December 19, 2006

Mr. Christopher M. Crane
President and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST FOR APPLICATION OF THE ALTERNATE SOURCE TERM METHODOLOGY (TAC NO. MC6519)

Dear Mr. Crane:

By letter dated March 28. 2005, AmerGen Energy Company, LLC (AmerGen or the licensee) requested changes to the Facility Operating License for the Oyster Creek Nuclear Generating Station (Oyster Creek). The license amendment request (LAR) would revise the Oyster Creek licensing basis in the area of radiological dose analyses for design-basis accidents using the alternative source terms depicted in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors."

The Nuclear Regulatory Commission staff has been reviewing the submittal and has determined that additional information is needed to complete its review. These questions were provided via e-mail in draft form to Mr. David Distel of you staff on November 28, 2006.

In order to complete our review of LAR 06-03, a response to this request for additional information is required to be provided within 30 days of the date of this letter. Following discussion of these questions during a December 5, 2006, public meeting, it was identified that performing the requested sensitivity studies may take longer than 30 days. Therefore, the NRC staff agreed to allow 45 days from the date of this letter to provide the results of the sensitivity studies discussed in questions 2.c, 3, and 5. Please inform us, in writing, of any need to deviate from the agreed upon time-frame for responding to these questions. If you have any questions, I can be reached at (301) 415-2481.

Sincerely,

/RA/

G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure:
Request for Additional Information

cc w/encl: See next page

December 19, 2006

Mr. Christopher M. Crane
President and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING LICENSE AMENDMENT REQUEST FOR APPLICATION OF THE ALTERNATE SOURCE TERM METHODOLOGY (TAC NO. MC6519)

Dear Mr. Crane:

By letter dated March 28. 2005, AmerGen Energy Company, LLC (AmerGen or the licensee) requested changes to the Facility Operating License for the Oyster Creek Nuclear Generating Station (Oyster Creek). The license amendment request (LAR) would revise the Oyster Creek licensing basis in the area of radiological dose analyses for design-basis accidents using the alternative source terms depicted in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors."

The Nuclear Regulatory Commission staff has been reviewing the submittal and has determined that additional information is needed to complete its review. These questions were provided via e-mail in draft form to Mr. David Distel of you staff on November 28, 2006.

In order to complete our review of LAR 06-03, a response to this request for additional information is required to be provided within 30 days of the date of this letter. Following discussion of these questions during a December 5, 2006, public meeting, it was identified that performing the requested sensitivity studies may take longer than 30 days. Therefore, the NRC staff agreed to allow 45 days from the date of this letter to provide the results of the sensitivity studies discussed in questions 2.c, 3, and 5. Please inform us, in writing, of any need to deviate from the agreed upon time-frame for responding to these questions. If you have any questions, I can be reached at (301) 415-2481.

Sincerely,
/RA/
G. Edward Miller, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure:
Request for Additional Information

cc w/encl: See next page

DISTRIBUTION:

PUBLIC	RidsNrrDorlLpl1-2	RidsNrrPMGMiller	RidsOgcMailCenter
LPL1-2 R/F	RidsNrrLACRaynor	RidsAcrsAcnwMailCenter	EForrest
RidsNrrDssSbpb	MHart	LBrown	RLobel

ADAMS Accession Number: **ML063330215**

OFFICE	LPL1-2/PM	LPL1-2/LA	DSS/SCVB/BC	DRA/AADB//BC	LPL1-2/BC
NAME	GEMiller	CRaynor	RDennig	MKotzalas	HChernoff
DATE	12/19/06	12/19/06	11/29/06	12/15/06	12/19/06

OFFICIAL RECORD COPY

Oyster Creek Nuclear Generating Station

Site Vice President - Oyster Creek
Nuclear Generating Station
AmerGen Energy Company, LLC
P.O. Box 388
Forked River, NJ 08731

Senior Vice President of
Operations
AmerGen Energy Company, LLC
200 Exelon Way, KSA 3-N
Kennett Square, PA 19348

Kathryn M. Sutton, Esquire
Morgan, Lewis, & Bockius LLP
1111 Pennsylvania Avenue, NW
Washington, DC 20004

Kent Tosch, Chief
New Jersey Department of
Environmental Protection
Bureau of Nuclear Engineering
CN 415
Trenton, NJ 08625

Vice President - Licensing and
Regulatory Affairs
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Mayor of Lacey Township
818 West Lacey Road
Forked River, NJ 08731

Senior Resident Inspector
U.S. Nuclear Regulatory Commission
P.O. Box 445
Forked River, NJ 08731

Director - Licensing and Regulatory Affairs
AmerGen Energy Company, LLC
Correspondence Control
P.O. Box 160
Kennett Square, PA 19348

Manager Licensing - Oyster Creek
Exelon Generation Company, LLC
Correspondence Control
P.O. Box 160
Kennett Square, PA 19348

Regulatory Assurance Manager
Oyster Creek
AmerGen Energy Company, LLC
P.O. Box 388
Forked River, NJ 08731

Assistant General Counsel
AmerGen Energy Company, LLC
200 Exelon Way
Kennett Square, PA 19348

Ron Bellamy, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406-1415

Correspondence Control Desk
AmerGen Energy Company, LLC
200 Exelon Way, KSA 1-–1
Kennett Square, PA 19348

Oyster Creek Nuclear Generating Station
Plant Manager
AmerGen Energy Company, LLC
P.O. Box 388
Forked River, NJ 08731

REQUEST FOR ADDITIONAL INFORMATION

MISCELLANEOUS TECHNICAL SPECIFICATION CHANGES

FPL ENERGY SEABROOK, LLC

SEABROOK STATION, UNIT NO. 1

DOCKET NO. 50-443

By letter dated March 28, 2005, AmerGen Energy Company, LLC (AmerGen or the licensee) requested changes to the Facility Operating License for the Oyster Creek Nuclear Generating Station (Oyster Creek). The license amendment request (LAR) would revise the Oyster Creek licensing basis in the area of radiological dose analyses for design-basis accidents (DBAs) using the alternative source term (AST) depicted in Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." The Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that the following additional information is needed to complete its review with respect to the aforementioned LAR:

1. Justify the use of MAAP4 for the containment accident thermal-hydraulics. Describe the phenomena occurring in containment as the accident progresses and show that MAAP4 can adequately model these phenomena in terms of any benchmarking to data or other computer codes for each phenomena. Since MAAP4 is being used for design basis calculations, show that the MAAP4 calculations bound the expected response.

2. RG 1.183 Position 4.5 states that technical specification values should be used. Position 6.2 states a similar position for the main steam isolation valves. Given that secondary bypass leakage rate is calculated as a function of pressure:

    a. Provide justification that leakage through narrow, ill-defined clearances that may change with pressure, like the stem and seat areas of valves, can be modeled as isentropic nozzles.

    b. Provide a reference to an NRC approval supporting page 36/45 of Attachment 1, which states that this modeling approach is consistent with the current licensing basis.

    c. Provide the results of a sensitivity study to show the difference between the time-dependent leakage assumption and the results using the technical specification leakage.

3. On page 33 of Attachment 1 to the March 28, 2005, submittal, AmerGen states that the current licensing basis for Oyster Creek includes an assumption of full mixing credit for dilution/mixing in the secondary containment. Please provide a reference for the NRC staff approval of this assumption. If applicable, provide a sensitivity study supportive of assuming full mixing credit.

4. With regard to the assumptions for drywell iodine removal:

   a. Justify the use of the STARNAUA removal models for this application. One way that would be acceptable to the NRC staff would be to compare STARNAUA to the models referred to in RG 1.183 as acceptable spray removal and natural deposition models.

   b. On page 8 of Attachment 3 AmerGen gives justification for assuming that the aerosol and elemental iodine removal rates are the same in the drywell, stating that it is believed that the elemental iodine will adhere to the aerosol, and if that is not so that the elemental iodine would be removed from the containment at a rate greater than the particulate. What is the basis for the statement that elemental iodine would be removed from the containment at a rate greater than particulate?

5. Address the aggregated effects of the assumptions discussed in questions 2 through 4, above.

6. Credit is proposed for control of the pH in the suppression pool following a loss-of-coolant accident (LOCA) by means of injecting sodium pentaborate into the reactor core with the standby liquid control (SLC) system. The SLC system design was not previously reviewed for this safety function (pH control post-LOCA). Licensees proposing such credit need to demonstrate that the SLC system is capable of performing the pH control safety function assumed in the AST LOCA dose analysis.

   a. Identify whether the SLC system is classified as a safety-related system as defined in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.2, and whether the system satisfies the regulatory requirements for such systems. If the SLC system is not classified as safety related, please provide the information requested in Items (i) through (v) below to show that the SLC system is comparable to a system classified as safety related. If any item is answered in the negative, please explain why the SLC system should be found acceptable for pH control agent injection.

      (i) Is the SLC system provided with standby AC power supplemented by the emergency diesel generators?

      (ii) Is the SLC system seismically qualified in accordance with RG 1.29 and Appendix A to 10 CFR Part 100 (or equivalent used for original licensing)?

      (iii) Is the SLC system incorporated into the plant's American Society of Mechanical Engineers Boiler and Pressure Vessel Code inservice inspection and inservice testing programs based upon the Oyster Creek's code of record in accordance with 10 CFR 50.55a?

      (iv) Is the SLC system incorporated into the Oyster Creek's Maintenance Rule program consistent with 10 CFR 50.65?

(v) Does the SLC system meet the requirements of 10 CFR 50.49? Describe how the SLC system design addresses General Design Criterion 4, or equivalent used for original licensing?

b. Describe proposed changes to plant procedures that implement SLC sodium pentaborate injection as a pH control additive and associated operator training.

c. How is transport of the sodium pentaborate to the suppression pool assured to occur? Is a low-pressure safety injection pump injecting coolant at the time of SLC injection?

d. Show that the SLC system has suitable redundancy in components and features to assure that, for operation from onsite or offsite electric power, its safety function of injecting sodium pentaborate for the purpose of suppression pool pH control can be accomplished assuming a single failure. For this purpose, the check value is considered an active device since the check valve must open to inject sodium pentaborate.

For reference, the following three options are listed as ways to justify taking credit for the SLC system if it can not be considered redundant with respect to its active components.

Option 1: Show acceptable quality and reliability of the non-redundant active components and/or compensatory actions in the event of failure of the non-redundant active components. If you choose this option, please provide the following information to justify the lack of redundancy of active components in the SLC system:

Identify the non-redundant active components in the SLC system and provide their make, manufacturer, and model number.

Provide the design-basis conditions for the component and the environmental and seismic conditions under which the component may be required to operate during a DBA. Environmental conditions include design-basis pressure, temperature, relative humidity and radiation fields.

Indicate whether the component was purchased in accordance with Appendix B to 10 CFR Part 50. If the component was not purchased in accordance with Appendix B, provide information on the quality standards under which it was purchased.

Provide the performance history of the component both at the licensee's facility and in industry databases such as EPIX and NPRDS.

Provide a description of the component's inspection and testing program, including standards, frequency, and acceptance criteria.

Indicate potential compensating actions that could be taken within an acceptable time period to address the failure of the component. An example of a

compensating action might be the ability to jumper a switch in the control room to overcome its failure. In the response please consider the availability of compensating actions and the likelihood of successful injection of the sodium pentaborate when non-redundant active components fail to perform their intended functions.

Option 2: Provide for an alternative success path for injecting chemicals into the suppression pool. Provide a description of the alternative injection path, its capabilities for performing the pH control function, and its quality characteristics. Does the alternate injection path require actions to be taken in areas outside the control room? How accessible will these areas be? What additional personnel would be required?

Option 3: Show that 10 CFR 50.67 dose criteria are met even if pH is not controlled. If you chose this option, demonstrate through analyses that the projected accident doses will continue to meet the criteria of 10 CFR 50.67 assuming that the suppression pool pH is not controlled. The dissolution of CsI and its re-evolution from the suppression pool as elemental iodine must be evaluated by a suitably conservative methodology. The analysis of iodine speciation should be provided for the NRC staff's review. The resulting iodine speciation should be incorporated into the dose analyses. A description of the dose analysis assumptions, inputs, methods, and results should be provided. It should be noted that using this option will incur longer NRC staff review times.

7. Pages 4 and 5 of Attachment 1 to the March 28, 2005 AST LAR state that previously-approved licensing basis atmospheric dispersion factors (χ/Q values) were used for the radiological propagation pathways.

   Table 2 on page 151 of Attachment 3 provides control room χ/Q values for postulated releases from the Oyster Creek stack, yard, and turbine building. Exclusion area boundary and low population zone χ/Q values for ground level and elevated releases are listed in Table 3. Confirm that the stack, yard, and turbine building are the only release locations that need to be considered to substantiate that the LOCA is the limiting DBA at Oyster Creek when applying the AST.

   The turbine building control room χ/Q values were discussed in the safety evaluation associated with Oyster Creek License Amendment No. 225 (Agencywide Documents Access and Management System accession number ML020320579) dated February 2, 2002. By what licensing action(s) were the other χ/Q values previously approved? If any of the χ/Q values were not previously approved, provide the input files (electronic files for data input into computer codes) used to generate the χ/Q values, summary output files.

8. Page 2 of Attachment 1 to the March 28, 2005, LAR states that AmerGen has performed a radiological consequence analysis for the Oyster Creek DBA that results in the most limiting offsite and control room operator exposure (i.e., LOCA). The analysis is presented to support full-scope implementation of the AST; although, it is further stated that Technical Information Document (TID) 14844, "Calculation of Distance Factors for Power and Test Reactor Sites," will continue to be used as the radiation

dose basis for the main steamline break, control rod drop and fuel handling accidents and for equipment qualification. Page 2 states that adopting the AST methodology may support future evaluations and license amendments. Page 8 states that the χ/Q values for other accident situations are similar to those used in the LOCA dose assessment, which was given as one reason that the LOCA remained the liming DBA. Provide a list of the other χ/Q values to show that they are similar to the LOCA χ/Q values. Justify why releases from these other scenarios as well as from bypass during secondary containment drawdown, loss of offsite power, or other single failure would not result in more limiting doses than those estimated for the LOCA DBA.

9. Control room AST dose assessments are typically made for the 0-2 hour, 2-8 hour, 8-24 hour, 24-96 hour, and 96-720 hour time periods. Table 2 combines the first two time periods into a single time interval presenting a single 0-8 hour χ/Q value for each postulated release location. What are the 0-2 hour and 2-8 hour control room χ/Q values? How does use of the 0-8 hour χ/Q values impact the dose assessment when compared with inputting the 0-2 hour and 2-8 hour χ/Q values?