



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

October 14, 1999

Mr. James W. Langenbach, Vice President
and Director, TMI
GPU Nuclear, Inc.
P.O. Box 480
Middletown, PA 17057

SUBJECT: CORRECTION LETTER - AMENDMENT NO. 215 ISSUED ON AUGUST 24, 1999
RE: ENGINEERED SAFEGUARDS FEATURE (ESF) SYSTEM LEAKAGE LIMIT--
ERRATA TO SAFETY EVALUATION (TAC NO. MA4665)

Dear Mr. Langenbach:

The Commission issued Amendment No. 215 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit 1 (TMI-1), on August 24, 1999, in response to your application dated February 2, 1999, as supplemented by letter July 29, 1999.

The amendment allows an increased ESF system leakage for the Cycle 13 operating cycle. As a result of information provided to the staff by the resident inspector concerning observed degradation in the flow rates for 2 of the 3 reactor building emergency fan/coolers which may have resulted in flows less conservative than assumed in your maximum hypothetical accident (MHA) analysis supporting your amendment request, the staff performed a further review of the potential effect of the degraded flows. The staff performed additional independent confirmatory dose calculations for all combinations of reactor building spray pumps and fan/coolers. As a result of this further review, we have determined that the spray pump fan/cooler combination assumed in your MHA analysis was not the most conservative combination. While, as stated in your analysis, the 2 reactor building spray pump assumption yielded a more conservative dose than the 1 spray pump combination, the staff determined that the 2 spray pump, 1 fan/cooler combination yielded the most conservative dose. Because the TMI-1 Technical Specifications require only 2 of the 3 fan/coolers to be operable, each powered by a different ESF electrical bus, the staff determined that the 2 spray pump 1 fan/cooler combination was the more appropriate assumption for use in your revised MHA analysis and resultant dose consequence calculations, given single failure considerations. The staff's evaluation further failed to give credit for the delay in emergency core cooling system leakage which we have corrected in the revision to the Safety Evaluation. This information was discussed with Mr. Fuhrer of your staff.

Additionally, the staff wishes to clarify, as discussed with Mr. Fuhrer, that the review conducted of your amendment request evaluated the dose consequences of the proposed action of increasing the allowable ESF leakage and adding additional surveillances and did not evaluate any procedural changes to operation of the ESF systems which you may choose to make as a result of the revised assumptions in your MHA analysis. It is our understanding that you intend to (independently of the staff's evaluation except for dose consequence) assess the effect of any proposed changes per the provisions of 10 CFR 50.59 and should you determine that an unreviewed safety question exists, submit the proposed changes for NRC review and approval. As also discussed with Mr. Fuhrer, you should include the appropriate single failure considerations in your analysis to determine whether a USQ exists as a result of any proposed changes you may consider. This may require consideration of a different worst case single failure than already considered if that would become more limiting.

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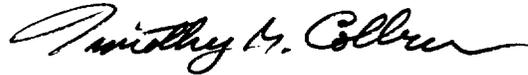
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J. Langenbach

- 2 -

Enclosed is an errata to our safety evaluation enclosed with our August 24, 1999, approval of license amendment 215 for TMI-1. The changes are highlighted in bold. If you have any questions, please contact me at (301) 415-1402.

Sincerely,



Timothy G. Colburn, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure: Errata to Safety Evaluation dated August 24, 1999

cc w/encl: See next page

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Original signed by:

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J. Langenbach

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DATE	10/8/99		10/12/99	10/13/99	10/8/99	10/8/99	

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Three Mile Island Nuclear Station, Unit No. 1

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ERRATA



UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 215 TO FACILITY OPERATING LICENSE NO. DPR-50

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

PENNSYLVANIA ELECTRIC COMPANY

GPU NUCLEAR, INC.

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-289

1.0 INTRODUCTION

By letter dated February 2, 1999, (which superseded an earlier submittal dated July 30, 1997), and supplemented by letter dated July 29, 1999, GPU Nuclear, Inc. (the licensee), requested changes to the Three Mile Island Nuclear Station, Unit 1 (TMI-1) Technical Specifications. The requested changes would increase the maximum allowable leakage of certain applicable portions of the engineered safeguards feature (ESF) systems located outside of containment, and clarifies the system design requirements for the Auxiliary and Fuel Handling Building Ventilation System (AFHBVS). The application also provided additional information related to the licensee's March 24, 1998 control room habitability dose assessment and superseded that submittal as well.

Specifically, the licensee requested the following:

1. TS Section 4.5.4 and its Bases be amended to (a) increase the maximum allowable limit from 0.6 gallon per hour (gph) to 15 gph for leakage from post-accident containment sump water recirculation ESF systems located outside of containment and (b) expand the number of ESF systems, which are assumed to leak during their intended operation in the course of a postulated loss-of-coolant accident (LOCA). Currently, the decay heat removal (DHR) system is specified as the ESF system that is assumed to leak. The licensee requested to add the building spray (BS) system and the makeup (MU) system to expand the ESF systems which are assumed to leak during their intended operation in the course of a postulated LOCA. The licensee also requested that this TS section be amended to revise the testing criteria to account for the highest pressure within that system during the containment sump recirculating phase.
2. TS Section 3.15.3 Bases be amended to clarify that no credit is taken for iodine removal by charcoal adsorbers in the AFHBVS in the licensee's radiological consequence analyses resulting from the waste gas tank rupture or maximum hypothetical accident.

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Enclosure

In addition, the licensee also proposed to revise the table of contents to reflect the new title of TS Section 4.5.4 as "Engineered Safeguards Feature (ESF) Systems Leakage."

The proposed revisions will close specific open items identified in NRC Inspection Report 96-201, "Three Mile Island, Unit No. 1 Design Inspection," dated April 15, 1997, and the TMI-1 Licensee Event Report (LER) 97-004, Revision 0, dated April 4, 1997. These reports identified the following specific discrepancies between the TMI-1 TS and the TMI-1 updated Final Safety Analysis Report (UFSAR):

"The TMI-1 UFSAR Section 6.4.3.6.4.4 and Table 6.4-3 stated the design basis leakage in the Auxiliary Building from the DHR system and BS system as 0.6 gph while the TMI-1TS Section 4.5.4, Decay Heat Removal System Leakage, allowed 6 gph leakage from the DHR system. There were no TS for BS system leakage."

To rectify the discrepancy, the licensee proposed an interim license amendment in a letter dated September 19, 1997, to reduce the maximum allowable leakage limit for the ESF systems outside containment in TS Section 4.5.1 from 6 gph to 0.6 gph to conform with the licensing-basis leakage stated in the UFSAR. The licensee also committed to limit the total leakage from post-accident containment sump water recirculating portions of the DHR system as well as the BS and MU systems. The staff accepted the proposed interim license amendment and issued License Amendment No. 205 on October 15, 1997. Therefore, the proposed TS revision supersedes the licensee's request granted by License Amendment No. 205 and closes specific open issues identified in the Nuclear Regulatory Commission (NRC) inspection report and the licensee's LER.

By letter dated July 29, 1999, the licensee per agreement during a July 27, 1999, telephone call with NRC staff reviewers and management, submitted a supplemental change to the proposed license amendment dated February 2, 1999, to limit the applicability of this amendment request to the next operating cycle (Cycle 13). This did not change the staff's initial no significant hazards consideration determination or the FEDERAL REGISTER notice.

2.0 EVALUATION

To demonstrate the adequacy of the TMI-1 ESF systems designed to mitigate the radiological consequences of the design-basis accidents with the increased ESF system leak rate of 15 gph and without relying upon the charcoal adsorbers in the AFHBVS for removal of iodine, the licensee reevaluated the offsite and control room radiological consequences resulting from the most limiting LOCA. The licensee included the results of these offsite and control room dose calculations in the submittals.

In the submittals, the licensee concluded that the existing ESF systems at TMI with the increased ESF leak rate and without relying upon the charcoal adsorbers in the AFHBVS will still provide assurance that the radiological consequences at the exclusion area boundary (EAB) and the low population zone (LPZ) resulting from the postulated LOCA will be within the dose reference values specified in 10 CFR Part 100.

To review the licensee's radiological consequence assessments, the staff performed a confirmatory dose calculation for the following three potential fission product release pathways following the postulated LOCA:

- (1) containment leak
- (2) post-LOCA leakage from engineered safety features systems outside containment
- (3) post-LOCA leakage from engineered safety features boundary valves to the borated water storage tank (BWST) vented to the environment

The results of the staff's radiological consequence calculation are given in Table 1 (Attachment 1). The major parameters and assumptions used by the staff in the radiological consequence calculations are listed in Tables 2 through 4 (Attachments 2 through 4 respectively).

2.1 Containment Leak Pathway

The radiological consequences resulting from containment leakage following a postulated design basis LOCA were evaluated. The staff reviewed the licensee's analysis and performed a confirmatory dose calculation. The staff's calculation incorporates the appropriate assumptions of the regulatory positions in Regulatory Guide 1.4. The staff used a containment leak rate of 0.1 percent per day based on the TMI-1 TS limit for the first 24 hours and a 0.05 percent per day leak rate for the remaining 29 days. No iodine removal credit was taken for the AFHBVS filters.

In the event of a postulated LOCA, the containment spray system is activated to reduce the post-accident energy and to remove airborne iodine. The licensee assumed a mixing rate of 4.9 unsprayed volumes per hour (58,000 cfm) between the sprayed and unsprayed portions of the containment atmosphere based on the operating capacity of two out of three containment emergency cooling fans. To be conservative, the licensee claimed elemental iodine removal by the containment spray for the first 28.5 minutes during initial spraying of fresh chemical injection solution, and no iodine removal credit was taken during the recirculating phase of the containment sump solution. The staff concludes that these assumptions are acceptable.

2.2 Post-LOCA Leakage from Engineered Safety Features Systems

In the TMI-1 UFSAR, the licensee assumed 0.6 gph for the post-LOCA leakage from ESF systems in its radiological consequence calculations. The maximum allowable leakage limit from the ESF components is also currently specified in the TMI-1 TS as 0.6 gph. In this license amendment, the licensee requested to change the 0.6 gph limit currently specified in the TMI-1 TS and 0.6 gph value assumed in the UFSAR to 15 gph.

The staff independently analyzed all containment spray pump/fan cooler combination and determined that the two spray pumps and one fan cooler operation to yield the most conservative radiological consequences in consideration of single failure criterion. Additionally, the staff noted that the current fan cooler operation at TMI-1 is with two of the three fan coolers operating in a degraded mode of 22,000 and 25,000 cfm respectively. While the licensee committed to restore fan cooler flow capacity to their assumed values of 29,000 cfm each during this refueling outage (Cycle 12), the staff

assumed that one fan cooler operation with 22,000 cfm flow capacity (worse case) in conjunction with the two spray pump operation to be most conservative in its radiological consequence assessment.

Two containment spray pump operation will provide approximately 28.5 minute delay in ECCS leakage while one spray pump operation provides 57 minute delay. Therefore, the staff assumed no ECCS leakage until 28.5 minutes into the accident, 30 gph of ESF leakage (twice the amount of TS limit) for the entire duration of the accident (30 days) after 28.5 minutes, and a gross failure of a passive component to occur at a rate of 50 gpm starting 24 hours into the accident and lasting for 30 minutes in accordance with the SRP. The staff assumed that 6.4 percent of the iodine contained in the ESF leakage water becomes airborne based on the containment sump water pH and the initial sump water temperature. The airborne iodine is assumed to be released immediately to the environment.

2.3 Post-LOCA Leakage Pathway from BWST Vent

The licensee identified another potential fission product release pathway from ESF system leakage following a postulated LOCA. This pathway is leakage through boundary valves to the BWST, which is vented to the environment. The licensee estimated the leakage rate to the BWST to be 180 gph for the first 5 hours, reduced to 102 gph until 24 hours, and reduced to 96 gph for the remaining 29 days. The licensee stated that the 180 gph leakage value is based on the capability of leakage-detection tests, and the remaining leakage values are estimated. The staff accepted the proposed leakage values. All of the ESF system leakage reaching the BWST is assumed to be in the liquid form. The staff assumed an iodine partition factor of 100. No credit is taken for iodine plateout in the BWST. The staff allowed a volatile iodine mixing efficiency of 10 percent in the BWST air space for holdup and decay prior to release to the environment.

2.4 Control Room Habitability

By letter dated August 14, 1986, the staff issued a supplemental safety evaluation (SE) regarding NUREG-0737, Item III.D.3.4, "Control Room Habitability." In the SE, the staff required the licensee to address only the whole body and skin doses stating that the thyroid dose for the control room operator would be deferred until completion of the staff's accident source term reevaluation. In a letter dated September 24, 1997, the staff requested that the licensee submit analyses to show that the thyroid dose to the control room operator is in compliance with General Design Criterion (GDC) 19 acknowledging that the source term study and its implementation at operating plants had not been completed. The licensee submitted the control room operator thyroid dose calculation in a letter dated March 24, 1998, and supplemented it by this proposed TS revision.

The requirements for the protection of the control room operators under postulated accident conditions are specified in GDC 19. The licensee has proposed to meet these requirements by incorporating shielding and emergency ventilation systems in the control room and by having an adequate supply of self-contained breathing apparatus in the control room. Upon receipt of an engineered safeguards signal or a high radiation level in control building ventilation system return air duct, the control room is isolated by automatic closing of the air inlet and exhaust dampers. This places the control building emergency ventilation system (CBEVS) in a

recirculating mode with 39,000 cfm of control room air being circulated through redundant high-efficiency particulate air filters and charcoal adsorber units. Following the isolation of the control room, outside air can be brought into the CBEVS by modulating outside air intake and exhaust dampers to maintain a positive pressure in the control room.

To be conservative, the licensee assumed that both outside air intake and exhaust air dampers, have failed to close fully at their intermediate positions, resulting in leakage of outside air through both dampers into the control room. The licensee measured in-leakage through the inlet air damper as 3400 cfm and in-leakage through the exhaust air damper (backflow) as 600 cfm. The 600 cfm value was based on the lower limit of detection of the air flow measurement instrument. The licensee assumed that the failed dampers can be repaired within 24 hours. In addition, the licensee assumed 10 cfm of unfiltered in-leakage for ingress/egress for the entire duration of the postulated LOCA (30 days).

The results of the staff's control room radiological consequences are given Table 1 (Attachment 1). The major parameters and assumptions used by the staff in the radiological consequence calculations are listed in Tables 2 and 3 (Attachments 2 and 3). Thyroid dose to the control room operator calculated by the licensee and the staff are slightly higher than the dose acceptance criteria specified in the SRP. The SRP interprets that the appropriate acceptance criterion for thyroid dose to comply with GDC 19 is 30 rem.

Currently, the staff is closely working with Nuclear Energy Institute (NEI) Control Room Habitability Task Force to resolve generically all control room habitability related issues. Therefore, because the thyroid dose is not significantly exceeded and we expect to resolve generic control room habitability issues in the near future, we conclude that the requested license amendment is acceptable for the Cycle 13 operating cycle. At the end of the cycle, the licensee must resubmit the requested license amendment along with TMI-1 control room habitability evaluation based on our generic resolution with the industry.

2.5 Atmospheric Relative Concentrations at the Exclusion Area Boundary, Low Population Zone and for the Control Room

By letter dated October 15, 1998, supplemented by another letter on February 3, 1999, the licensee submitted a proposal to amend the atmospheric dispersion (χ/Q) values for the EAB and the LPZ for the radiological consequence assessments resulting from the postulated design basis accidents. The staff reviewed the licensee's analysis and concluded that the proposed revision of the χ/Q values was acceptable. These revised χ/Q values, which are used in this evaluation, are listed in Table 3 (Attachment 3).

The licensee calculated the 95th percentile χ/Q values for a postulated release from the containment to the control room through the yard intake using the diffuse source release option of the ARCON96 computer code (NUREG/CR-6331, Revision 1, "Atmospheric Relative Concentrations in Building Wakes"). This option assumes that the release occurs over an area rather than from a single point. As the distance between the release location and receptor increases, the calculational results of these two methodologies converge. Following discussions with the staff, the licensee agreed to recalculate the initial diffusion coefficients by dividing the assumed release area width and height by 6. Initially, the licensee's values were estimated by dividing the area width and height by 4 and 2, respectively. Onsite meteorological

data for 1992, 1993, 1995, and 1996 were used as input in these and all of the following calculations.

Since the exact location and dimensions of releases from the containment building are not known, the staff also made comparative calculations assuming a point release for multiple points around the circumference of the containment. The shortest distance between the containment building and yard intake is approximately 90 meters. The χ/Q values calculated making this assumption were about 75 percent higher than those calculated assuming the diffuse source release option. The χ/Q values calculated by the staff for a point at an average release distance were only about 20 percent higher than those calculated using the diffuse source release option. It would be very conservative to assume that the release will occur at the point on the containment closest to the yard intake. In addition, in the event of an accident, effluent could be released from more than one location (e.g., leaking from two penetrations) or over a small area.

The control room ventilation exhaust is not a point at which air would normally be drawn into the control room. However, the ventilation exhaust is very near the containment building and, in the event of damper failure in the air exhaust duct, air adjacent to the containment building could be drawn by backflow into the control room. The licensee estimated χ/Q values for this pathway by assuming releases at locations scattered around the containment surface. The licensee examined test data of flow around other building configurations and applied the results to the TMI building complex. The tests did not model the TMI site itself. The licensee estimated surface concentration coefficients (K values) by applying the test data to the TMI site and calculated χ/Q values by assuming fractional releases from the selected locations with mixing in the building wake cavity. This method was selected because of concerns in using the ARCON96 methodology, a Gaussian plume model, for a postulated release location very near the receptor location.

Since the exact location and dimensions of releases from the containment building are not known, the staff made comparative calculations assuming a point release for multiple points around the circumference of the containment. Atmospheric dispersion (χ/Q) values calculated by the staff using the ARCON96 methodology for a point at an average release distance were about 2 to 5 times higher than the licensee's calculated χ/Q values. In the worst case, if effluent were released directly across from the ventilation exhaust, with limited mixing, the resultant χ/Q values could be much greater than the weighted χ/Q values calculated by the licensee. However, it is unlikely that the release would occur at a point on the containment closest to the ventilation exhaust. In addition, in the event of an accident, effluents could be released from more than one location (e.g., leaking from two penetrations) or over a small area.

Further, the ventilation exhaust is not the design intake and, therefore, would not routinely draw in air in event of an accident. Backflow would only occur under conditions of damper failure.

The licensee has proposed use of χ/Q values for a release from the borated water storage water tank to the control room via the control room ventilation exhaust instead of the yard intake. The borated water storage tank is closer to the ventilation exhaust than to the yard intake, although in a different wind direction. The staff confirmed that this assumption is more conservative than assuming intake at the yard intake. The licensee calculated χ/Q values for postulated releases from the auxiliary building to the yard intake by assuming a ground level

release from the auxiliary building at a point close to the yard intake. The staff performed confirmatory calculations.

The staff finds the χ/Q values calculated by the licensee to be acceptable for use in the dose assessment for the Cycle 13 operating cycle. The NRC is attempting to resolve control room issues generically through an industry forum and the staff may reassess the control room χ/Q values proposed by the licensee in this license amendment request, if needed, based on conclusions drawn from resolution of the control room generic issues.

The staff has reviewed the licensee's analysis and performed a confirmatory assessment of the radiological consequence resulting from the postulated LOCA. The doses calculated by the staff are listed in Table 1 (Attachment 1). The staff's analysis confirms the licensee's conclusion that the radiological consequences would not exceed the dose reference values specified in 10 CFR Part 100 for the EAB and LPZ. For the control room operator dose, the staff is closely working with NEI Control Room Habitability Task Force to resolve generically all control room habitability related issues. Therefore, we conclude that the requested technical specification changes are acceptable for the Cycle 13 operating cycle. At the end of the cycle, the licensee must resubmit the requested license amendment along with TMI-1 control room habitability evaluation based on our generic resolution with the industry. Therefore, the staff has determined that the license amendment requested by the licensee to increase the maximum allowable ESF system leakage limit is acceptable for operating cycle 13.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 14283). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by

operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

- Attachments:
1. Table 1, Radiological Consequences
 2. Table 2, Assumptions Used in Computing Radiological Consequence
 3. Table 3, Atmospheric Dispersion Factors (χ/Q) Values
 4. Table 4, Control Room χ/Q Values

Principal Contributors: J. Lee
L. Brown
T. Colburn

Date: August 24, 1999

TABLE 1

**Radiological Consequences
(rem)**

<u>Release Pathways</u>	<u>EAB</u>		<u>LPZ</u>		<u>Control Room</u>	
	Thyroid	WB ⁽¹⁾	Thyroid	WB ⁽¹⁾	Thyroid	WB ⁽¹⁾
Containment Leak	190	2	134	<1	14	<1
ECCS Leak	97	<1	146	<1	18	<1
BWST Vent	<1	<1	11	<1	7	<1
TOTAL	288	2	291	<1	39	<1
Acceptable Dose Criteria	300	25	300	25	30	5

⁽¹⁾ Whole body

Table 2
Assumptions Used in Computing Radiological Consequences

<u>Parameter</u>	<u>Value</u>
Power level, MWt	2825
Fraction of core inventory released, fractions	
Noble gases	1.0
Iodine	0.25
Iodine chemical forms, fractions	
Organic	0.04
Elemental	0.91
Particulate	0.05
Primary containment leakage, %/day	
0 to 24 hours	0.1
1 to 30 days	0.05
Primary containment free volume, ft ³	2.16E+6
Sprayed volume	1.45E+6
Unsprayed volume	7.10E+5
Containment spray	
Flow rate, gpm	5,000
Average drop fall height, ft	96
Spray solution pH	>8.0
Iodine removal rate by spray, hour ⁻¹	
Elemental	10
Particulate	6.06
Organic	0
Sump water recirculating startup time, minutes	28.5
ECCS leak rate	
0 to 0.475 hours, gph	0
0.475 to 24 hours, gph	30
24 to 24.5 hours, gpm	50
24.5 to 720 hours, gph	30
Containment atmosphere mixing rate, cfm	22,000

Table 2
Assumptions Used in Computing Radiological Consequences
(Cont'd)

Sump water volume, ft ³	6.3E+4
Iodine partition factor	6.4
Sump water leakage to BWST, gpm	
0 to 5 hours	3
5 to 24 hours	1.7
24 to 720 hours	1.6
BWST volume, ft ³	4E+4
BWST air mixing efficiency, %	10

Table 3
Atmospheric Dispersion Factors (χ/Q Values)
(sec/m³)

0-02 hour EAB	8.0E-4
0-02 hour LPZ	1.4E-4
2-08 hour LPZ	6.0E-5
8-24 hour LPZ	3.9E-5
1-04 day LPZ	1.6E-5
4-30 day LPZ	4.0E-6

Table 4 Control Room χ/Q Values (sec/m³)

Yard Intake (Normal)

0-2 hour	3.40E-4
2-8 hour	2.25E-4
8-24 hour	1.02E-4
1-4 day	7.61E-5
4-30 day	4.99E-5

Ventilation Exhaust Intake (back flow)

0-8 hour	1.96E-3
8-24 hour	1.37E-3
1-4 day	9.14E-4
4-30 day	5.09E-4

Borated Water Storage Tank Vent

0-2 hour	8.45E-4
2-8 hour	5.23E-4
8-24 hour	2.49E-4
1-4 day	1.77E-4
4-30 day	1.19E-4

Auxiliary Building Release

0-2 hour	3.02E-3
2-8 hour	2.08E-3
8-24 hour	1.02E-3
1-4 day	6.63E-4
4-30 day	4.37E-4