March 4, 2003

Mr. William R. Kanda
Vice President - Nuclear, Perry
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
P.O. Box 97, A200
10 Center Road
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT 1 - ISSUANCE OF AMENDMENT (TAC NO. MB6928)

Dear Mr. Kanda:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 122 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit 1. This amendment is in response to your application dated December 9, 2002 (PY-CEI/NRR-2674L).

Pursuant to 10 CFR 50.67, "Accident source term," this amendment approves the use of alternative source term radiological calculations to update the design basis analysis for the fuel handling accident as described in the Updated Safety Analysis Report. Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," was used in the application.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA by DPickett for/

Stephen P. Sands, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures: 1. Amendment No. 122 to License No. NPF-58
2. Safety Evaluation

cc w/encls: See next page

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PD 3-2 r/f	ACRS	THarris	EWeiss	
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ADAMS Accession No.: ML023580025

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*see previous concurrence **OFFICIAL RECORD COPY**

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FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 122
License No. NPF-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the FirstEnergy Nuclear Operating Company (the licensee) dated December 9, 2002, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended to authorize revision of the Updated Safety Analysis Report (USAR) as set forth in the application for amendment by the licensee, dated December 9, 2002. The licensee shall update the USAR by adding a description of the methodology incorporating Alternative Source Term calculations to update the design basis analysis for the Fuel Handling Accident, as authorized by this amendment and in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of the date of its issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by LRaghavan for/

Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Date of Issuance: March 4, 2003

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 122 TO FACILITY OPERATING LICENSE NO. NPF-58

FIRSTENERGY NUCLEAR OPERATING COMPANY

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By letter dated December 9, 2002, FirstEnergy Nuclear Operating company (the licensee), requested changes to the Updated Safety Analyses Report (USAR) for the Perry Nuclear Power Plant. The licensee requested changes to the USAR using a selective implementation of the alternative source term (AST), as described in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," and pursuant to 10 CFR 50.67, "Accident Source Term." The proposed changes would revise the radiological consequence analyses for the postulated fuel handling accident (FHA) during refueling operations.

2.0 BACKGROUND

The current radiological consequence analysis for the postulated FHA for Perry is based on TID 14844 accident source term. In 1995, the staff published NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants." NUREG-1465 provides estimates of the accident source term that were more physically based and that could be applied to the design of future light-water power reactors. NUREG-1465 presents a representative accident source term for a boiling-water reactor (BWR) and for a pressurized-water reactor (PWR). These source terms are characterized by the composition and magnitude of the radioactive material, the chemical and physical properties of the material, and the timing of the release to the containment.

The staff considered the applicability of the revised source terms in NUREG 1465 to operating reactors and determined that the current analytical approach based on the TID-14844 source term would continue to be adequate to protect public health and safety. Operating reactors licensed under that approach would not be required to re-analyze accidents using the revised source terms. The staff also determined that some licensees might wish to use AST analyses to support cost-beneficial licensing actions. The staff, therefore, initiated several actions to provide a regulatory basis for operating reactors to use the AST in design basis radiological consequence analyses. These initiatives resulted in the development and issuance of 10 CFR 50.67 and Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors.".

A holder of an operating license issued prior to January 10, 1997, or a holder of a renewed license under 10 CFR Part 54 whose initial operating license was issued prior to January 10, 1997, is allowed by 10 CFR 50.67, "Accident Source Term," to voluntarily revise its current accident source term used in design basis radiological consequence analyses for a license amendment under 10 CFR Part 50.90. In this license amendment, the Perry licensee requested a selective implementation of the AST, as described in Regulatory Guide 1.183 pursuant to 10 CFR 50.67. In general, information provided by Regulatory Guides 1.183 is reflected in Chapter 15.0.1 of the Standard Review Plan (SRP), "Radiological Consequence Analyses Using Alternative Source Term." In March 1999, the staff issued Perry License Amendment No. 103 which included the radiological consequence analysis for a loss-of-coolant accident (LOCA) using a full-scope implementation of an AST as a pilot plant representing operating reactors.

3.0 EVALUATION

The current radiological consequence analysis for the postulated design basis FHA, which is provided in Perry USAR Section 15.7, is based on the accident source term described in TID-14844. The licensee re-evaluated the radiological consequences resulting from a postulated FHA in the spent fuel pool area and in the containment with the containment and the fuel handling building (FHB) open and without any credit for removal of fission products by the FHB and the fuel handling building ventilation system (FHBVS). The licensee concluded that the radiological consequences at the exclusion area boundary (EAB), at the low population zone (LPZ), and in the control room resulting from the postulated FHA in the spent fuel pool area and in the containment are still within the dose acceptance criteria specified in Standard Review Plan (SRP) 15.0.1, "Radiological Consequence Analyses Using Alternative Source Terms," and those specified in 10 CFR 50.67.

The licensee reached this conclusion based upon the following assumptions:

(1) implementation of the AST,

(2) conformance with the guidelines provided in Regulatory Guide 1.183,

(3) no credit was taken for removal of fission products by the FHB, FHBVES, Annulus Exhaust Gas Treatment System (AEGTS), or Control Room Emergency Recirculation System.

(4) no credit was taken for either containment or FHB integrity,

(5) no credit was taken for the isolation of the control room normal air intake,

(6) a fission product decay period of 24 hours (time period from the reactor shutdown to the first fuel movement),

(7) an overall decontamination factor of 200 for iodine in elemental and particulate forms in the spent fuel pool water with minimum water depth of 23 feet consistent with the guidelines provided in Regulatory Guide 1.183,

(8) control room intake air dispersion factors (χ/Q values) approved and accepted by the staff in Perry License Amendment Nos. 102 and 103 both issued in March 1999,

(9) an unfiltered air in-leakage rate of 6600 cfm (normal flow rate plus 10% to conservatively maximize radioactivity input to the control room) for the first 36

seconds and 5400 cfm (normal makeup flow minus 10% to conservatively minimize the purging effect) for the remaining period of the accident (30 days),

(10) no credit was taken for using protective equipment or prophylactic drugs by the control room operator, and

(11) all fuel rods in one fuel assembly (151 fuel rods) with an axial power peaking factor of 2.0 and a peak rod average fuel burnup of 62,000 MWD/MTU are damaged to the extent that its entire gap activity inventory of the damaged fuel rods is released to the surrounding water for single fuel assembly drop event consistent with the guideline provided in Regulatory Guide 1.183. (the corresponding maximum linear heat generation rate will not exceed 6.3 kW per foot)

The staff reviewed the licensee's methods, parameters, and assumptions used in its radiological dose consequence analyses. To verify the licensee's radiological consequence assessments, the staff performed its confirmatory radiological consequence dose calculations for the postulated FHA. The radiological consequences calculated by the staff are well within the dose criterion specified in 10 CFR 50.67 (a TEDE of 5 rem in the control room) and the dose acceptance criteria specified in SRP 15.0.1 (a TEDE of 6.3 rem at the EAB and LPZ).

Although the staff performed confirmatory dose calculations, the staff's acceptance is based on the licensee's analyses. The results of the licensee's radiological consequence calculations are provided in Table 1 and the major parameters and assumptions used by the licensee and accepted by the staff are listed in Table 2. The radiological consequences at the EAB, at the LPZ, and in the control room calculated by the licensee are also well within the dose criterion specified in 10 CFR 50.67 and meet the dose acceptance criterion specified in SRP 15.0.1.

By letter dated December 5, 2002, the licensee withdrew a previous application to implement the AST. Included in this letter was an update to a previous regulatory commitment made in support of License Amendment No. 102 (March 1999) which provided approval for handling irradiated fuel under Shutdown Safety controls at Perry. The original commitment was made to a draft version of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The following commitment was updated to commit to Revision 3 of NUMARC 93-01, Section 11.3.6.5. This ensures that a building closure plan is in effect and ventilation systems remain available to monitor and filter a release from a FHA.

> *In addition to the guidance of NUMARC 91-06, for plants which obtain license amendments to utilize shutdown safety administrative controls in lieu of Technical Specification requirements on primary or secondary containment operability and ventilation system operability during fuel handling or core alterations, the following guidelines should be included in the assessment of systems removed from service:*
>
> - *During fuel handling/core alterations, ventilation system and radiation monitor availability (as defined in NUMARC 91-06) should be assessed, with respect to filtration and monitoring of releases from the fuel. Following shutdown, radioactivity in the RCS decays fairly rapidly. The basis of the Technical Specification operability amendment is the reduction in doses due to such decay. The goal of maintaining ventilation system and radiation availability is to reduce doses even further below that provided by the natural decay, and to avoid unmonitored releases.*

- *A single normal or contingency method to promptly close primary or secondary containment penetrations should be developed. Such prompt methods need not completely block the penetration or be capable of resisting pressure. The purpose is to enable ventilation systems to draw the release from a postulated fuel handling accident in the proper direction such that it can be treated and monitored.*

Based upon the above dose calculations and the licensee's revised commitment, the staff finds that the licensee's requested changes are acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

This 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 or changes a surveillance requirement. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (68 FR 804). Accordingly, this 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 this amendment.

6.0 CONCLUSION

The staff 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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Jay Lee, NRR

Date: March 4, 2003

TABLE 1

Radiological Consequences Expressed as TEDE
(rem)

Design Basis Accident	EAB[1]	LPZ[2]	Control Room
Fuel handing accident	1.44	0.161	1.03
Dose criteria	6.3[3]	6.3[3]	5.0[4]

[1] Exclusion area boundary,
[2] Low population zone
[3] SRP 15.0.1
[4] 10 CFR 50.67

Table 2
Parameters and Assumptions
Used in
Radiological Consequence Calculations

Parameter	Value
Reactor power	3833 MWt
Radial peaking factor	2.0
Fission product decay period	24 hours
Number of fuel assembly damaged	1
Fuel pool water depth	23 ft
Fuel gap fission product inventory	
Noble gases excluding Kr-85	5%
Kr-85	10%
I-131	8%
Alkali metals	12%
Fuel pool decontamination factors	
Iodine	200
Noble gases	1
Duration of accident	2 hours
Meteorological Data	

Exclusion Area Boundary

Time (hr)	X/Q (sec/m^3)
0-2	4.3E-4

Low Population Zone Distance	
0 to 8	4.8E-5
8 to 24	3.3E-5
24 to 96	1.4E-5
96 to 720	4.1E-6

Control Room	
0 to 8	3.5E-4
8 to 24	2.1E-4
24 to 96	1.1E-4
96 to 720	5.8E-5