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MURRAY R. EDELMAN
VICE PRESIDENT
NUCLEAR

July 18, 1985
PY-CEI/NRR-0259 L

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Containment Bypass Leakage
(Questions 480.49-480.51,
License Condition 16)

Dear Mr. Youngblood:

This letter is provided to supplement our response dated January 31, 1984 (PY-CEI/NRR-0090L) which responded to your December 21, 1983 request for additional information on drywell purge, containment leakage testing and containment isolation provisions. Our previous submittal provided responses to questions 480.50(b),(c), and 480.51. A response to question 480.49 is attached.

These responses and clarifications are the result of ongoing discussions with the NRC staff, and this letter incorporates the lastest results of these discussions. The staff earlier established the scope of this effort at a November 15, 1984 meeting as 5 additional tasks. Attachment 1 to this letter provides resolution for some of these items; the balance concern feedwater bypass leakage to be addressed by separate letter.

In addition, Attachment 2 to this letter describes the revised Perry containment bypass leakage limit. Allowable limits for the containment leakage sources have been determined; radiological analysis indicates that postulated accident doses remain within 10CFR100 limits.

Question responses and the additional clarifications will be reflected in a future FSAR amendment. Please call if you have any questions.

Very truly yours,

R. Kaplan for

Murray R. Edelman
Vice President
Nuclear Group

MRE:njc
Attachments

cc: Jay Silberg, Esq.
John Stefano
J. Grobe

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480.49 The FSAR does not identify the extent to which the drywell purging system will be used during operating modes 1 through 3. Therefore, provide the following information:

a. Discuss the manner by which small pressure variations in the drywell will be accommodated. Include in your response the anticipated transients which would cause the pressure surge, the pressure differential value which would trigger a pressure relief action and the system or portions of a system that will be used for pressure control.

b. Does CEI foresee personnel entry into the drywell during normal power operations? If so, discuss the manner in which airborne activity would be reduced (ALARA) to accommodate plant personnel during drywell entry. If the drywell purge system would be used such that it is connected to the annulus exhaust gas treatment system (AEGTS), show that in the event of a LOCA the AEGTS equipment and line isolation valves will be able to withstand the effects of LOCA-related pressure transients. Also, show the effects on all plant transients if the purge system is being used at the onset of a LOCA.

<u>Response</u>

a. Reactor startup is the only anticipated transient that will result in a small pressure rise in the drywell. The means to provide pressure relief from drywell to containment during start up will be the 2" Combustible Gas Control System (M51) backup purge line. This small line is designed to vent 50 scfm from the drywell to the Annulus Exhaust Gas Treatment System (AEGTS) and has containment isolation valves qualified active for LOCA conditions. Analysis shows that the flow capacity of this system M51 line should be sufficient to keep the drywell pressure below the high pressure scram setpoint. Operators will follow procedures to terminate pressure relief after startup, when drywell temperature has stabilized.

The system M51 2" backup purge line (for initial pressure relief) is connected into the AEGTS system filter trains. A conservative estimate of LOCA flow capacity of this line was made with the 0.96 inch ID in-line flow orifice as the only restriction. A peak of 360 scfm was found for air flow. This increase of air into the annulus will cause neither a loss of negative annulus pressure, nor an increase of flow through the filters. Additional flow from system M51 would only last 30 seconds beyond a containment

isolation signal (M51 containment isolation valves close in 30 seconds). The AEGTS exhaust and recirculation dampers, which normally vent less than 400 cfm, will modulate to vent an additional 300 cfm for LOCA effects plus the 360 scfm from system M51. Since the dampers can vent up to 2000 cfm as recirculation flow is cut back to maintain the negative annulus pressure, the system still has almost 100% reserve capacity. Furthermore, a second 2000 cfm parallel train is automatically on line post-LOCA.

b. CEI does not anticipate any routine entries into the drywell during conditions 1, 2, and 3. Personnel may, however, need to enter the drywell to perform non-routine surveillances. If drywell access is required, the Health Physics Unit will consider special dosimetry requirements, respiratory protection requirements, and ALARA prior to personnel entry. The drywell purge system M14 will not be used to reduce drywell radioactivity during conditions 1, 2, and 3. The purge valves will be sealed closed during conditions 1, 2, and 3.

Responses to NRC Questions from 11/15/84 Meeting

Item 1: In finalizing the draft responses to NRC questions... CEI will describe how containment leakages were determined, including the use of drywell purging directed to outside containment during Operating Mode 2; and how feedwater bypass leakage and MSIV leakage are accounted for in the containment leakage test program.

Response: MSIV leakage test limit is 25 scfh per valve, resulting in 100 scfh for all four main steam lines. MSIV leakage is not added into .60 La (the Appendix J acceptance limit for the isolation valve test) because of the leakage control system. Feedwater leakage criteria are being developed, based on the potential for feedwater leakage post-LOCA.

Item 2: With respect to drywell purge, CEI will clarify the use of the 2-inch and 36/42-inch lines and the routing through filtering systems, providing supporting analyses and technical justification (The NRC staff suggested that CEI consult with Mississippi Power and Light, the Grand Gulf BWR/6 licensee, in developing this response).

Response: See CEI's response to NRC question 480.49(a).

Item 3: With respect to feedwater system/bypass leakage limits, CEI will clarify how feedwater leakage is handled and the extent to which conservatisms were used in developing leakage limits. CEI will also address related radiation dose rates calculated which are required for consultation with the NRC Accident Evalution staff, not represented at the meeting.

Response: Feedwater leakage criteria are being developed, based on the potential for feedwater leakage post-LOCA. We are currently performing analyses to evaluate short-term sealing of the feedwater lines post-LOCA. Appropriate test specifications for water or air leakage will be based on the results of this evaluation.

Regarding conservatisms used in developing leakage limits please refer to discussions below regarding several aspects of Regulatory Guide 1.3 and conservatisms in analytical assumptions.

1) Regulatory Guide 1.3 requires instantaneous release of specified fission products to the containment with no suppression pool scrubbing, to leak at calculated maximum pressure for the entire accident duration. Perry dose reduction factors of 1.14 (EAB) and 1.44(LPZ) would be realized by using predicted pressure history instead of calculated maximum.

2) Using 50th percentile X/Q instead of highest 5th percentile would reduce calculated dose a factor of roughly 17.6 (EAB) and 8.5 (LPZ).

3) Other conservatisms in source term include 105% of power level for fission product inventory, and immediate release of activity via MSIV leakage to the annulus (instead of allowing a 20 minute delay). Also, dose conversion factors from TID-14844 are used. Using the factors from Regulatory Guide 1.109 for normal dose conversion would result in the EAB dose being reduced by a factor of 1.2.

4) Other conservatisms in water leakage include doubling the allowable value, ECCS leaking immediately instead of allowing time for actuations, and 10% of iodine in water leakage to become airborne.

5) No credit is taken for suppression pool scrubbing. A dose reduction factor of 2 for the EAB dose would result from taking credit for scrubbing, using conservative assumptions.

Dose rates related to bypass leakage are discussed in Attachment 2.

<u>Item 4</u>: In conjunction with "other " penetrations identified by the staff which may be bypass leakage paths (e.g., isolation valves and instrument lines), CEI is to consider these potential sources of bypass leakage in determining allowables, or justify why they are not considered as bypass leakage paths, and update the FSAR accordingly.

<u>Response</u>: Potential secondary containment bypass paths are identified in Table 6.2-33 (Potential Secondary Containment Bypass Leakage Paths) of the Perry FSAR. All penetrations are identified in this table. Where penetrations are excluded as a potential bypass path, justification has been provided. Following is further clarification to Table 6.2-33.

1. <u>Closed System Outside Containment (Note 4 of Table 6.2-33).</u> In line leakage through containment isolation valves into closed systems outside containment have been excluded because the leakage does not communicate with the outside environment.

   The ECCS, RCIC and Feedwater Leakage Control are the only systems where credit has been taken for closed systems outside containment. The systems are missile protected, Seismic Category 1, Safety Class 2 and have a pressure and temperature rating in excess of that for containment. In addition, these systems have jocky pumps which form a water seal which is maintained at a pressure that is always higher than primary containment pressure.

Closed systems outside containment are tested for potential water leakage under the guidance of NUREG 0737 Item III.D.1.1. Attachment 3 identifies Perry's closed system leak test proposed to meet this NUREG. Water leakage identified during this testing will be added to the bypass water leakage allowable.

Failure of an ECCS or RCIC line water seal could cause draining down of the line such that an air leakage path could exist which was not identified by the NUREG 0737 testing. These lines are not a source of air bypass leakage for the following reasons:

ECCS and RCIC Injection Line Isolation Valves

The attached Figure 1 shows vessel elevations of the high and low pressure core spray spargers, the low pressure coolant injection line, the top of active fuel, and the minimum water level recovery point as shown on FSAR figures in Chapter 6.3. Note that the water level recovery point is above the LPCI injection point, but at or below the core spray spargers. The RCIC line injects through the vessel head and is therefore above the water level recovery point. The maximum time for water level to reach the recovery point is about 16 minutes (FSAR Figure 6.3-69).

For LPCI A, B, and C injection lines (penetrations P113, P412, and P411) the concern is whether air leakage could occur through the injection valves during the 16 minute period the LPCI injection line in the vessel remains uncovered by water. Prior to the accident, the injection lines inside containment will be water-filled. At the initial depressurization caused by the LOCA, some of the water in the lines will flash to steam. The remainder of the water would have to leak through the closed injection valves before the valves would leak air into the closed systems outside containment. Based on the pipe lengths and amount of water in the lines post-LOCA, the injection valves would have to leak excessively (greater than 10 gpm) to eliminate the water seal in the 16 minute period the LPCI lines are exposed to vessel atmosphere. Per Perry's Technical Specifications, the injection valves are limited to 1 gpm leakage. Therefore, even if the waterleg pumps fail and the systems become inoperable, the LPCI A, B, and C injection lines will not leak air post-LOCA and will not be sources of air bypass leakage.

The RCIC injection line enters the vessel through the vessel head. Three valves in the line minimize leakage: one check valve inside containment, one check valve

outside containment, and one gate valve outside containment. Initially post-LOCA, the valves will leak water which was in the line prior to the LOCA. For the water level in the RCIC closed system piping outside containment to decrease, several gate and check valves in the closed system outside containment must also leak. The water will decrease to a level in the piping equal to the head supplied by the Condensate Storage Tank. With the water seal up to this elevation, only one 3/4" double-valved, capped test connection will become exposed to containment air (assuming the down-stream isolation valves and closed system valves leak). Since the test connection is isolated by two valves and a cap, the leakage would be zero. In addition, the valve is tested with water during the RCIC closed system leak test. Based on the above, even if RCIC is inoperable and the waterleg pump fails, the injection line will not leak air post-LOCA and will not be a source of air bypass leakage.

HPCS and LPCS spargers discharge into the reactor vessel above the water level recovery point, therefore, assuming an inoperable system and a water leg pump failure, air could leak into these closed systems outside containment. Several barriers, however, will prevent air leakage to the atmosphere:

i) <u>Water existing in the closed system piping prior to the LOCA</u>. The water in the piping will take time to drain down to an elevation corresponding to the head provided by the condensate storage tank (HPCS) or suppression pool (LPCS). In order for the water level to decrease, several closed valves in series at lower elevations in the closed system piping must leak. It will take 55 days for the water in HPCS piping to decrease to a point where all the flanged connections, stem packings, and test connections above the minimum drain-down elevation are exposed to air. It will take 52 days for the water in LPCS piping to decrease to a point where all the flanged connections, stem packings, and test connections above the minimum drain-down elevation are exposed to air. The above drain-down times assume valve design specification leakages.

ii) <u>Flanged connections and stem packings that do not leak water at system operation pressures.</u> HPCS and LPCS undergo closed system leak testing with water every 18 months. The leak tests are performed with the systems at operating pressures (pressures many times higher than Pa). We expect to eliminate any detected leakage through stem

packings and flanged connections. Because of the leak-tightness at water pressures well above Pa, the stem packings and flanged connections are not expected to leak air at Pa.

iii) Capped test connections. All test connections that could be exposed to air inside the closed systems post-LOCA contain at least one isolation valve and are capped. Any air leakage past the isolation valve(s) will be stopped by the caps.

Due to the items described above, ECCS and RCIC lines are not considered air bypass leakage paths.

Although none of the injection line valves are considered bypass paths the valves will be Type C tested with air. Valves will be added into Type B & C test totals in the manner described in FSAR Table 6.2-40. During Type C testing of these valves, a soap bubble test is done on each valve stem. If leakage is detected, the bonnet is tightened down, and stem leakage is eliminated or, if not eliminated, added into the bypass leakage total. The valve is then retested.

In summary, air leakage through closed systems outside containment is not considered a source of air bypass leakage.

2. Instrument Lines (Note 5 of Table 6.2-33)

Instrument lines penetrating containment are assumed to allow zero bypass leakage. Valves in instrument lines penetrating containment are open post-LOCA in order to fulfill the instrument's functions. The instruments are designed to allow zero leakage. The lines from containment to the instruments are checked for leaks during containment integrated leak rate tests and/or individual system leak tests every 18 months. Detected leakage will be eliminated or will be added into the bypass leakage allowable.

3. Spectacle or Blind Flanges (Note 6 of Table 6.2-33)

Penetrations which contain lines isolated by spectacle or blind flanges are assumed to allow zero bypass leakage. Spectacle and blind flanges are type C tested. Any leakage determined by type C tests will be eliminated by tightening and/or re-sealing the flange, or will be added into the bypass leakage allowable.

4. Leakage Control Systems (Note 7 of Table 6.2-33)

The main steam lines have been excluded as a potential bypass leakage path. The Main Steam Isolation Valve Leakage Control System (refer to Section 6.7 of the Perry FSAR) controls leakage from the isolation valves.

The feedwater system has a dedicated leakage control system (refer to Section 6.9 of the Perry FSAR) which pressurizes the piping between the inboard check valves and outboard gate valves. Leakage through the feedwater line is under evaluation.

5. Personnel Airlocks (Note 8 of Table 6.2-33)

The personnel airlocks are not considered a bypass leakage path because all leakage through the inner and outer door seals is routed back into the annulus volume between the concrete shield building and steel containment. Any leakage would be treated by the Annulus Exhaust Gas Treatment System (refer to Section 9.4.5 of the Perry FSAR).

6. ADS Accumulator and Personnel Air Lock Door Seal Accumulators (Note 9 of Table 6.2-33).

The air supply lines to the ADS accumulators and personnel air lock door seal accumulators are not considered bypass leakage paths since they are safety related lines that remain pressurized post-LOCA (at a pressure exceeding containment vessel design pressure).

In addition to the above clarifications, a line by line review of Table 3.6.4.1 (Containment & Drywell Isolation Valves) of Perry's Technical Specification (Proof & Review Copy) has been completed to provide justification for exclusion of valves from bypass leakage. This information is provided in Attachment 4.

Item 5: Define the treatment of line leakage vs valve leakage per 10CFR50 Appendix J.

Response: For lines penetrating containment with isolation valves in series, Perry assumes the lowest-leaking valves(s) fail open. The leakage assigned to the penetration is then the leakage of the highest-leaking valve. We add penetration leakages for comparision with .60 La per 10CFR 50 Appendix J.

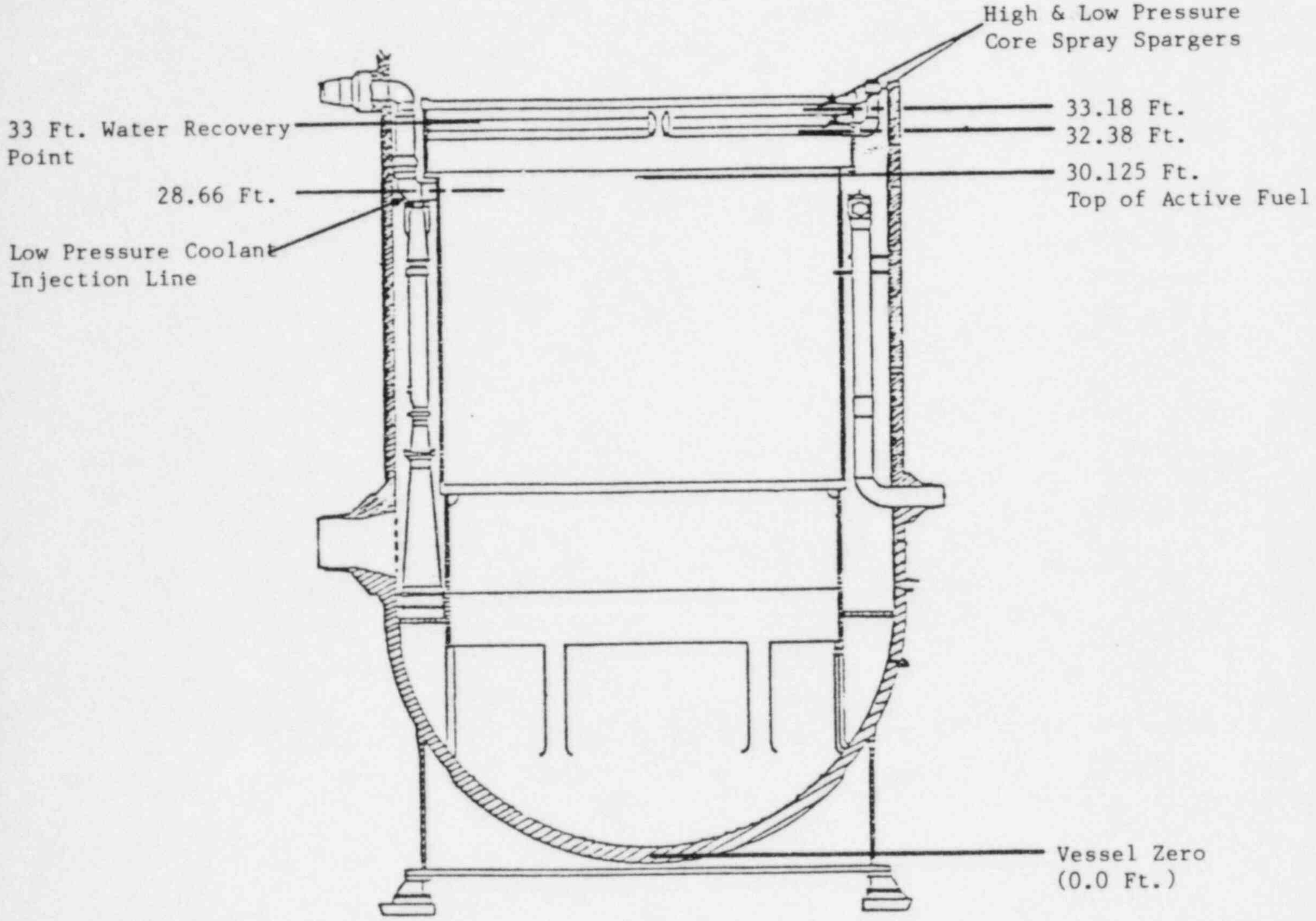

FIGURE 1 REACTOR VESSEL ELEVATIONS

PNPP BYPASS LEAKAGE LIMIT

The Perry Technical Specifications for containment bypass leakage presently specify a single percentage of total allowable containment leakage (La). This bypass specification is proposed to be separated into an allowance for feedwater (if needed) and a percentage of allowable containment leakage (La) for all other bypass leakage paths.

As discussed in Attachment 1, feedwater leakage criteria are still under investigation. The other bypass leakage term has been respecified as the sum of all other bypass leakage paths. These changes can be summarized as follows:

All bypass except feedwater, % La	Present	Proposed
LOCA calculation	4%	6.72%
Tech Spec limit	3%	5.04%

Background and justification for these bypass leakage limits follows.

GE document NEDO-21424, 238 Nuclear Island, Containment Bypass Leakage Sealing and Testing Methods, states that integrated containment leak rate is established as a technical specification by the applicant since the specific value depends upon site specific parameters, such as meteorology, site boundaries, etc. For the purpose of that report, 0.1% per day was used as an example. It went on to define the limit of leakage that would bypass the annulus as being 8% of the containment leak rate.

Early in Perry's design, when a value for total allowable containment leakage was being established, 0.1% per day was selected based on past experience. The defined value for bypass leakage from NEDO-21424 of 8% was employed. When meteorological data was established and dose calculations were performed, it was determined that the 0.1% per day was too conservative, i.e., it set the allowable containment leakage unreasonably low.

The leakage was changed to 0.2% per day, thereby allowing a higher leakage and still remaining within 10CFR 100 limits. Allowing the leakage to double from 0.1% to 0.2% would in turn double the actual bypass leakage if the bypass (in CFM) limit were to remain at 8%. To prevent the actual air leakage (in CFM) from doubling, the bypass limit was cut in half and set at 4%. The values of 0.2% per day for total allowable containment leakage and 4% of the containment allowable leakage for bypass leakage were reported in PSAR Amendment 5 paragraph 15.1.31.2.2.2.4.b. Calculations done at that time with then current control room parameters showed that the offsite/control room doses were not exceeded using the stated leakages.

The current 4% value is the design bypass leakage limit, but for test purposes, the limit is 75% of this value, or 3%. This reduced value is a requirement of plant technical specifications to allow for barrier degradation between test periods.

Bypass leakage was later re-evaluated for all bypass leakage paths except feedwater by combining isolation valve specification leakages. The resulting limit is 5.04% of the total allowable containment leakage based on free air volume. This 5.04% value will be included in the Perry Technical Specifications. For offsite dose analysis, an air leakage of 6.72% (5.04% divided by 75%) of the total allowable containment leakage is assumed in Table 1.

We performed a preliminary bounding offsite dose analysis assuming valve specification water and air leakages. Given the operating experience with the feedwater isolation valve leakage, the dose analysis was performed to allocate the maximum allowable feedwater leakage (assuming air leakage) based on 10CFR100 dose limits.

The following table presents preliminary bounding post-LOCA offsite doses based on these results:

a) 6.72% bypass leakage + AEGTS effluent
b) bypass water leakage plus leakage attributed to the annulus fix, which reduced free volume
c) feedwater line leakage (assuming air)
d) the total of a), b), c)
e) post-LOCA control room doses

TABLE 1
PRELIMINARY BOUNDING POST-LOCA OFFSITE DOSES (1)

	0-2 hr. dose, exclusion area boundary, rems		0-30 day dose, low population zone, rems	
	Thyroid	Whole Body	Thyroid	Whole Body
10 CFR 100 Limit	300	25	300	25
1) CEI-calculated (2), based on 4% bypass	115	6.24	143	4.20
2) NRC calculated (3)	88	6.6	122	2.3
3) CEI-calculated on following assumptions				
a) 6.72% bypass + AEGTS effluent	178.5	--	253.5	--
b) Water leakage + annulus fix	40	--	35	--
c) Allowable FW leakage (4)	81.1	--	10	--
d) Total	299.6	8.1	298.5	4.8

POST-LOCA CONTROL ROOM DOSES

	Beta Skin, rems	Whole Body, rems	Thyroid Inhalation, rems
Regulatory limit	75*	5**,*	30*
CEI-calculated (2), 4%	33.4	3.41	13.4
CEI-calculated, 6.72% + water leakage + annulus fix + FW Leakage (4)	36.7	2.1	27.6

1 Originally presented in November 1984 meeting. Calculations performed to maximize allowable feedwater air leakage.
2 FSAR Table 15.6-15
3 SER Table 15.1
4 Equivalent to 11.72 scfh for 40 minutes (7.8 scf total)
* From SRP Chapter 6.4, Section II.6.
** From GDC 19, 10CFR50 Appendix A.

Several improvements in offsite dose calculations were realized by reducing the source term with containment sprays, as allowed by Regulatory Guide 1.3, and by taking credit for more realistic values of X/Q. X/Q values used to calculate original design basis doses were based on 3 years of meteorological data. The X/Q values used to calculate the doses below are based on 4 more years of data, using the PAVAN model (NUREG/CR-2858) in accordance with Regulatory Guide 1.145 (Rev. 1 1982). Table 2 shows the results of containment spray automatic initiation after the LOCA event, along with changes to the water leakage and meterological assumptions. Table 2 represents our containment bypass evaluation, factoring in the benefits of improved X/Q and sprays for these calculations.

TABLE 2
DOSES ASSUMING CONTAINMENT SPRAYS & REVISED X/Q

	0-2 hr doses, exclusion area boundary, rems		0-30 day dose, low population zone, rems	
	Thyroid	Whole Body	Thyroid	Whole Body
CEI-calculated based on following assumptions (sprays initiated post-LOCA):				
a) 6.72% bypass + AEGTS effluent	126.7	---	157.3	---
b) Water leakage (5 gph) * + annulus fix	58.2	---	60.4	---
c) FW valve leakage	**		**	
d) Total	184.9	3.73	217.7	1.98

* Sprays have no effect on water leakage dose contribution. Water leakage was increased to allow a more reasonable test limit.

** Doses due to FW valve leakage have not been included.

POST-LOCA CONTROL ROOM DOSES

Beta Skin, rems	Whole Body, rems	Thyroid Inhalation, rems
20.2	1.37	29.7

Closed System Leak Test

SER 11.5
License Condition 16

In accordance with the requirements of NUREG-0737 TMI Action Plan Item III.D.1.1, the applicant shall implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids during serious transients or accidents to a level as low as possible. The applicant has formally committed to develop procedures and a scheduled maintenance program to monitor leakage and to reduce detailed leakage to acceptable levels for systems outside containment that could contain radioactivity. He has also agreed to furnish a leakage surveillance and preventative maintenance program to the staff at least 4 months before the anticipated date of issuance of the operating license. The staff finds this acceptable and will evaluate and report on this program in a supplement to this report. It should be noted, however, that the program to meet Item III.D.1.1 is not a prerequisite for fuel loading, but must be implemented before full-power operation as specified in NUREG-0694 (page 26).

Resolution

The Leakage Surveillance and Preventative Maintenance Program will be applied to the following systems in the manner summarized below: Low Pressure Core Spray, High Pressure Core Spray, Residual Heat Removal, Reactor Core Isolation Cooling, Feedwater Leakage Control, Combustible Gas Control Hydrogen Analysis, and Post Accident Sampling.

Visual Examination - Water systems will be inspected while the systems are operating and visually checked for leaks. Potential leakage paths include valve, pump, and flange seals and test connections. Leakage will be eliminated to the extent practicable; any leakage not eliminated will be measured and compared to an overall water leakage limit.

Leakage Collection Past Boundary Valves - Leakage past valves in branch lines that are potential leakage paths to the atmosphere will be measured. Leakage will be collected downstream of the boundary valves while the system is operating. Where it is impractical to measure leakage while the system is operating, the boundary valves will be removed and bench-tested. Leakage will be compared to an overall water leakage limit.

Radioactivity Grab Sample - While RCIC is in operation using reactor steam, a grab air sample will be taken from the RCIC room and an isotopic analysis performed to determine if steam leakage exists. Steam leaks will be identified and eliminated.

Ultrasonic Leak Detection - The H_2 Analysis System will be pressurized with air or nitrogen to the post-LOCA operating pressure and then inspected. Leaks will be identified with an ultrasonic leak detector. Leaks will be eliminated.

Systems Not Tested/Justification:

Personnel Airlock Leakage Control System (PAL-LCS) - The PAL-LCS routes contaminated air from between the airlock door seals to the annulus. The Annulus Exhaust Gas Treatment System (AEGTS) maintains the annulus at a vacuum. Any post-LOCA containment atmosphere in the airlock leakage control lines will flow into the annulus. As a result, no containment atmosphere will bypass the annulus and a leakage test of the airlock leakage control lines is unnecessary.

Main Steam Isolation Valve Leakage Control System (MSIV-LCS) - This system is maintained at a vacuum post-LOCA for MSIV leakage control, therefore, a leak test is unnecessary.

Annulus Exhaust Gas Treatment System (AEGTS) - The AEGTS takes suction on the annulus between the containment vessel and the shield building. The air is treated before being recirculated back into the annulus or to the atmosphere. Since the suction lines are at a vacuum, and since the discharge lines contain treated air, a leakage test on the system is unnecessary.

Reactor Water Cleanup (RWCU), Fuel Pool Cooling & Cleanup (FPC&CU), and Suppression Pool Cleanup (SPCU) System - These systems may be used for long-term cleanup efforts post-LOCA. The systems will be used only after the plant has stabilized and plant personnel have assessed each system's condition. Unidentified leakage from these systems is not expected to occur.

Justification for Exclusion from Bypass Leakage Path

Valve Number	Tech Spec Page	Justification for Exclusion as a Bypass Leakage Path
B21F022A-D	3/4 6-30	The Main Steam Isolation Valve Leakage Control System (MSIV-LCS) takes suction on lines these valves isolate and directs leakage to the Annulus Exhaust Gas Treatment System (AEGTS).
F028A-D	"	
F067A-D	"	
E12F008	"	Valves leak into a closed system. Closed system integrity is tested during closed system leak tests.
F009 *	"	
F011A,B	"	Line terminates inside containment below the minimum suppression pool water level. If valves leak, they will leak water. Leakage is into a closed system.
F021 *	"	Valves leak into closed system.
F023 *	"	
F024A,B	"	See E12F011 A, B above.
F037A,B	"	Valves leak into closed system.
F042A,B	3/4 6-31	Valves leak into closed system.
F064A-C	"	See E12F011 A, B above.
E21F011	"	See E12F011 A, B above.
F012	"	
E22F004 *	"	Valves leak into closed system.
F012 *	"	
F023 *	"	
1E32F001A,E, J,N	"	MSIV-LCS precludes out-leakage.
E51F031	3/4 6-31	See E12F011 A,B above
F063	"	Valves leak into closed system.
F064 *	"	
F076	"	
F077	"	Valves leak into closed system. Valve design incorporates diaphram seal which prevents stem & bonnet leakage.
G33F039 *	"	Valves leak into closed system (Feedwater Leakage Control System)
F040	"	

Valve Number	Tech Spec Page	Justification for Exclusion As A Bypass Leakage Path
M51F090	3/4 6-32	Valves isolate line which ties into AEGTS. Also, valves are diaphram-sealed, preventing stem & bonnet leakage.
F110	"	
P52F160	3/4 6-33	Safety-related airlock seal pressurization system downstream of these valves prevents bypass leakage.
F170	"	
P53F010	"	Valves are in lines tied to the Personnel Airlock Leakage Control System, (PAL-LCS). All containment leakage is directed to the AEGTS.
F015	"	
F020	"	
F025	"	
F070	"	
F075	"	
IV-3N	3/4 6-34	MSIV-LCS precludes out-leakage.
D23F010A,B	"	Instrument lines and instruments are checked for leakage during the containment Integrated Leak Rate Test. Any detected leakage will be eliminated. Stem/bonnet leakage is prevented by seal-welded housing.
F020A,B	"	
F030A,B	"	
F040A,B	"	
F050	"	
E12F004A,B	3/4 6-34	See E12F001 A,B
F027A,B *	3/4-34	Valves leak into closed system.
F028A,B	"	
F042C *		
F056C/ F057C	"	Valves are on a test connection inside containment.
F073A,B	"	Valves leak into closed system. Valves are diaphram-sealed, preventing stem/bonnet leakage.
F105	"	See E12F011 A,B.
F556A/F557A	3/4 6-35	Valves are on a test connection inside containment.
F556B/F557B	"	
E21F001	3/4 6-36	See E12F011 A,B.
F005 *	"	Valve leaks into closed system.

Valve Number	Tech Spec Page	Justification for Exclusion As A Bypass Leakage Path
F517/	"	Valves are on a test connection inside containment.
F518		
F519/	"	
F520	"	
E22F015	"	See E12F011 A,B.
F517/	"	Valves are on a test connection inside containment
F518	"	
F519/	"	
F520	"	
E32F025A/	3/4 6-37	MSIV-LCS precludes out-leakage.
F026A	"	
F025E/	"	
F026E	"	
F025J/	"	
F026J	"	
F025N/	"	
F026N	"	
E51F013 *	"	Valves leak into closed system.
F019 *	"	
F068 *	"	
E61F504	"	Lines are isolated by blind and spectacle flanges inside containment. Spectacle and blind flanges are Type B tested; leakage is eliminated.
F505	"	
F514	"	
G43F050A,B	3/4 6-38	See D23F010 A,B.
F060	"	
M14F602	"	Valves are on a test connection located in the annulus, which is treated by the AEGTS.
F065	"	
M17F055	"	See D23F010 A,B.
F065	"	
M51F210 A,B	"	Valves isolate lines leading to hydrogen analyzer. The hydrogen analyzer is checked for leakage during closed system leak testing every 18 months; acceptable leakage is zero. Stem/bonnet leakage out of valves is prevented by seal-welded housing.
F220 A,B	"	
F230 A,B	"	
F240 A,B	"	
F250 A,B	"	
N27F555A/	3/4 6-39	Valves are on a test connection inside containment.
F556A	"	
F555B/	"	
F556B	"	
P52F644	3/4 6-40	See P52F160.
F645	"	

Valve Number	Tech Spec Page	Justification for Exclusion As A Bypass Leakage Path
P53F030	"	PAL-LCS precludes out-leakage.
F035	"	
F040	"	
F045	"	
F558/	"	
F566	"	
F559/	"	
F567	"	
F562/	"	
F568	"	
F563/	"	
F569	"	
P57F015 A,B	"	Valves are in a safety-related continuously pressurized air line. Line leads to the ADS Safety Relief Valve accumulators. Pressurized system precludes containment leakage.
F523 A,B	"	Valves are on a test connection inside containment.
P87F037	"	Valves leak into Post-Accident Sampling System (PASS) which is give a leak test every 18 months Any measured leakage out of PASS is already included in overall containment water and air leakage values and compared to acceptance limits. Stem/bonnet leakage is prevented by seal-welded housing.
F065	"	
F071	"	
F074	3/4 6-41	
F077	"	
E12F005 *	3/4 6-42	Valves leak into closed system (relief valves).
F025 A-C*	"	
F041C	"	This is check valve inside containment, seat leakage travels into a closed system.
F055 A,B *	"	Valves leak into closed system (relief valve).
F550	"	These are check valves inside containment, seat leakage travels into a closed system.
F558 A,B	"	
E21F006	"	See E12F041 C above.
F018 *	"	See E12F005 above.
E22F005	"	See E12F041 C above.
F035 *	"	See E12F005 above.
E51F066	"	See E12F041 C above.

* During Type C testing, valve stem and bonnet are checked for leaks. Detected leakage is either eliminated or added to bypass leakage total.