absolute pressure in containment vessel during verification test (psia).

T_1 = Mean absolute temperature in containment vessel at start of test (^oR).

T_2 = Mean absolute temperature in containment vessel at end of measurement interval (^oR).

T_{std} = Standard temperature (^oR).

T'_t = Mean absolute temperature in containment vessel at start of verification test (^oR).

T_t = Average absolute temperature in containment vessel during verification test (^oR).

t_{amb} = Ambient temperature at start of leakage rate test (^oF).

t_{max} = Maximum ambient temp. expected during leakage rate test (^oF).

T = Individual temperature sensor readings (^oF).

D = Individual dewpoint sensor readings (^oF).

DPT = Mean dewpoint temperature (^oF).

M = Measured percent leakage based on most recent data and data taken at start of test (percent).

A.1 Definition of Symbols (Cont'd)

L_a = Specified allowable leakage rate (percent/24 hrs.).

L_o = Leakage rate imposed on vessel during verification test and calculated from flowmeter readings (percent/24 hrs.).

L'_o = Leakage rate to be imposed on vessel during verification test (SCFM).

L_c = Leakage rate calculated during verification test from measured data (percent/24 hrs.).

A.1.A Definition of Symbols for Linear Regression Analysis for Least Mean Square Calculation and Deviation Analysis

N = Number of measured percent leakage data points

H = Number of hours of elapsed time

M = Measured percent leakage

A = Calculated slope of regression line

B = Calculated intercept on M axis (at start of test)

L = Calculated percent leakage (at elapsed time H)

$\bar{H}$ = Mean number hours of elapsed time

$\bar{M}$ = Mean of measured percent leakage

S = Variance of slope of regression line.

L_m = Calculated 24 hour leakage rate of containment vessel

ΣH = Summation H

ΣH^2 = Summation H^2

ΣM = Summation M

ΣM^2 = Summation M^2

ΣHM = Summation HM

$t_{0.05}$ = 95% confidence factor for N-2 degrees of freedom

S_L = Variance of calculated percent leakage

$S_{\bar{L}}$ = Variance of average percent leakage

A.2 Mean Absolute Temperature

$$T = \frac{.667}{12}\left[T1 + T2 + T3 + T4 + T5 + T6 + T7 + T8 + T9 + T10 + T11 + T12\right] +$$

$$\frac{.333}{8}\left[T13 + T14 + T15 + T16 + T17 + T18 + T19 + T20\right] + 460$$

A.3 Mean Dewpoint Temperature

$$DPT = \frac{1}{18}\left[D1 + D2 + D3 + D4 + D5 + D6 + D7 + D8 + D9 + D10 + D11 + D12 + D13 + D14 + D15 + D16 + D17 + D18\right]$$

A.4 Measured Percent Leakage

$$M = \left[1 - \frac{T_1 (P_2 - P_{v2})}{T_2 (P_1 - P_{v1})}\right] \times 100$$

A.5 Regression and Deviation Analysis

$$\bar{H} = \frac{\Sigma H}{N}$$

$$\bar{M} = \frac{\Sigma M}{N}$$

$$\Sigma' H^2 = \Sigma H^2 - \frac{(\Sigma H)^2}{N} = \Sigma H^2 - \bar{H}\Sigma H$$

$$\Sigma' M^2 = \Sigma M^2 - \frac{(\Sigma M)^2}{N} = \Sigma (M - \bar{M})^2 = \Sigma M^2 - \bar{M}\Sigma M$$

$$\Sigma' HM = \Sigma HM - \frac{\Sigma H \Sigma M}{N} = \Sigma HM - \bar{H}\Sigma M$$

A.5 Cont'd

$$A = \frac{N\Sigma HM - \Sigma H\Sigma M}{N\Sigma H^2 - (\Sigma H)^2} = \frac{\Sigma HM - \bar{M}\Sigma H}{\Sigma H^2 - H\Sigma H} = \frac{\Sigma' HM}{\Sigma' H^2}$$

$$B = \frac{\Sigma M\Sigma H^2 - \Sigma H\Sigma HM}{N\Sigma H^2 - (\Sigma H)^2} = \bar{M} - A\bar{H}$$

$$S^2_L = \frac{\Sigma' M^2 - A\Sigma' HM}{N - 2}$$

$$S^2 = \frac{1}{N-2}\left[\frac{N\Sigma M^2 - (\Sigma M)^2}{N\Sigma H^2 - (\Sigma H)^2} - A^2\right] = \frac{S^2_L}{\Sigma' H^2}$$

$$S^2_{\bar{L}} = \frac{S^2_L}{N}$$

$$L_m = 24\left[A \pm t_{0.05}\,(S)\right]$$

$$L = AH + B$$

A.6 Verification Test

$$L'_o = \frac{2834000}{100}\left[\frac{.75\ La}{24\ (60)}\right]\left[\frac{P't}{Pstd}\right]\left[\frac{Tstd}{Tt}\right]$$

$$L_o = \frac{(\text{Avg Flowmeter Readings})(60)(24)(100)}{2834000}\left[\frac{Pstd}{Pt}\right]\left[\frac{Tt}{Tstd}\right]$$

$$L'_m = L_c - L_o$$

$$L_m - L'_m \leq .25\ L_a$$

SUBJECT	MADE BY	CHKD BY	REV			CHARGE NO.
Appendix to Vessel	CRS			By		70-6449
Test Instructions	DATE	DATE		Chkd		
				Date		SHT 5 OF 5

FINAL TEST REPORT

At 0145 hours on September 21, 1976, after a stabilization time of 4 1/2 hours at 38 psig, the Integrated Leakage Rate Test (ILRT) was started.

The following data was recorded at 15 minute intervals.

Individual Temperature Sensor Readings (F) T_1 thru T_{20}	
Individual Dewpoint Sensor Readings (F) D_1, thru D_{18}	*
Vessel Pressure (psia)	P
Weighted Average Internal Air Temperature (F)	T
Weighted Average Internal Dewpoint Temperature (F)	DPT
Partial Pressure of Water Vapor (psi)	PV

*Dewpoint sensors D_6 and D_{18} failed and were deleted from the data.

Leakage rate test data was collected for 27 3/4 hours until 0530 hours on September 22, 1976.

Field calculations of the data using only data at hourly intervals were made at the site. All computations on the field data sheets were made with a desk calculator and typed copies are included in this report.

The data was analyzed by linear regression using measured leakage rates calculated each hour on a total time basis for a 26 hour period from 0145 September 21, 1976, to 0445 September 22, 1976. The results of this analysis was a leakage rate of .0881 + .02318 percent per 24 hours by weight.

The verification test was started at 0530 hours by establishing a leakage rate of 13 SCFM through the flowmeters. Data for the verification test was collected until 1800 hours for a total time of 12 hours. In accordance with 4.2 of procedure VLT-70-6449, the difference between L_m and L'_m was less than .25 L_a. These field calculations are included with this report. The verification test was concluded at 1800 hours.

Absolute Method
Progressive Analysis
Data Work Sheet
Total Time

CONTAINMENT VESSEL
LEAKAGE RATE TEST
CORRECTED FIELD CALCULATIONS

Contract 70-6449

Sheet 1 of 1

Date	Time	P psia	P_v psi	$P-P_v$ psia	T °R	M x 10^1 Total Time	H Hour	H^2	HM x 10^1	M^2 x 10^2
9/21/76	0145	52.7077	.4834	52.2243	544.888	---	0	0	---	---
	0245	52.6915	.4818	52.2097	544.907	.3144218	1	1	.3144218	.0988610683
	0345	52.6778	.4807	52.1971	544.639	.0638844	2	4	.1277688	.0040812166
	0445	52.6652	.4794	52.1858	544.492	.0104578	3	9	.0313734	.0001093656
	0545	52.6533	.4788	52.1745	544.591	.4087362	4	16	1.6349448	.1670652812
	0645	52.6419	.4779	52.1640	544.406	.2702882	5	25	1.3514410	.073055711
	0745	52.6335	.4773	52.1562	544.430	.4638406	6	36	2.7830436	.2151481022
	0845	52.6246	.4768	52.1478	544.307	.3989869	7	49	2.7929083	.1591905464
	0945	52.6168	.4750	52.1418	544.220	.3542184	8	64	2.8337472	.1254706749
	1045	52.6096	.4755	52.1341	544.064	.2152532	9	81	1.9372788	.0463339401
	1145	52.6036	.4724	52.1312	544.106	.3480372	10	100	3.4803720	.1211298926
	1245	52.5965	.4722	52.1243	544.085	.4417716	11	121	4.8594876	.1951621466
	1345	52.5893	.4726	52.1167	543.882	.2144885	12	144	2.573862	.0460053166
	1445	52.5821	.4718	52.1103	543.856	.2894731	13	169	3.7631503	.0837946756
	1545	52.5749	.4710	52.1039	544.025	.7227733	14	196	10.1188262	.5224012432
	1645	52.5684	.4703	52.0981	543.846	.5051455	15	225	7.5771825	.2551719762
	1745	52.5618	.4695	52.0923	543.807	.5447455	16	256	8.7159280	.2967476598
	1845	52.5552	.4695	52.0857	543.794	.6474852	17	289	11.0072484	.4192370842
	1945	52.5468	.4690	52.0778	543.565	.3781033	18	324	6.8058594	.1429621055
	2045	52.5391	.4688	52.0703	543.441	.2940076	19	361	5.5861444	.0864404688
	2145	52.5313	.4685	52.0628	543.502	.5501872	20	400	11.003744	.3027059550
	2245	52.5211	.4670	52.0541	543.658	1.0039407	21	441	21.0827547	1.007896929
	2345	52.5116	.4665	52.0451	543.455	.8035677	22	484	17.6784894	.6457210485
9/22/76	0045	52.5020	.4627	52.0393	543.528	1.0491049	23	529	24.1294127	1.100621091
	0145	52.4948	.4639	52.0309	543.335	.8555688	24	576	20.5336512	.7319979715
	0245	52.4870	.4636	52.0234	543.537	1.3708590	25	625	34.271475	1.879254398
	0345	52.4805	.4622	52.0183	543.431	1.2739866	26	676	33.1236516	1.623041857
	0445	52.4727	.4605	52.0122	543.206	.9774724	27	729	26.3917548	.9554522928
					Σ	14.7708056	378	6930	266.5099219	11.30506002

$$A = \frac{28(266.5099219) - 378(14.7708056)}{28(6930) - (378)^2}(10^{-1}) = .00367290893\%/HR.$$

$$S = \sqrt{\frac{1}{26}\left[\frac{28(.1130506002) - (1.47708056)^2}{28(6930) - (378)^2} - (.003672908937)^2\right]}$$

S= .0004697861633 %/HR F= 2.056

Lm= .08815 + .02318 %/24 HRS

Absolute Method
Progressive Analysis
Data Work Sheet
Total Time

CBD
CONTAINMENT VESSEL
LEAKAGE RATE TEST VERIFICATION
CORRECTED FIELD CALCULATIONS

Contract 70-6449

Sheet 1 of 1

Date	Time	P psia	P_v psi	$P-P_v$ psia	T °R	M x 10^1 Total Time	H Hour	H^2	HM x 10^1	M^2 x 10^2
9/22/76	0600	52.4619	.4599	52.0020	543.018	0	0	0	--------	--------
	0700	52.4506	.4587	51.9919	543.235	.5936045	1	1	.5936045	.3523663024
	0800	52.4398	.4586	51.9812	543.281	.8838868	2	4	1.7677736	.7812558752
	0900	52.4284	.4577	51.9707	543.263	1.052607	3	9	3.1578210	1.107981496
	1000	52.4159	.4572	51.9587	542.928	.6670303	4	16	2.6681212	.4449294211
	1100	52.4033	.4566	51.9467	542.720	.5149185	5	25	2.5745925	.2651410616
	1200	52.3902	.4566	51.9336	542.842	.9915405	6	36	5.949243	.9831525631
	1300	52.3782	.4568	51.9214	542.955	1.4340883	7	49	10.0386181	2.056609252
	1400	52.3669	.4542	51.9127	542.797	1.3107907	8	64	10.4863256	1.718172259
	1500	52.3597	.4539	51.9058	542.547	.9834068	9	81	8.8506612	.9670889343
	1600	52.3561	.4530	51.9031	542.492	.9340939	10	100	9.340939	.872531414
	1700	52.3495	.4524	51.8971	542.635	1.3128389	11	121	14.4412279	1.723545977
	1800	52.3418	.4521	51.8897	542.862	1.8727868	12	144	22.4734416	3.507330398
					Σ	12.5515930	78	650	92.3423692	14.78010496

$$A = \frac{13(92.3423692) - 78(12.5515930)}{13(650) - (78)^2} \quad (1C-1)$$

A = .0092586875%/HR.

L_C = .22461%/24HRS.

VERIFICATION COMPARISON

DATE	TIME	L'o (SCFM)	T (^{O}R)	P (PSIA)	
9/22	0600	13.01	543.018	52.4619	
	0700	13.16	543.235	52.4506	
	0800	13.07	543.281	52.4398	
	0900	13.02	543.263	52.4284	
	1000	13.10	542.928	52.4159	
	1100	13.04	542.720	52.4033	
	1200	13.06	542.842	52.3902	
	1300	13.05	542.955	52.3782	
	1400	13.06	542.797	52.3669	
	1500	13.04	542.547	52.3597	
	1600	13.09	542.492	52.3561	
	1700	12.82	542.635	52.3495	
	1800	12.80	542.862	52.3418	
		169.32	7057.575	681.1423	Total
		13.02	542.890	52.3956	Average

$$Lo = \frac{(\text{Avg. Flowmeter Readings})\ (60)\ (24)\ (100)}{2834000} \left[\frac{Pstd}{P}\right] \left[\frac{Tt}{Tstd}\right]$$

$$Lo = \frac{(13.02)\ (60)\ (24)\ (100)}{2834000} \left[\frac{14.7}{52.3956}\right] \left[\frac{542.890}{530}\right] = 0.19012\%$$

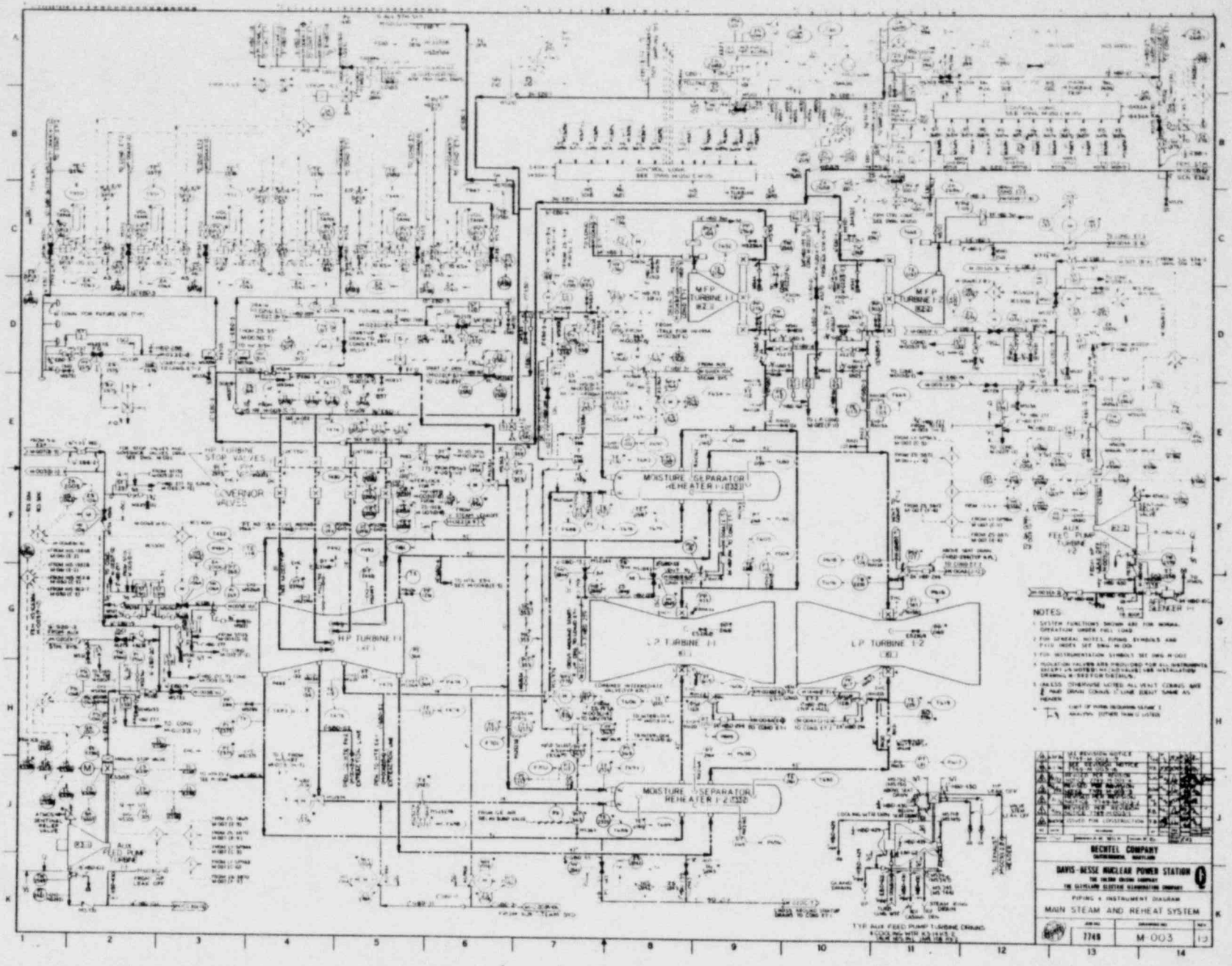
$$L'm = Lc - Lo = .22461 - .19012 = .03449\%$$

$$Lm - L'm \leq .25La$$

$$.08815 - .03449 \leq .25(.25)$$

$$.05366\% \leq .0625\%$$

ATTACH. A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MFP TURBINE 2
MOISTURE SEPARATOR REHEATER 1
MOISTURE SEPARATOR REHEATER 2
HP TURBINE
LP TURBINE 1
LP TURBINE 2
AUX FEED PUMP TURBINE
NOTES
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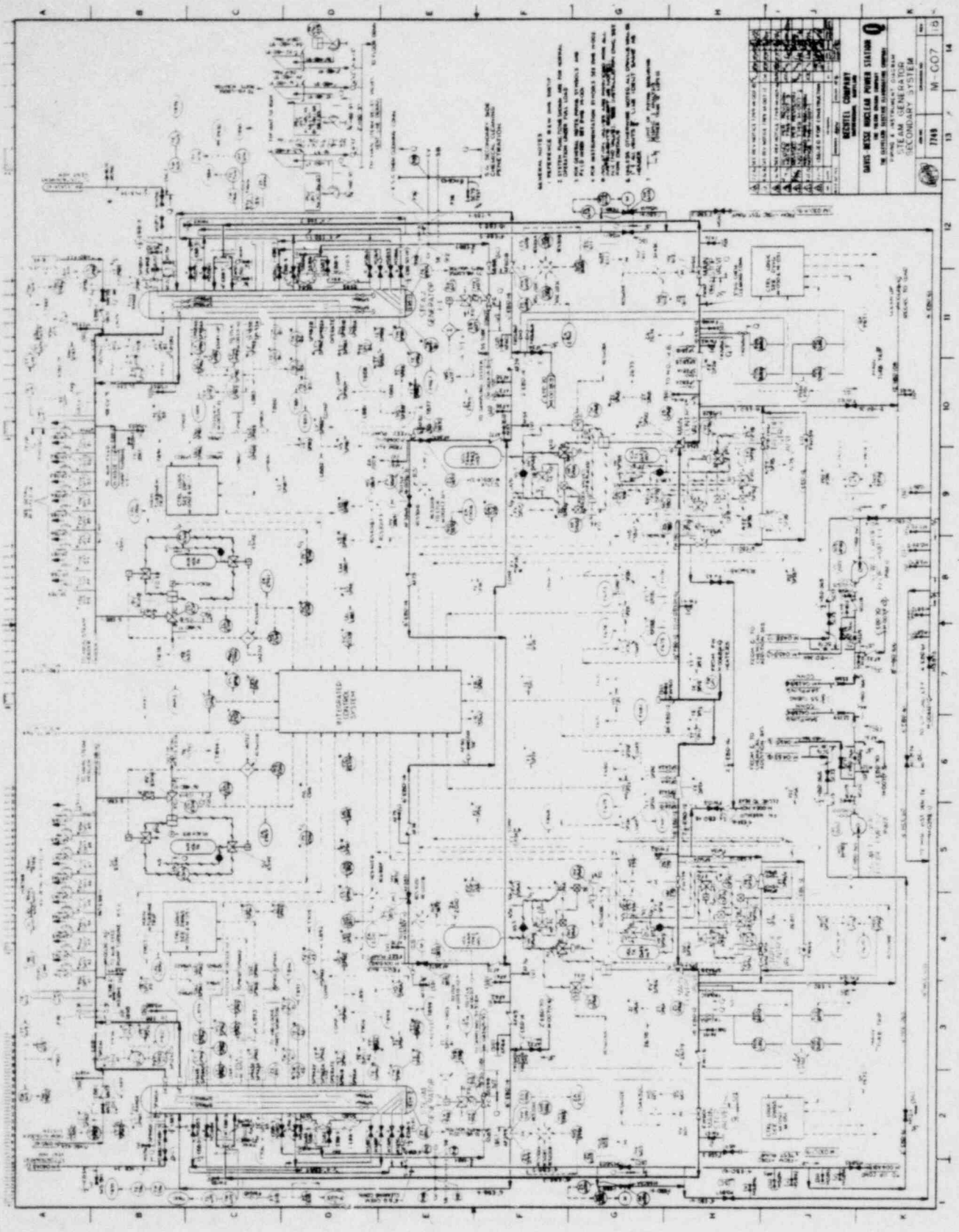
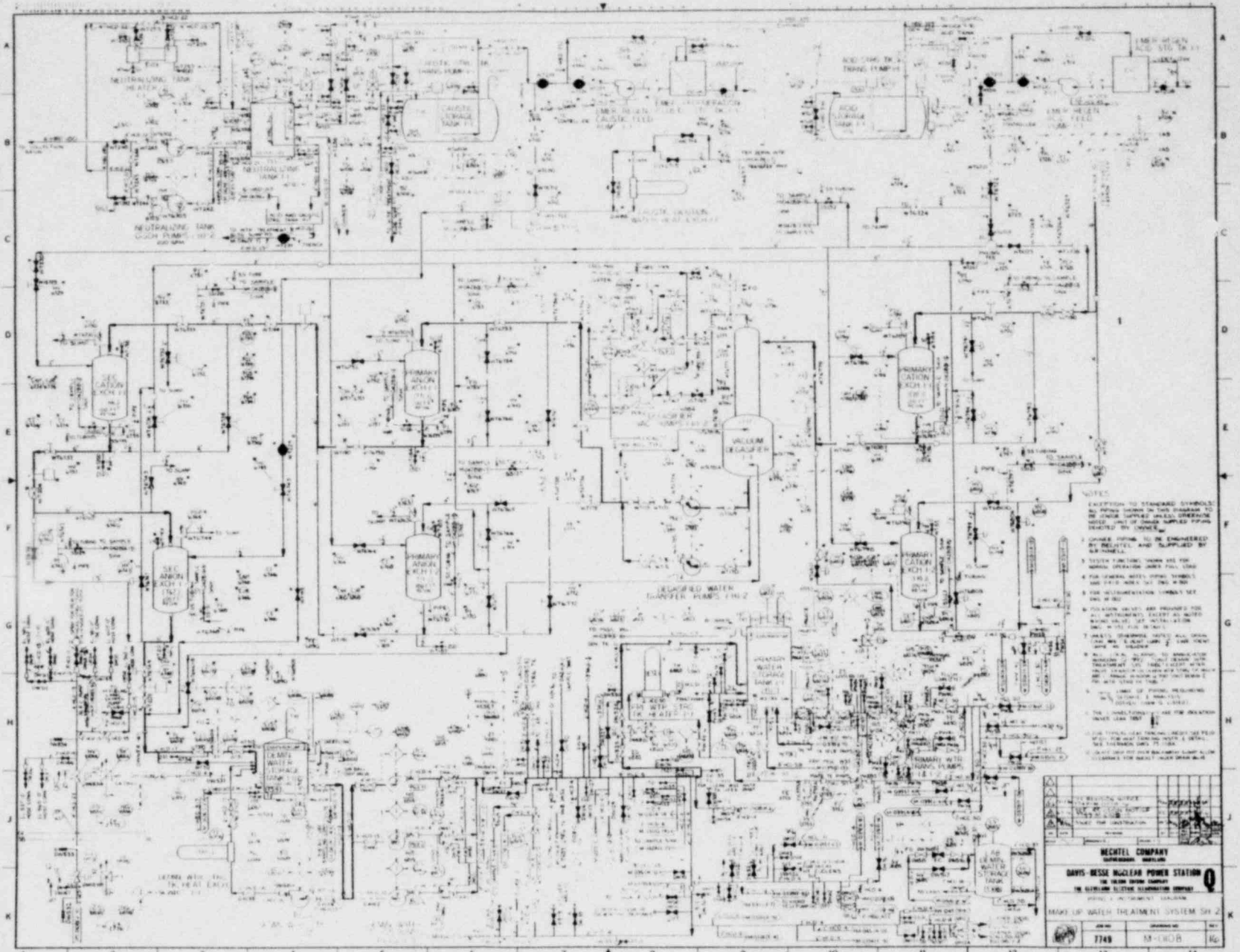
DAVIS-BESSE NUCLEAR POWER STATION
PIPING & INSTRUMENT DIAGRAM
MAIN STEAM AND REHEAT SYSTEM
7748
M-003

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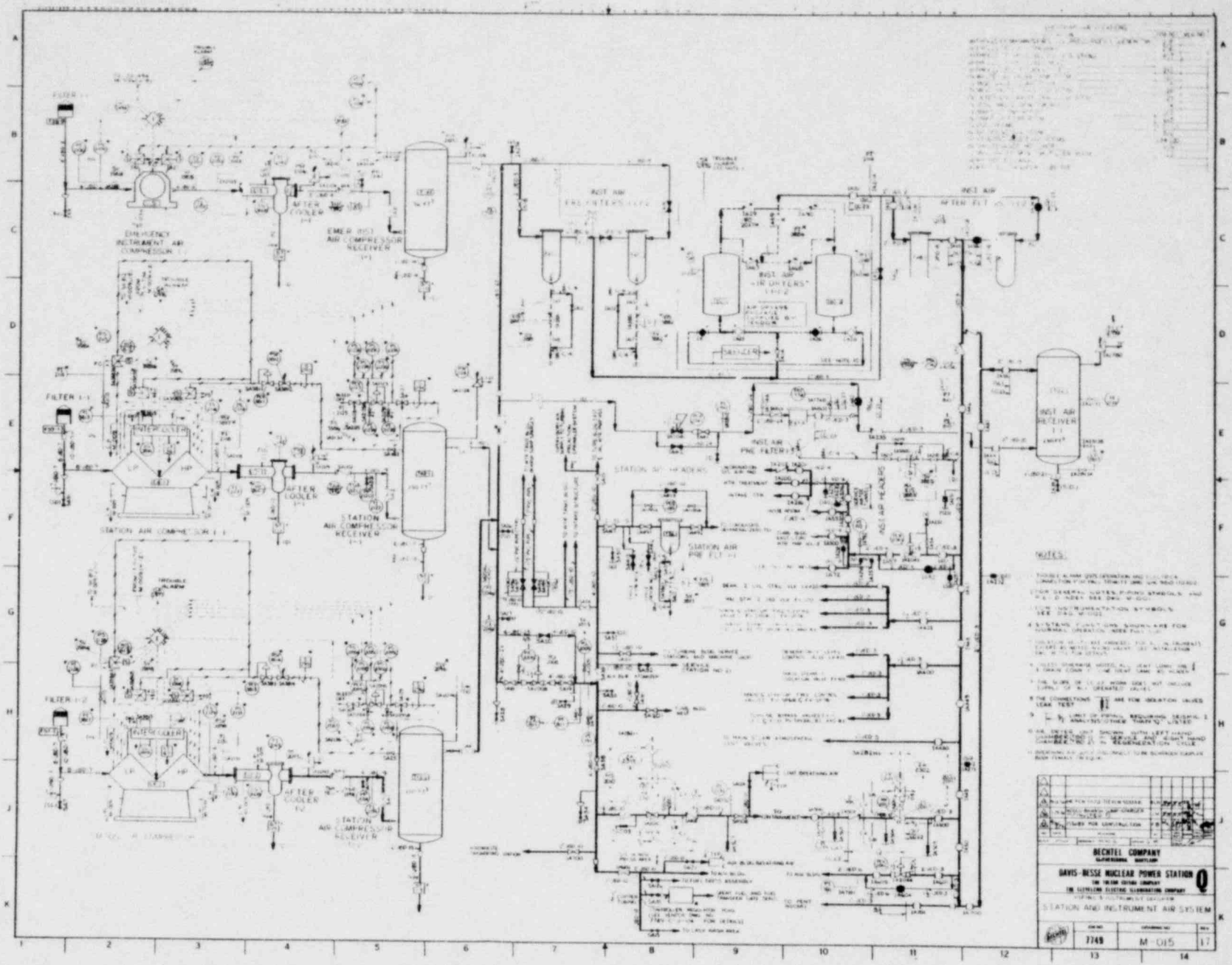
NEUTRALIZING TANK
NEUTRALIZING TANK
VACUUM DEAERATOR
SECONDARY WATER CHEMICAL FEED TANK
PRIMARY WATER STORAGE TANK
MECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
MAKE UP WATER TREATMENT SYSTEM SH 2
7749
M-108
Q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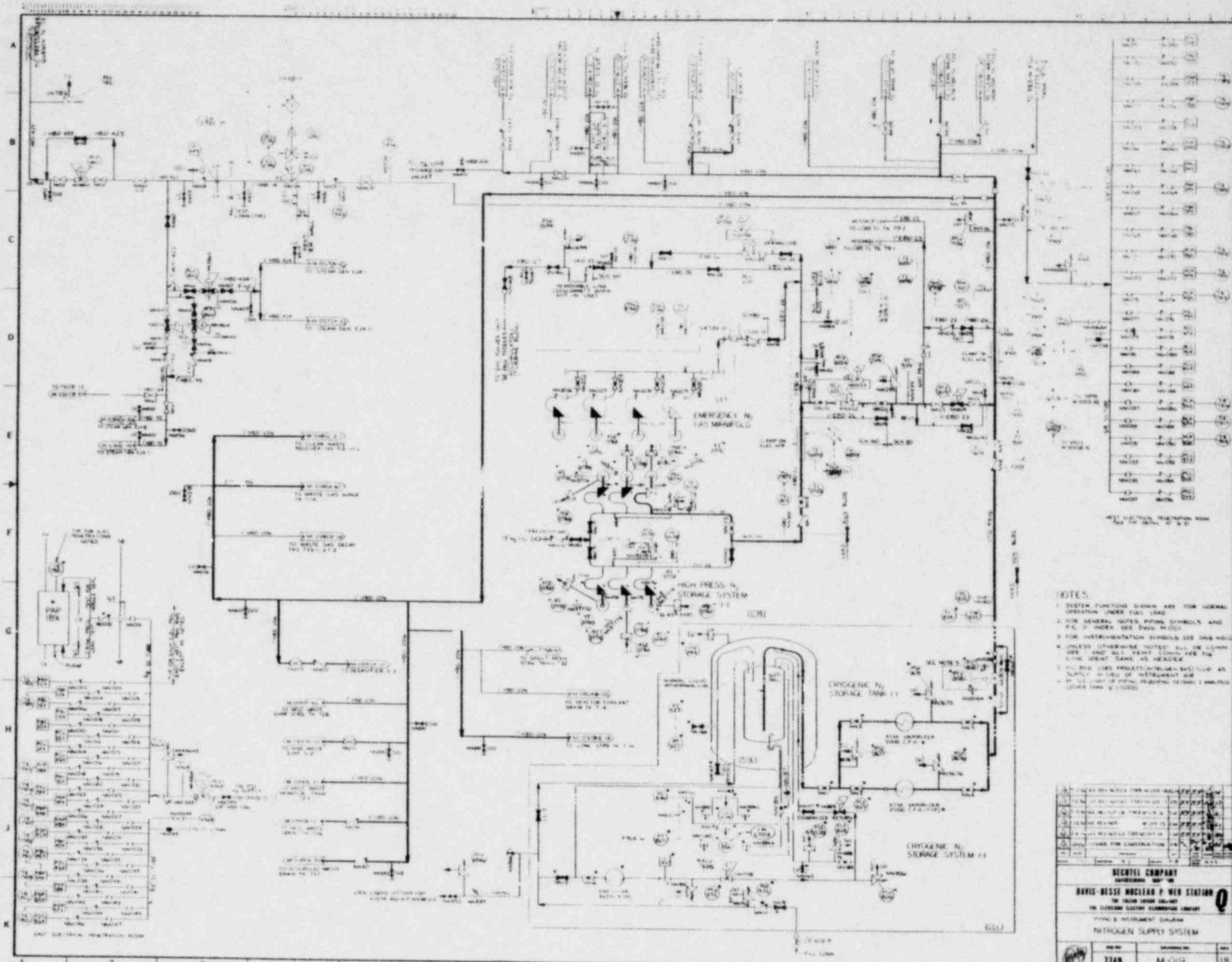
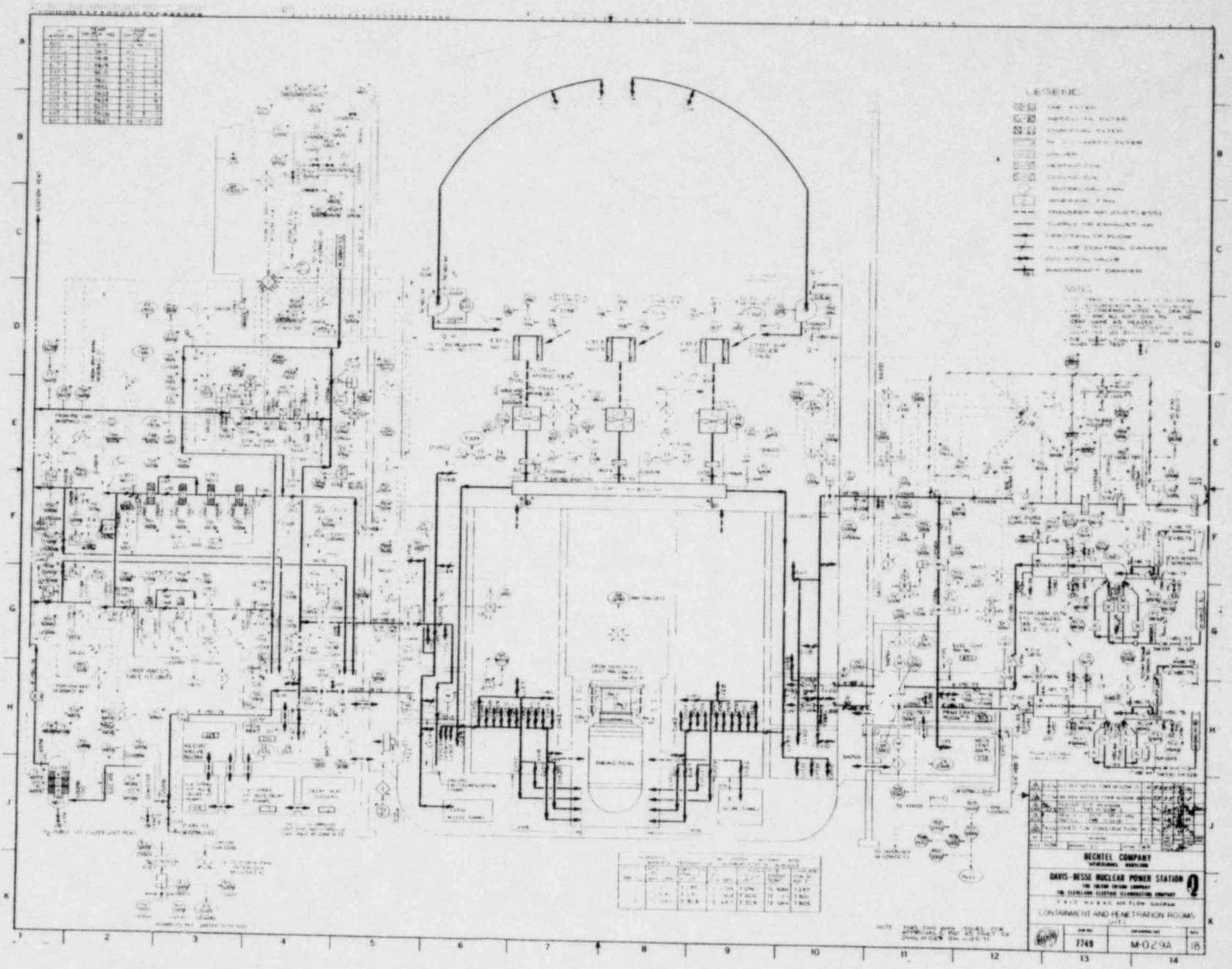
EMER INST AIR COMPRESSOR RECEIVER
AFTER COOLER
INST AIR AFTER FILT
INST AIR "AIR DRYERS"
INST AIR RECEIVER
INST AIR PNC FILTER
STATION AIR COMPRESSOR
STATION AIR COMPRESSOR RECEIVER
STATION AIR PNC FILTER
STATION AIR HEADERS
FILTER 1-1
FILTER 1-2
NOTES:
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
THE TOLEDO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
STATION AND INSTRUMENT AIR SYSTEM
7749
M-015
17


EMERGENCY N2 GAS MANIFOLD
HIGH PRESS N2 STORAGE SYSTEM
CRYOGENIC N2 STORAGE TANK 1-1
CRYOGENIC N2 STORAGE SYSTEM 1-1
NOTES
1. SYSTEM FUNCTIONS SHOWN ARE FOR NORMAL OPERATION UNDER FULL LOAD
2. FOR GENERAL NOTES PIPING SYMBOLS AND P&ID INDEX SEE DWG M-001
ISSUED FOR CONSTRUCTION
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
Q
PIPING & INSTRUMENT DIAGRAM
NITROGEN SUPPLY SYSTEM
7749
M-019
18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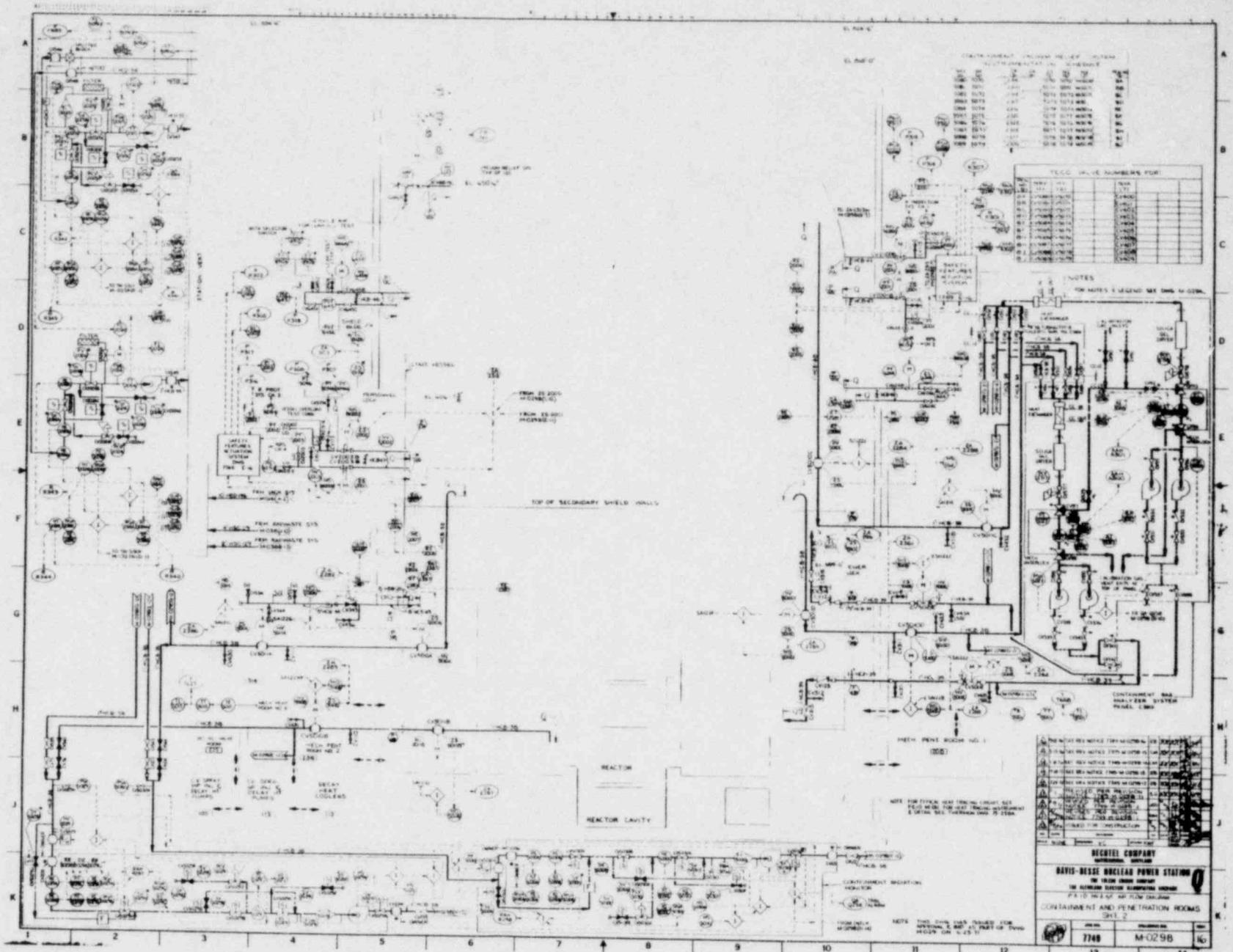
DAVIS-BESSE NUCLEAR POWER STATION
CONTAINMENT AND PENETRATION ROOMS
7749
M-029A
18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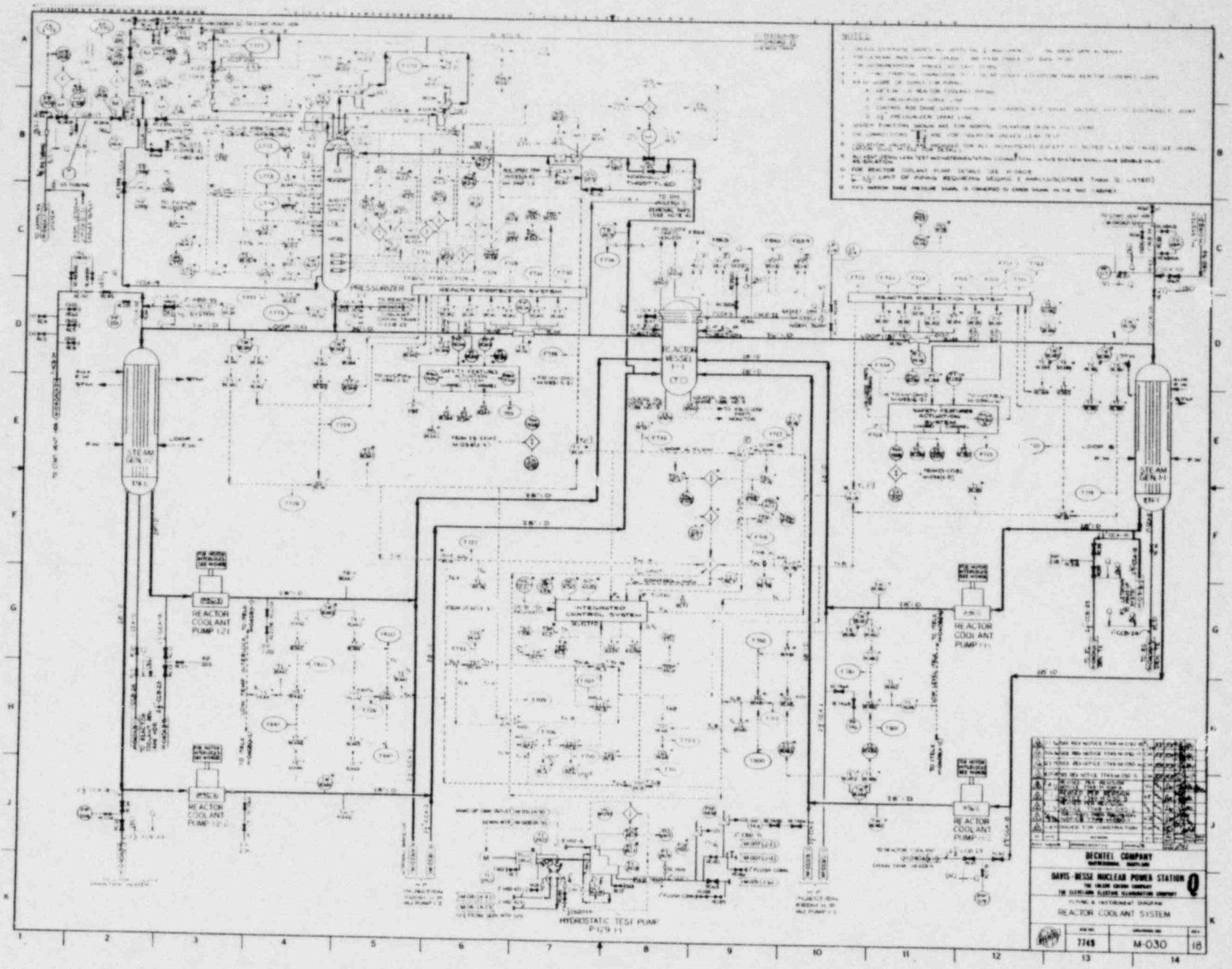
DAVIS-BESSE NUCLEAR POWER STATION
CONTAINMENT AND PENETRATION ROOMS
Unit 2
7749
M-0298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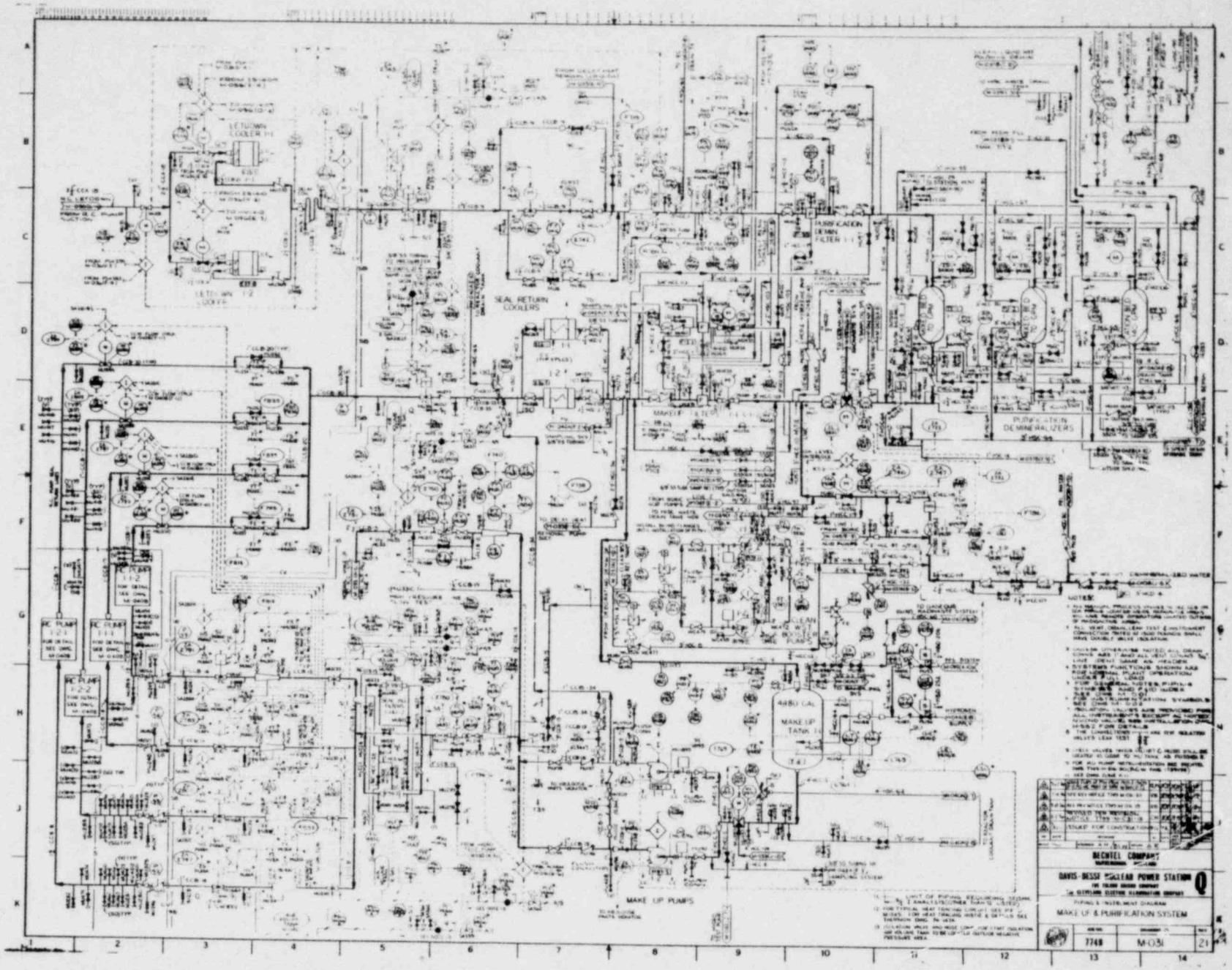
REACTOR VESSEL
STEAM GEN. 1-2
STEAM GEN. 1-1
REACTOR COOLANT PUMP 1-2
REACTOR COOLANT PUMP 1-1
REACTOR COOLANT PUMP 2-2
REACTOR COOLANT PUMP 2-1
INTEGRATED CONTROL SYSTEM
HYDROSTATIC TEST PUMP P-129-1
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
REACTOR COOLANT SYSTEM
7749
M-030
18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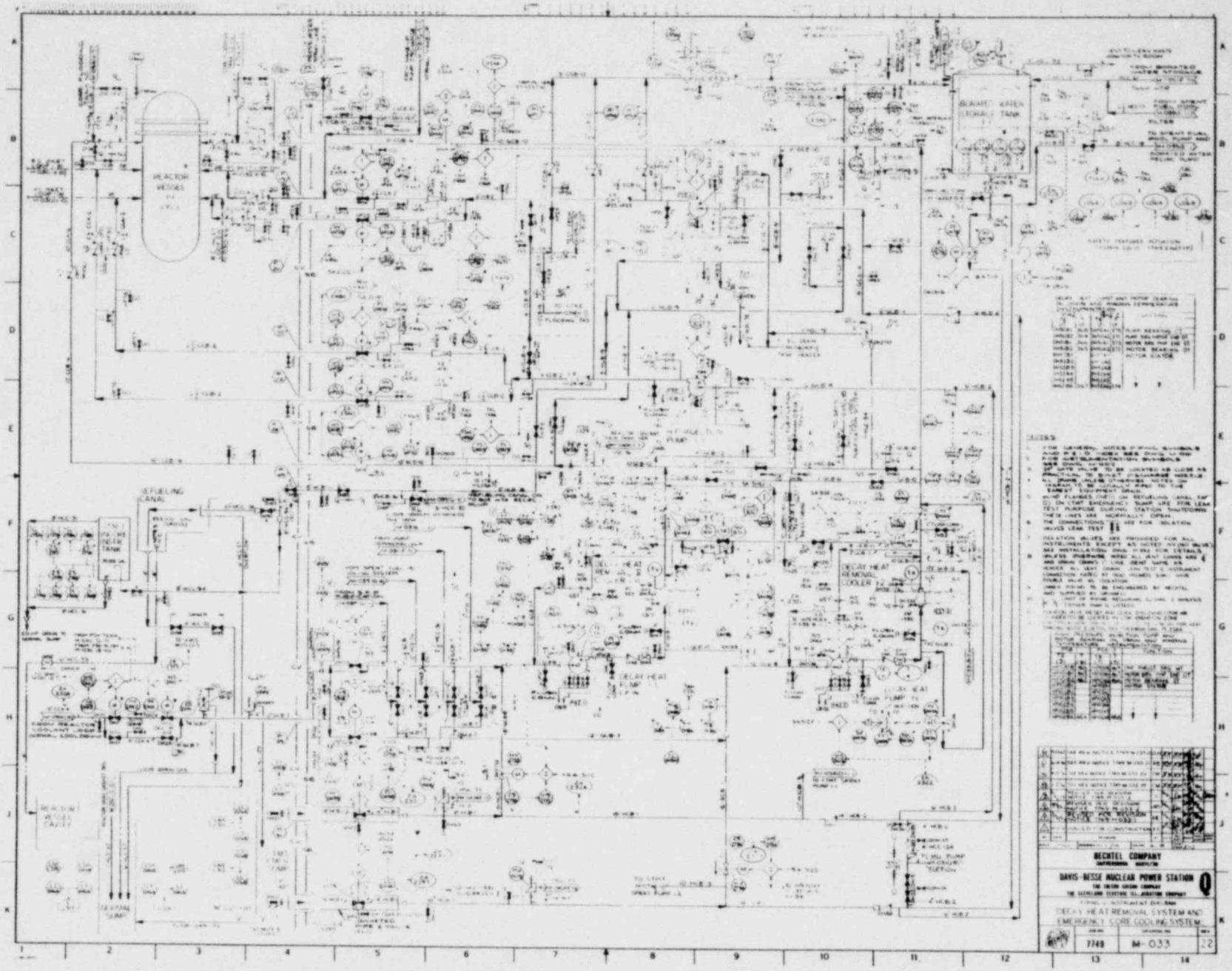
PURIFICATION DEMINERALIZERS
MAKE UP PUMPS
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
PIPING & INSTRUMENT DIAGRAM
MAKE UP & PURIFICATION SYSTEM
7748
M-031
21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REFUELING CANAL
DECAY HEAT COOLER
BECHTEL COMPANY
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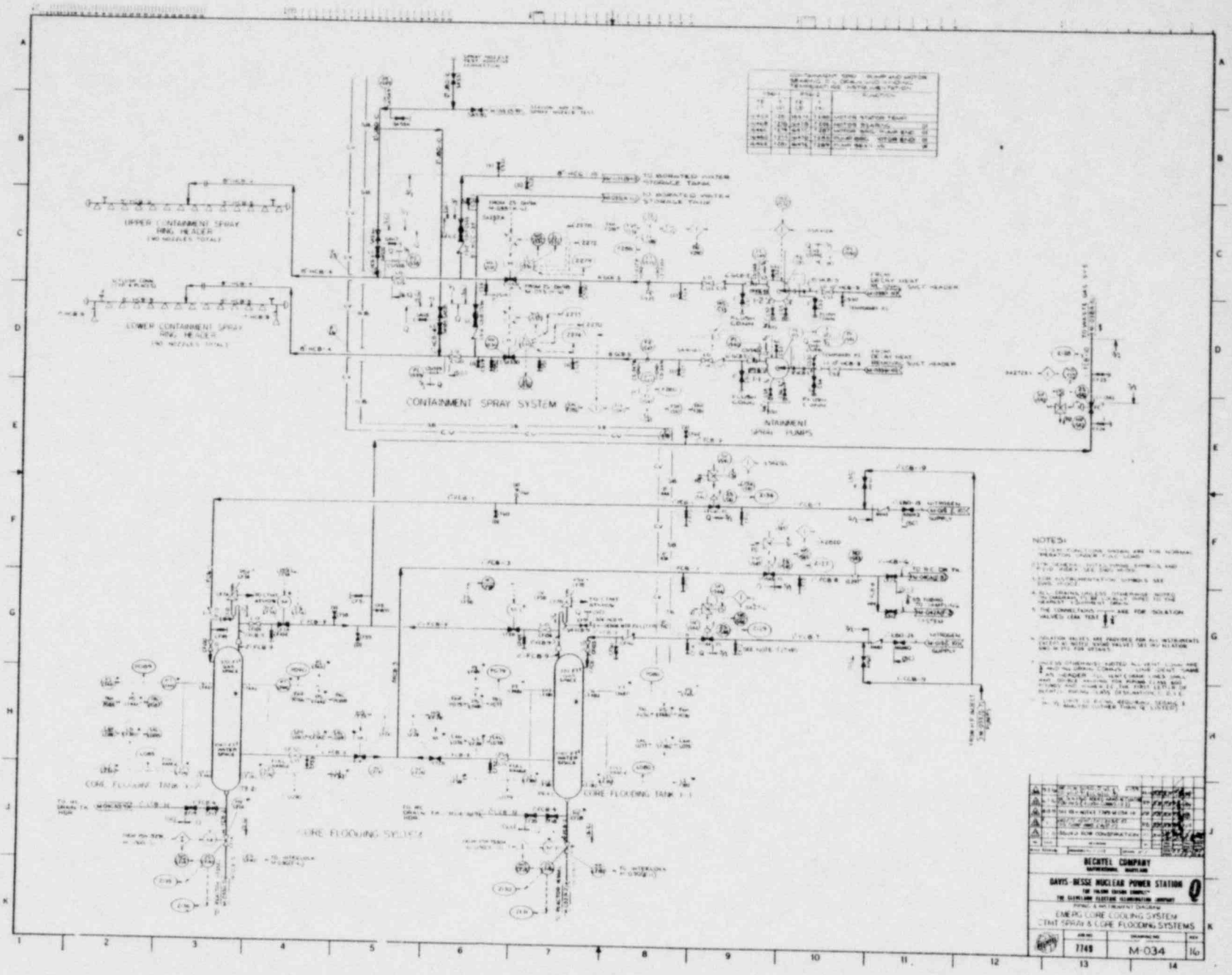
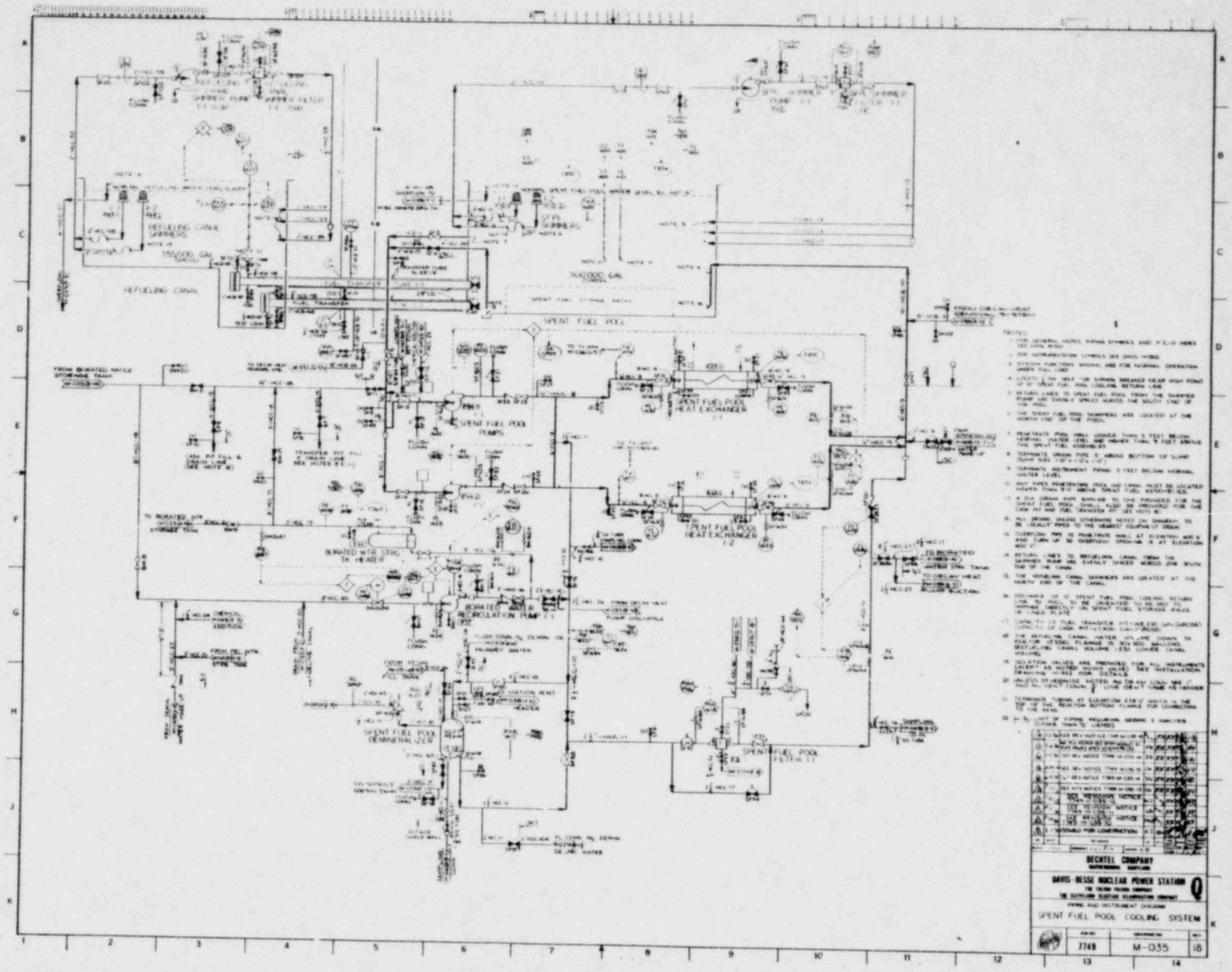
M-033
22


CONTAINMENT SPRAY SYSTEM
CORE FLOODING SYSTEM
CORE FLOODING TANK
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
EMERG CORE COOLING SYSTEM
CONT SPRAY & CORE FLOODING SYSTEMS
7748
M-034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SPENT FUEL POOL
SPENT FUEL POOL PUMPS
SPENT FUEL POOL HEAT EXCHANGER 1-1
SPENT FUEL POOL HEAT EXCHANGER 1-2
BORATED WTR STRG TK HEATER
BORATED WATER RECIRCULATION PUMP 1-1
SPENT FUEL POOL DEMINERALIZER
SPENT FUEL POOL FILTER 1-1
DEMINERALIZED WATER STRG TANK
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DAVIS-BESSE NUCLEAR POWER STATION
SPENT FUEL POOL COOLING SYSTEM
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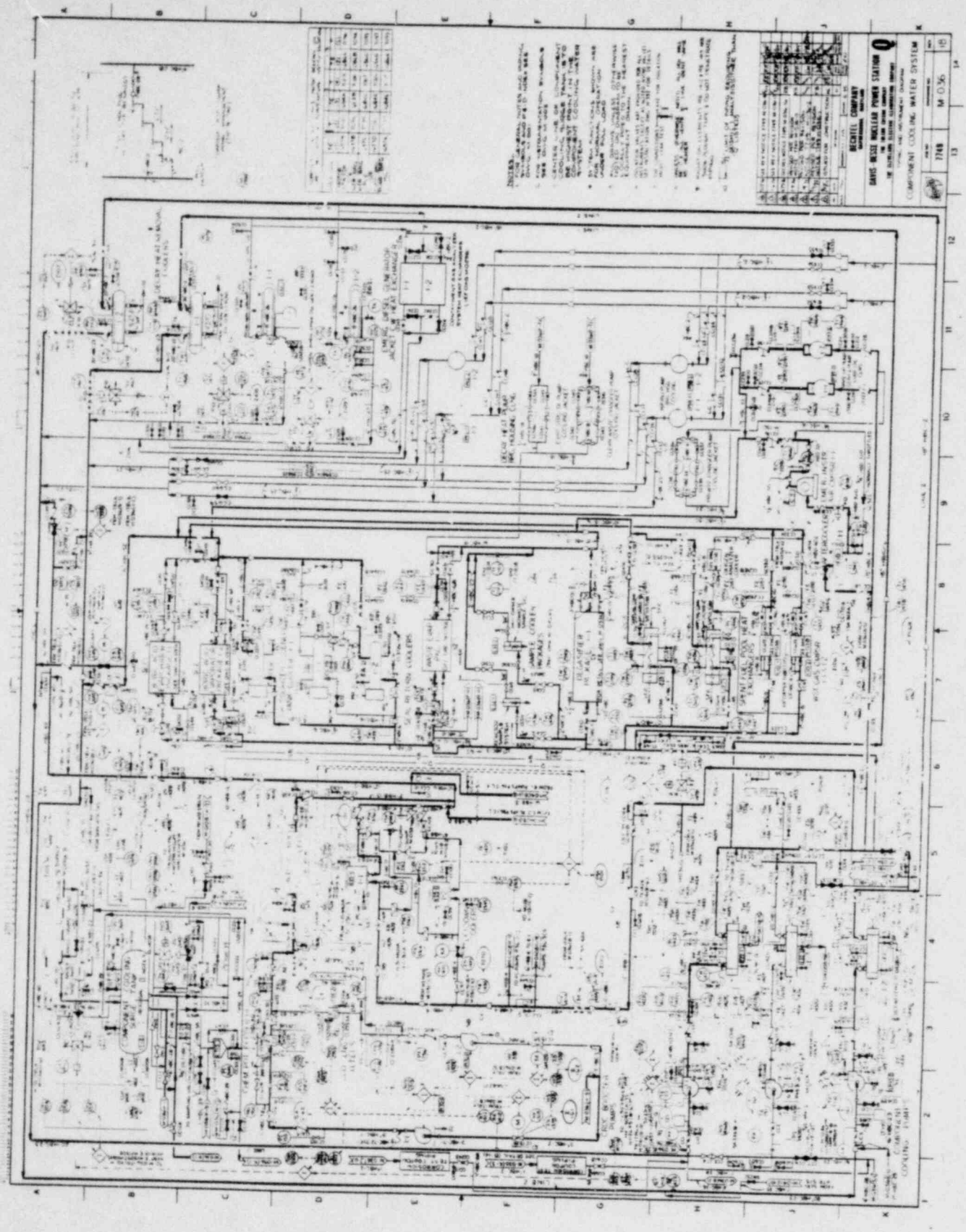
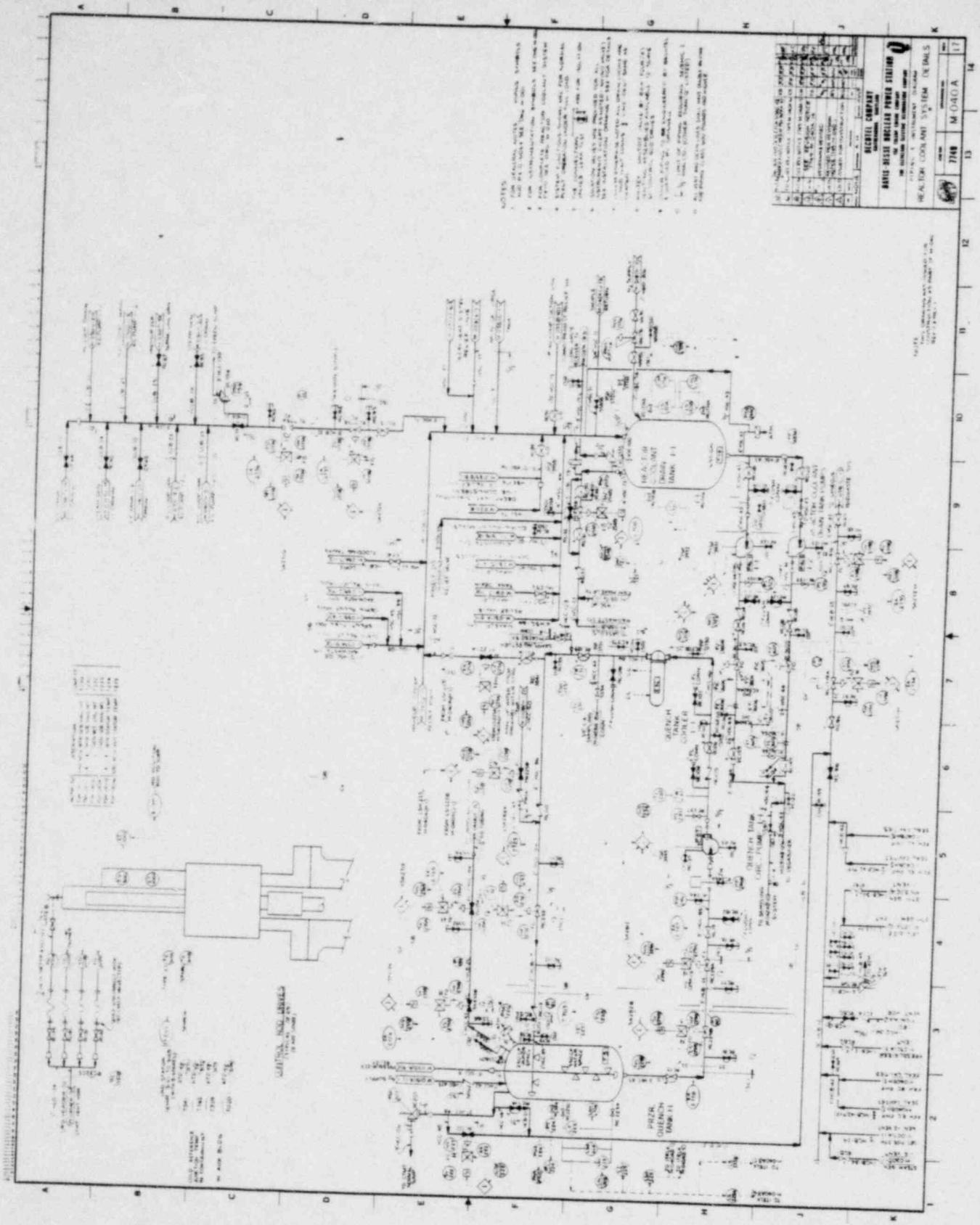
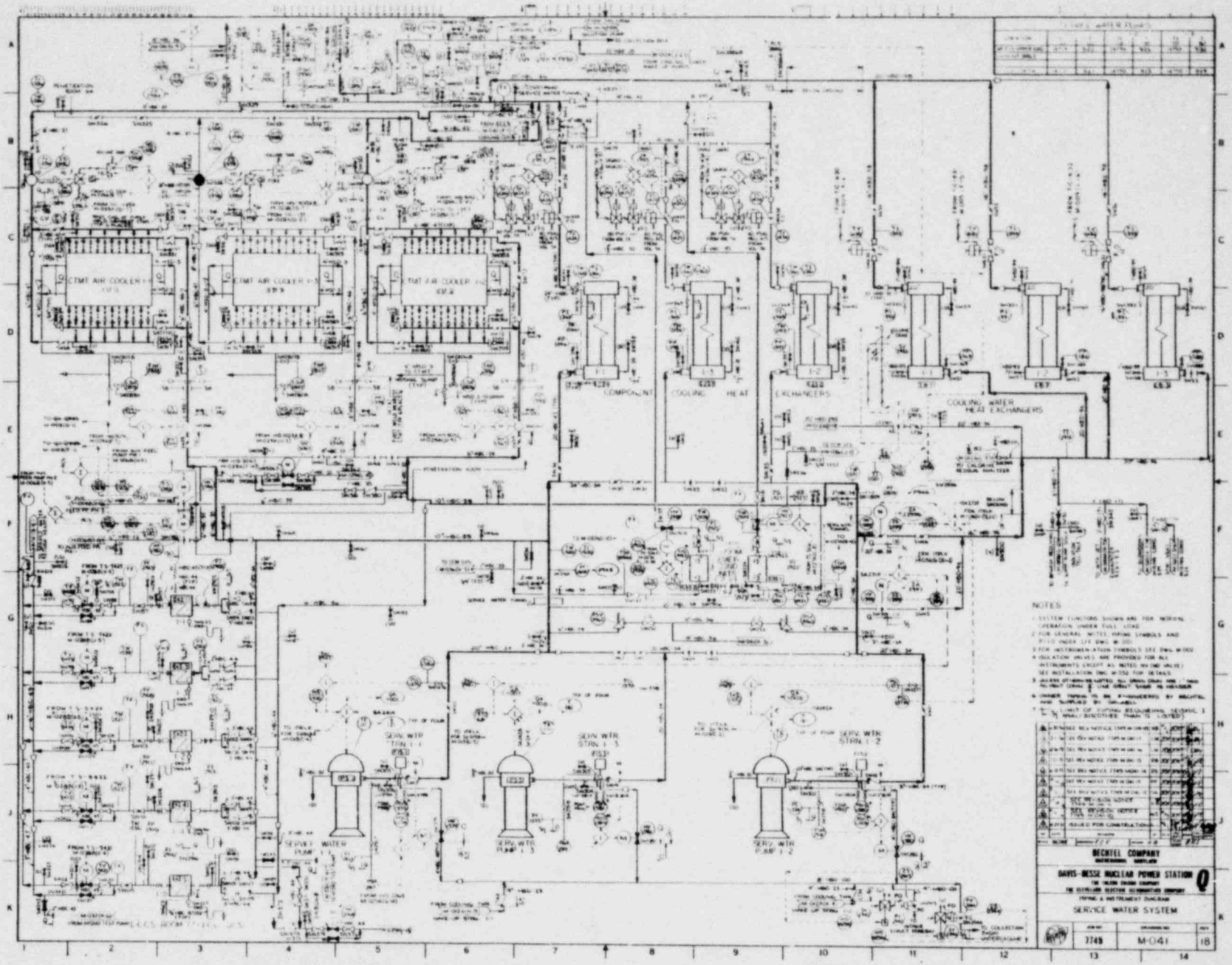
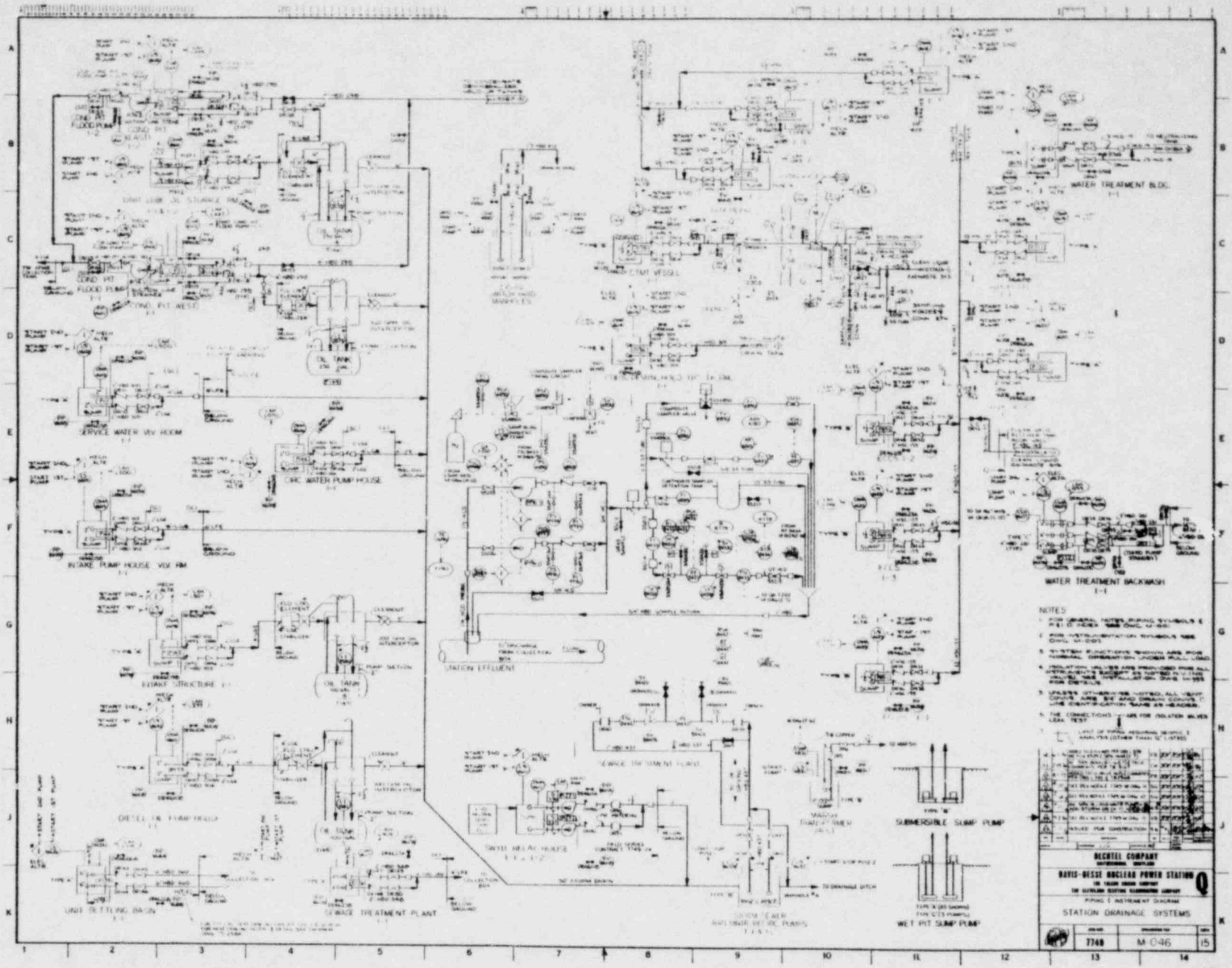
M-035
18






CTMT AIR COOLER
COMPONENT COOLING HEAT EXCHANGERS
COOLING WATER HEAT EXCHANGERS
SERV WTR STRN 1-3
SERV WTR STRN 1-2
SERVICE WATER PUMP
SERV WTR PUMP 1-3
SERV WTR PUMP 1-2
NOTES
BECHTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
PIPING & INSTRUMENT DIAGRAM
SERVICE WATER SYSTEM
7749
M-041
18


WATER TREATMENT BLDG.
WATER TREATMENT BACKWASH
SERVICE WATER VLV ROOM
INTAKE PUMP HOUSE VLV RM
STATION EFFLUENT
SEWAGE TREATMENT PLANT
SUBMERSIBLE SUMP PUMP
WET PIT SUMP PUMP
NOTES
ALCOTEL COMPANY
DAVIS-BESSE NUCLEAR POWER STATION
PIPING & INSTRUMENT DIAGRAM
STATION DRAINAGE SYSTEMS
7749
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ATTACH. B

LOCAL LEAK RATE TEST

The local leak rates listed in Table 1 were determined using the flow method. The sum of the Type B and C leak rates is 4184 cc/minute or .00751 percent per 24 hours by weight of containment air which is less than 60 percent of the allowable leakage rate (.60 x 0.5 = 0.3). The sum of the filtration bypass penetrations listed in Table 2 is 1169 cc/minute or .00209 percent per 24 hours by weight of containment air which is less than the allowable filtration bypass leakage limit of 0.0075.

The sum of the local leak rates, which were completed after the integrated leak rate test, was 505 cc/minute or .00091 percent per 24 hours by weight of the containment air. When added to the integrated leak rate test results, the resulting maximum measured leakage (.11224 percent per 24 hours by weight) is considered to be acceptable.

TABLE 1

TYPE B TESTS

Penetration	Measured Leakage (cc/min.)
23	0
24	0
30	0
31	0
37	0
38	0
39	0
40	0
80	45*
81	150*
82	0
101, 102	6

*Seal leakage for penetrations 80 and 81 was zero at 10 psig.

TYPE C TESTS

Penetration	Measured Leakage (cc/min.)
1	0
3	0 (tested after ILRT)
4	0
5, 9	130
6, 10	0 (tested after ILRT)
7, 11	450
8A	75
8B	120
8C	0
8D	0
8E	0
8F	120
8G	0
8H	0
8I	0
8J	0
12	0

TABLE 1 (cont.d)

13	250 (tested after ILRT)
14	0
16	0
17	135
19	0
21	265
25	90
26	105 (tested after ILRT)
29	750
32	0
33	0
34	700
41	75
42A	82
42B	80
43A	0
43B	80
44A	105 (tested after ILRT)
44B	0
47A	0
47B	0
48	0
49	90
51	0
52	0
53	150 (tested after ILRT)
54	0
55	0
56	0
59	0
67	65
68A	0
69	66
71B	0
71C	0
68B	0
73B	0
74B	0
74C	0

TABLE 2

SECONDARY CONTAINMENT BYPASS LEAKAGE PATHS

Penetration	Measured Leakage (cc/min.)	Service
1	0	Pressurizer sample line
13	250	Containment vessel normal sump drain line
14	0	Letdown line to purification demineralizers
16	0	Containment vessel equipment vent header
21	265	Demineralized water supply line
42A	82	Service air supply line
43A	0	Instrument air supply line
44B	0	Pressurizer quench tank N_2 supply line
49	90	Refueling canal fill line
52	0	Reactor coolant pump seal water supply
53	150	Reactor coolant pump seal water supply
54	0	Reactor coolant pump seal water supply
55	0	Reactor coolant pump seal water supply
56	0	Reactor coolant pump seal water return
67	65	Hydrogen dilution supply line
68A	0	Pressurizer quench tank sample line
69	66	Hydrogen dilution supply line
74C	0	Pressurizer auxiliary spray line
80	45	Emergency lock
81	150	Personnel lock
82	0	Equipment hatch
101	6	Electrical penetrations
102		Electrical penetrations