Commonwealth Edison Company
Dresden Generating Station
6500 North Dresden Road
Morris, IL 60450
Tel 815-942-2920

ComEd

April 2, 1997

JSPLTR: #97-0065

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Subject: Dresden Nuclear Power Station Units 2 and 3
Additional Information Regarding Application for Amendment to Facility Operating Licenses DPR-19 and DPR-25, Appendix A, Technical Specifications, **Section 3/4.7.K, "Suppression Chamber," and Section 3/4.8.C, "Ultimate Heat Sink."**
Docket Nos. 50-237 and 50-249

References:
a) J. Stephen Perry Letter (ComEd) to U.S. NRC, dated February 17, 1997

b) J. Stephen Perry Letter to USNRC, dated February 27, 1997

c) J. Stephen Perry Letter to USNRC, dated March 12, 1997, Dresden Nuclear Power Station Units 2 and 3

d) J. F. Stang Letter to Irene Johnson, dated March 21, 1997

e) J.M. Heffley Letter to U.S. NRC, dated March 26, 1997

Pursuant to 10 CFR 50.90, ComEd has requested approval of changes to Facility Operating Licenses DPR-19 and DPR-25 via Reference (a). The purpose of this letter is to complete ComEd's response to a request for additional information based on Reference (d) and a March 27, 1997 meeting between ComEd and the Staff in Washington D.C. In response to your request, ComEd is providing the following: 1) response to Question 4 in accordance with Reference (d) and 2) proposed license conditions for implementation of the requested amendment. The remainder of ComEd's response to the request for additional information (Reference (d)) was transmitted on March 26, 1997 via Reference (e).

Request for Additional Information

Dresden Station will initiate the change process to evaluate the Dresden Emergency Operating Procedures (DEOPs) to more closely tie the overpressure requested for the time the sprays might be on, such that higher pressure will be present in containment, to provide more margin in the Net Positive Suction Head (NPSH) available. The action being investigated consists of the addition of guidance to the DEOPs for operators to terminate sprays at a higher pressure if indications of

pump cavitation exist. This action will be completed within 90 days of the approval of the amendment.

The analysis provided in Reference (a) provides a bounding case of the limiting event conditions for evaluation of NPSH. Furthermore, the analysis is based upon very conservative assumptions on the use of containment spray. In accordance with Reference (c), a sensitivity analysis was performed which showed a long term peak pressure of 28 psia when the containment analysis is run without containment sprays. During worst case accident conditions, a reactor water level of only two-thirds core height can be achieved. In accordance with the DEOPs, sprays are initiated only when LPCI flow is not required for adequate core cooling.

Attachment 1 contains a more detailed response to the Staff's question on modification of containment spray termination criteria and a description of Dresden Emergency Operating procedures relative to actuation of containment sprays.

Proposed License Condition and Amendment Implementation

ComEd's proposed license conditions and requirements for implementation of this amendment are provided in Attachment 2.

The proposed conditions include a commitment to complete a revised containment analysis utilizing a 2-sigma adder on the ANS-5.1 decay heat curve within 180 days after approval of the amendment request submitted in Reference (a).

The revised analysis will utilize the same assumptions and approach as the analysis submitted via Reference (a) except the following assumptions may also be incorporated into the analysis with the 2-sigma uncertainty: 1) vessel modeling to include realistic modeling of the enthalpy content of the reactor fluid, and 2) use of actual ECCS pump efficiency when converting pump horsepower to heat in the suppression pool. The above conservatisms, and associated impact, were detailed in Reference (e). In addition, ComEd will evaluate increasing CCSW flow above the 5000 gpm presently used in the analysis. The 5000 gpm CCSW flow has margin with respect to the ability to maintain the 20 psi differential pressure between CCSW and LPCI, the revised analysis will evaluate increasing the minimum CCSW flow while maintaining the 20 psi differential pressure.

The torus attached piping evaluation for Unit 2 is underway. ComEd will notify the Commission in writing when this evaluation is complete. Completion of the Unit 3 torus attached piping evaluations is addressed in the proposed license conditions provided in Attachment 2.

The information provided herein has been reviewed by the Onsite and Offsite review groups in accordance with Company procedures and policies.

ComEd is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated state official.

To the best of my knowledge and belief, the statements contained in this document are true and correct. In some respects these statements are not based on my personal knowledge, but on information furnished by ComEd employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

If there are any questions regarding this issue, please contact Frank Spangenberg, Dresden Station Regulatory Assurance Manager at (815) 942-2920, extension 3800.

Sincerely,

J. Stephen Perry
Site Vice President
Dresden Station

Signed before me on this 2 day,
April, 1997,
by Sherry L. Butterfield
Notary Public

OFFICIAL SEAL
SHERRY L BUTTERFIELD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:05/23/00

Attachments: 1) Responses to Question 4 of Reference (d) Request for Additional Information.
2) Proposed License Conditions and Implementation Requirements

cc: A. Bill Beach, Regional Administrator - RIII
Senior Resident Inspector -Dresden
J. F. Stang, Dresden Project Manager, NRR

W. J. Kropp, Branch Chief, Division of Reactor Projects, Region III
Office of Nuclear Facility Safety - IDNS

bcc: Dresden Regulatory Assurance CHRON File, with attachments
Dresden Regulatory Assurance Subject File, with attachments
Quad Cities Regulatory Assurance - C. Peterson, with attachments
Document Control Desk, Downers Grove, with attachments
R. Freeman
F. Spangenberg
T.L. Riley, with attachments
B. Rybak, with attachments
P. Piet
M. Wagner
E. C. Connell
J. Williams
R. Holbrook
T. Fuhs - Quad Cities, with attachments
L. M. Weir, with attachments
File Numerical

ATTACHMENT 1

Response to Reference (d), Question 4
Request for Additional Information

Question 4

Per discussion between the NRC staff and ComEd, it seems likely that the containment sprays would be turned on and remain on under the loss-of-coolant accident (LOCA) conditions analyzed for NPSH purposes.

Is it possible that the termination criteria for the sprays could be more closely tied to the overpressure requested for the time the sprays would be on, such that higher pressures would be present in containment and, therefore, more margin in NPSH available would exist?

Response to Question 4

The containment analysis provided in Reference (a) defines the worst case analysis relative to available net positive suction head for the core spray and low pressure coolant injection pumps (CS/LPCI). The analysis is based on very conservative assumptions, consistent with original licensing basis, including the use of containment spray to minimize the available net positive suction head. Due to the design features of the vessel, and the availability of ECCS pumps under limiting single failure assumptions, only two-thirds core height reactor water level will be achieved during the worst case scenario. Based on the Dresden Emergency Operating Procedures, containment sprays would not be placed in service due to the inability to achieve a reactor water level of the top of the active fuel for the limiting DBA case; however the containment sprays have been included in the analysis to ensure that bounding conditions are calculated should a smaller break size be postulated and conditions favorable to containment spray initiation occur.

The spectrum of small and intermediate breaks is bounded by Reference (a) analysis because during these scenarios a reactor water level above the top of the active fuel is achieved, the rate of heat addition is less, and the ECCS flowrate to achieve this reactor water level is a fraction of that required during the large break Design Basis Accident-LOCA. During the short term (<600 seconds), the Reference (a) analysis is much more limiting due to the flowrate of the ECCS pumps and the rate of heat addition from the large break LOCA to the suppression pool. During the long term (>600 seconds), the suppression pool parameters (temperature and containment overpressure) would be consistent with or bounded by the conditions identified in Reference (a). The integrated heat addition to the suppression pool for Small or Intermediate Break Accidents would effectively be the same as that from the large break LOCA . The large break LOCA places the most heat into the pool short term, and is expected to provide bounding maximum pool temperatures as well. Transient temperature results less than those occurring in the DBA LOCA case would have a positive effect on NPSH calculations, even with the accompanying reduced overpressure. This can be shown from the existing plant license basis where a maximum pool temperature of 160°F is the post accident pool temperature and a containment overpressure of 0 psig (long term) is required to provide adequate net positive suction head. It is therefore concluded that the DBA-LOCA analysis provided in Reference (a) provides a bounding case of the limiting event conditions for evaluating NPSH.

Dresden Station will initiate the change process to evaluate the DEOPs to more closely tie the overpressure requested for the time the sprays might be on, such that higher pressure will be present in containment, to provide more margin in NPSH available. The action being investigated consists of addition of guidance to the operators to terminate sprays at a higher pressure if

indications of pump cavitation exist. This action will be completed within 90 days of approval of the requested amendment. Background on the emergency procedures and items that will be addressed during the change review process are provided below:

Emergency Procedures Guidelines Background

Procedure direction for operation of the containment sprays is provided by the Dresden Emergency Operating Procedures (DEOPs). The basis for the DEOPs are the BWR Owners Group Emergency Procedure Guidelines (EPGs) Revision 4 (NEDO-31331). An NRC Safety Evaluation Report (SER) was issued on September 13, 1988 providing Staff approval of the guidelines for implementation by licensees.

The EPGs are based on the following:

Entry conditions and operator actions are keyed to certain plant parameters or symptoms with appropriate actions specified to restore and maintain parameters within limits which define safe plant conditions.

Any mechanistically possible plant conditions for which generic operational guidance can be provided are addressed, as appropriate, to minimize the impact on public health and safety, irrespective of the probability of occurrence. Thus, the EPGS address a spectrum of conditions including those more severe as well as those less severe than were considered in developing the plant design basis. These conditions include multiple equipment failures and operator errors.

Operator actions, limits and action levels are based on realistically bounding best estimate engineering calculations, as opposed to licensing design basis.

The EPGs function as an integrated set of instructions. Each guideline protects one of the principal barriers to radioactivity release through the control of key plant parameters.

Current DEOPs

DEOP 200-1, "Primary Containment Control," specifies control of containment sprays for control of pressure and temperature. The purpose of this procedure is to maintain primary containment integrity and to protect equipment in containment. The existing procedure requires the Torus Sprays to be initiated before containment pressure reaches 9 psig and requires the Drywell Sprays to be initiated after containment pressure has exceeded 9 psig. Sprays are only permitted if the reactor core is adequately cooled. The Drywell Sprays are initiated above a containment pressure of 9 psig to preclude chugging ; the cyclic condensation of steam at the downcomer openings of the drywell vents. Prolonged chugging could result in fatigue failure of downcomer joints at the vents, resulting in a loss or reduction of suppression capability. Drywell Sprays are also initiated to maintain the drywell temperature less than the design temperature of 281 °F. Sprays are terminated when containment pressure drops below 2 psig to preclude making the containment pressure negative with respect to reactor building, thus operating the Torus-Reactor Building Vacuum Breakers and de-inerting the containment.

Emergency Procedure Guideline / Severe Accident Guidelines:

The Emergency Procedure Guidelines and Severe Accident Guidelines (EPG/SAG) were developed by the BWR Owners Group to provide comprehensive technical direction for the operation of BWR power plants during emergencies and severe accidents consistent with NUREG-0737, Item I.C.1, "Guidance for the Evaluation and Development of Procedures for Transients and Accidents." Dresden has previously committed to implement the formal industry position on Severe Accident Closure Guidelines in accordance with NEI 91-04 rev.1, "Severe Accident Issue Closure Guidelines". The EPG/SAG represents the Owners Group developed basis for severe accident management guidance. Important to note is that EPG/SAG permits operation of the Torus and Drywell Sprays to 0 psig to facilitate use of the sprays for fission product scrubbing at low pressures or if the containment has failed, and directs use of sprays during Primary Containment Flooding.

Conclusions

Terminating Drywell Sprays at a higher containment pressure than the current 2 psig action level under all postulated post-accident conditions is not advisable. The advantages to maintaining the sprays in operation to minimize pressure and temperature include: 1) less fission product release due to lower containment pressure, 2) reduced flammability of combustible gases through the addition of water vapor to the gas mixture, 3) suppressed temperature and pressure increase following combustion if a deflagration occurs, 4) fission product scrubbing of the containment atmosphere in anticipation of radioactive release, 5) less effect on vessel level instruments due to lower temperatures and, 6) less effect on environmentally qualified equipment. Also, the potential exists for procedural conflicts within the DEOPs in the event that sprays are required for temperature control (i.e., local heating) concurrent with low containment pressures. By the very nature of the proposed change, terminating the sprays early defeats the purpose of symptom-based procedures since adequate margin has been shown to be available. Finally, the effectiveness of the EPG/SAG when implemented using this approach would be restricted since the SAG strategies would have permitted spray operation to 0 psig.

Based on the containment analysis for the limiting DBA in conjunction with the single failure of a diesel generator, reactor water level will not recover above the Top of Active Fuel, but will recover to two-thirds core height per design. DEOP 200-1 does not allow initiation of torus or drywell sprays if LPCI flow is required for core cooling. Long term core cooling is ensured by Containment Flooding under worst case conditions. However, once Containment Flooding has been initiated and it is determined that spraying the Drywell or Torus will not result in a significant reduction in reactor water level and hence core cooling, a decision can be made to initiate sprays.

ATTACHMENT 2

Proposed License Conditions and Implementation Criteria for Unit 2 and Unit 3

ATTACHMENT 2 (Cont'd)

Proposed License Conditions: Unit 2 (DPR-19)

By Amendment No. _____, the license is amended to allow for credit of containment pressure, as detailed below, to assure adequate Net Positive Suction Head (NPSH) is available for low pressure ECCS pumps following a design basis accident.

Time (Seconds)	Containment Pressure (psig)
0 - 240	9.5
240 - 480	2.9
480 - 6000	1.9
6000 - accident termination	2.5

Implementation:

1. The licensee will perform a revised containment analysis utilizing a 2-sigma adder on the ANS 5.1 decay heat model utilized in the licensee's amendment request J. Stephen Perry (ComEd) to USNRC letter dated February 17, 1997. This analysis must be completed within 180 days of approval of the amendment and be based upon the same assumptions as originally submitted to the NRC except as detailed below:

    a) Vessel modeling will include realistic modeling of the initial enthalpy content of the reactor fluid; and,

    b) Use of actual ECCS pump efficiency when converting pump horsepower to heat in the suppression pool; and,

    c) Increase of minimum CCSW flows while maintaining the 20 psi differential pressure across the LPCI Heat Exchanger.

    If the revised analysis shows that any UFSAR allowables are exceeded, the licensee will complete revision of affected calculations and submit the revised containment analysis and results of the revised affected calculations for NRC review and approval within 180 days of approval of this amendment.

2. The licensee will initiate the change process to evaluate the Emergency Operating Procedures to more closely tie the overpressure requested for the time the sprays might be on, such that higher pressure will be present in containment, to provide more margin in NPSH available. These actions will be completed within 90 days of approval of this amendment.

ATTACHMENT 2 (Cont'd)

Proposed License Conditions: Unit 3 (DPR-25)

By Amendment No. _____, the license is amended to allow for credit of containment pressure, as detailed below, to assure adequate Net Positive Suction Head (NPSH) is available for low pressure ECCS pumps following a design basis accident:

Time (Seconds)	Containment Pressure (psig)
0 - 240	9.5
240 - 480	2.9
480 - 6000	1.9
6000 - accident termination	2.5

Implementation:

1. Credit for increase containment pressure for calculation of NPSH and changes to Technical Specification 3/4.7.K (Suppression Pool Temperature) are effective for Unit 3 (Facility Operating License DPR-25) only after the licensee completes all necessary calculations and modifications, if required, to the affected torus attached piping to justify the use of the peak post-LOCA suppression pool temperature of 176 °F.

2. The licensee will perform a revised containment analysis utilizing a 2-sigma adder on the ANS 5.1 decay heat model utilized in the licensee's amendment request J. Stephen Perry (ComEd) to USNRC letter dated February 17, 1997. This analysis must be completed within 180 days of approval of this amendment and be based upon the same assumptions as originally submitted to the NRC except as detailed below:

   a) Vessel modeling will include realistic modeling of the initial enthalpy content of the reactor fluid

   b) Use of actual ECCS pump efficiency when converting pump horsepower to heat in the suppression pool

   c) Increase of minimum CCSW flows while maintaining the 20 psi differential pressure across the LPCI Heat Exchanger.

   If the revised analysis shows that any UFSAR allowables are exceeded, the licensee will complete revision of affected calculations and submit the revised containment analysis and results of the revised affected calculations for NRC review and approval within 180 days of approval of this amendment.

3. The licensee will initiate the change process to evaluate the Emergency Operating Procedures to more closely tie the overpressure requested for the time the sprays might be on, such that higher pressure will be present in containment, to provide more margin in NPSH available. These actions will be completed within 90 days of approval of this amendment.