MAY 17 2005

L-PI-05-042
10 CFR 50.90

U S Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Prairie Island Nuclear Generating Plant Units 1 and 2
Dockets 50-282 and 50-306
License Nos. DPR-42 and DPR-60

Supplement To License Amendment Request (LAR) Dated September 1, 2004, Request for Use of GOTHIC 7 In Containment Response Analyses (TAC Nos. MC4245 and MC4246)

By letter dated September 1, 2004, the Nuclear Management Company, LLC (NMC) submitted an LAR titled, "Request for Use of GOTHIC 7 In Containment Response Analyses," which proposed to allow use of the code for Generation of Thermal-Hydraulic Information for Containment, Version 7.1patch1 (GOTHIC 7) to model Prairie Island Nuclear Generating Plant (PINGP) containment response for loss of coolant accidents (LOCA) and main steam line break (MSLB) accidents. This letter supplements the subject LAR. NMC submits this supplement in accordance with the provisions of 10 CFR 50.90.

By letter dated April 20, 2005 the Nuclear Regulatory Commission (NRC) Staff requested additional information on the September 1, 2004 LAR. Enclosure 1 to this letter states the NRC Staff questions and the NMC responses. Enclosure 2 provides documentation supporting the proprietary status of Enclosure 3 including a copyright notice, proprietary information notice and Westinghouse authorization letter CAW-05-1989 which provides the requisite affidavit. Enclosure 3 is a Compact Disk, (CD) which provides the GOTHIC input models in electronic format as requested by the NRC Staff.

As Enclosure 3 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the consideration listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR 2.390 of the Commission's regulations. Correspondence with respect to the

Enclosure 3 Contains Proprietary Information

A001

copyright or proprietary aspects of Enclosure 3 or the supporting Westinghouse affidavit should reference CAW-05-1989 and should be addressed to J.A.Gresham, Manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

The proposed changes in this supplement do not impact the conclusions of the Determination of No Significant Hazards Consideration and Environmental Assessment presented in the original September 1, 2004 submittal.

In accordance with 10 CFR 50.91, NMC is notifying the State of Minnesota of this LAR by transmitting a copy of this letter and non-proprietary enclosures to the designated State Official.

Summary of Commitments

In this letter NMC has not made any new or revised any Nuclear Regulatory Commission commitments.

I declare under penalty of perjury that the foregoing is true and accurate.
Executed on MAY 17 2005 .

Joseph M. Solymossy
Site Vice President, Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC

Enclosures (3)

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
Minnesota Department of Commerce

ENCLOSURE 1

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Response to Request for Additional Information

Nuclear Regulatory Commission Staff Question 1:

A fog or mist has been observed in the vapor-air boundary layer between a cool surface and a heated bulk air-steam mixture. This mist can contribute to an increase in the sensible heat transfer through the vapor-air boundary layer and, in the GOTHIC model, the diffusion of the mist into the bulk atmosphere can result in a decrease in the containment pressure due to evaporation of the mist.

Although the formation of mist has been observed, for example Mori and Hijikata (Ref.1), its effect on containment pressure and temperature has not been measured. The staff is not aware of any known direct measurements of the formation rate of the mist or of its impact on the heat transfer rate to the surface. In addition, the staff is not aware of any data demonstrating the effect of mist in the vapor-air boundary layer on bulk atmosphere pressure. The GOTHIC 7.0 qualification report (Ref. 2), Section 5.10, discusses verification of this model in terms of comparison with experimental data. However, other codes have compared well with these same data without including this effect. In particular, the NRC CONTAIN 2.0 (Ref.3) code compares well with these data. Thus, while mist or fog in the vapor-air boundary layer has been observed under certain circumstances, the quantification of its effect is considered uncertain and not verified to the extent required for a phenomenon with a significant effect on licensing calculations. The NRC staff therefore believes that the mist formation model should not be used for licensing calculations. (See for example, ADAMS accession document ML032681050, September 29, 2003 letter "Kewaunee Nuclear Power Plant - Issuance of Amendment (TAC No. MB6408)", to T. Coutu, Kewaunee Nuclear Power Plant, Nuclear Management Company, LLC, from A. C. McMurtray, NRC.)

Based on a review of the input decks presented in WCAP-16219-P, it appears that NMC proposed to use this mist formation model (and not to use the fog model), in part based on sample calculations presented with the mist formation model active.

For the staff to reconsider the use of the mist formation model for licensing calculations, NMC needs to provided additional information demonstrating that

the rate of the formation of the mist and its impact on the bulk containment atmosphere are known and can be quantified. Absent additional information, the NRC staff's previous conclusion that the mist formation model should not be used for licensing calculations will be applied to WCAP-16219-P.

Nuclear Management Company (NMC) Response:

The NRC Staff position with regard to mist formation (ADAMS accession document ML032681050, September 29, 2003 letter "Kewaunee Nuclear Power Plant - Issuance of Amendment (TAC No. MB6408)", to T. Coutu, Kewaunee Nuclear Power Plant, Nuclear Management Company, LLC, from A. C. McMurtray, NRC.) relates specifically to mist formation in the boundary layer incorporated in the mist diffusion layer model (MDLM) wall heat and mass transfer option in GOTHIC 7.0. In compliance with the NRC Staff position, the boundary layer mist generation and film roughening models are not used with the GOTHIC diffusion layer heat and mass transfer model (DLM) in the Prairie Island Nuclear Generating Plant containment design basis accident (DBA) analysis model. NMC is not asking the NRC Staff to reconsider allowing use of the boundary layer mist generation model for the PINGP DBA analysis.

The mist modeling in question applies to the containment atmosphere. When the bulk atmosphere becomes supersaturated, there must be some mechanism or assumption to condense the excess steam and release the heat of condensation to the atmosphere. Allowing the supersaturated conditions to persist would, in general, be non-conservative. The GOTHIC user can select either the Fog Model or the Mist Model (but not both) for addressing supersaturated vapor conditions in the bulk atmosphere. The Fog Model creates small water drops that may result in an overestimate of the inter-phase heat and mass transfer between the vapor and droplet phase. The Mist Model creates and tracks a mist phase that is transported with the vapor. The Mist Model is the recommended and default option in GOTHIC 7.0 and later versions. The default Mist Model was used in the PINGP analysis.

The PINGP GOTHIC containment DBA analysis model, as well as other previously NRC approved GOTHIC containment DBA analysis models, use the Mist Model for modeling supersaturated vapor conditions in the containment atmosphere. The use of the Mist Model will not impact the containment peak pressure or temperature for either the loss of coolant accident or main steam line break events because the atmosphere in containment is most likely saturated or slightly superheated at the time of peak pressure. In addition, the absence of a method to address supersaturated vapor conditions, which could potentially develop as the atmosphere is cooled during the long-term containment cooling phase, could result in a modeling problem in GOTHIC and non-conservative results. Therefore, NMC intends to use the default Mist Model in the PINGP GOTHIC containment DBA model.

Nuclear Regulatory Commission Staff Question 2:

The benchmark case for the main steam line break (MSLB) comparison to the CONTEMPT code uses the approved Uchida model for heat transfer and the approved 8 percent revaporization. NMC is requesting use of the mist diffusion layer model (MDLM) (Ref.4), with NRC limitations — the diffusion layer model (DLM), as an alternative to the Uchida model with revaporization, for steamline breaks.

For the MSLB licensing evaluation, does NMC plan to use both the accepted DLM model and the 8 percent revaporization at the same time? (WCAP-16219, Table 3-1 indicates the revaporization fraction is "N/A" for GOTHIC, however the input decks indicate a "default" is being used.) If so, NMC needs to justify the independence of the phenomena in the DLM model and the revaporization fraction used to account for the difference observed in an early containment test facility and the ability of containment codes to predict the experimental results.

NMC Response:

NMC does not plan to use both the accepted DLM model and a fixed 8% revaporization at the same time. The MSLB GOTHIC Evaluation Model for Prairie Island will use the Direct plus DLM model for evaluating heat transfer to structures. The fixed revaporization fraction is not used in conjunction with the DLM model and thus is listed as "N/A" in WCAP-16219-P, Table 3-1. As stated in WCAP-16219-P, Page 2-3, paragraph 6, "the DLM correlation does not require the user to specify a revaporization input value". Per the GOTHIC User's Manual, "DEFAULT" indicates GOTHIC will calculate the appropriate revaporization rather than using a fixed value.

Nuclear Regulatory Commission Staff Question 3:

The staff would like NMC to provide, in electronic format (CD-ROM, 3.5-in floppy disk), the GOTHIC input models (the *.GTH files) used in WCAP-16219. This would enable the NRC staff to perform its own sensitivity studies and assist us in better understanding GOTHIC.

NMC Response:

An electronic format Compact Disc (CD) is provided as Enclosure 3. To access the files in this CD the password 4nrcuse must be entered.

ENCLOSURE 2

COPYRIGHT NOTICE, PROPRIETARY INFORMATION NOTICE AND WESTINGHOUSE AUTHORIZATION LETTER CAW-05-1989 (includes Affidavit)

7 pages follow

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE