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December 9, 2004

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Information Supporting the Request for License Amendment Related to Application of Alternative Source Term

Reference: Letter from Michael J. Pacilio (AmerGen Energy Company, LLC) to U. S. NRC, "Request for License Amendment Related to Application of Alternative Source Term," dated April 3, 2003

In the referenced letter, AmerGen Energy Company (AmerGen), LLC requested an amendment to the facility operating license for Clinton Power Station (CPS), Unit 1. The proposed change is requested to support application of an alternative source term (AST) methodology, in accordance with 10 CFR 50.67, "Accident source term," with the exception 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 equipment qualification.

The NRC, in support of their review of the referenced amendment request, has requested additional information related to meteorology and atmospheric dispersion factors. The attached provides the requested information.

AmerGen has reviewed the information supporting a finding of no significant hazards consideration that was previously provided to the NRC in the referenced letter. The supplemental information provided in this submittal does not affect the bases for concluding that the proposed license amendment does not involve a significant hazards consideration.

If you have any questions concerning this letter, please contact Mr. Timothy A. Byam at (630) 657-2804.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 9th day of December 2004.

Respectfully,

Keith R. Jury
Director – Licensing and Regulatory Affairs
AmerGen Energy Company, LLC

Attachment: Additional Information Supporting the Request for License Amendment Related to Application of Alternative Source Term

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Illinois Emergency Management Agency – Division of Nuclear Safety

ATTACHMENT

Additional Information Supporting the Request for License Amendment Related to Application of Alternative Source Term

Request 1

The control room X/Q value was calculated for the west, normal, and east outside air intakes (OAI) with the main stack as the single release point. AmerGen did not identify X/Q values for use with control room unfiltered inleakage. Please see Regulatory Position 3.3.3 of RG 1.194. The X/Q values determined for the three OAIs may not adequately represent the X/Q values that should be used for control room infiltration, particularly if the factor of four reduction is applied. Please identify the X/Q values that AmerGen used to assess the dose from the control room unfiltered inleakage pathway and provide a justification of why these values are conservative with regard to all inleakage locations.

Response 1

The main plant vent consists of the separate and independent common station HVAC stack and Standby Gas Treatment System (SGTS) vent stack. These two stacks are located side-by-side and therefore, are considered to be a common release point (see Figure 2 in Attachment 2 of Reference 1). All of the main plant vent to control room outside air intake atmospheric dispersion factors (X/Qs) were calculated using the ARCON96 computer code and were provided in Table 1 of Attachment 2 to the Clinton Power Station (CPS) alternative source term (AST) submittal (Reference 1). The X/Q values used for unfiltered inleakage into the control room are based on the ARCON 96 computer code analyses performed for the main plant vent to control room normal air intake pathway shown on Figure 2 of Attachment 2 to Reference 1. No factor of four dual intake based reduction was applied. The normal intake X/Qs utilized for the assumed unfiltered inleakage are the most conservative (i.e., most limiting) of any of the X/Qs calculated for the three outside air intakes. As the control room is maintained pressurized with sealed boundary penetrations and airtight access doors, potential unfiltered inleakage would not be expected at any locations other than these outside air intakes.

Request 2

The main plant vent was identified as the sole release point. In determining X/Q values for the exclusion area boundary (EAB) and low population zone (LPZ) X/Q values, it is reasonable to assume a single release point given the distances from the plant to the EAB and LPZ compared to the relatively smaller distances between release points, and in consideration of the 360 degree nature of the EAB and LPZ. However, for control room OAIs and infiltration X/Qs, the source-to-receptor direction and the source-to-receptor distance could differ significantly for the various release points. Please provide a justification of why it is conservative to consider the main plant vent as the only release point, including the following considerations:

a. *It is not clear how the flow from main steam isolation valve (MSIV) leakage during a LOCA would be collected and released via the main plant vent. Note that in the LOCA analysis, AmerGen did not credit holdup and plateout downstream of the outboard MSIVs since the downstream piping and the main condenser has not been evaluated for seismic ruggedness. Thus, this postulated release to the environment would be assumed to occur just downstream of the outboard MSIVs.*

b. *It is not clear how the flow from leakage via the upper personnel airlock would be collected and released via the main plant vent. The Clinton USAR provides that the secondary containment surrounds the primary containment with the exception of the upper personnel airlock. Table 4 of Attachment 2 to the submittal states that a secondary containment bypass of 8 percent for the first 24 hours and 4 percent thereafter to the environment is assumed.*

c. *It is not clear how the flow from primary containment leakage prior to secondary containment drawdown (12 minutes) would be collected and released via the main plant vent.*

d. *It is not clear how the release via the offgas system (control rod drop accident condenser release sequence 2) is collected and released from the main plant vent.*

Response 2

The justification for using the main plant vent as the source of all releases is as follows.

a. As described in the request, since there was no credit taken for holdup and plateout downstream of the MSIVs or in the condenser it was assumed that any leakage from the MSIVs would occur just downstream of the outboard MSIV. This results in a release to the Turbine Building. Although it is not seismically qualified, it is assumed that the Turbine Building structure will direct radioactive steam leakage and/or contaminated air through the normal Turbine Building ventilation system to the common station HVAC vent stack. This release to the stack will be unfiltered. No credit is taken for turbine building holdup or plate-out. This has the effect of maximizing the dose associated with this release since all releases from the MSIVs to the environment are effectively instantaneous.

   As a comparison, additional X/Qs were considered for a leaking MSIV at the Turbine Building/Auxiliary Building boundary and at the elevation of the steam lines at this boundary to each of the control room outside air intakes. This evaluation did not take credit for any Turbine Building structure. At the control room East air intake location, the resulting X/Qs were found to be bounded by the X/Qs for the main plant vent release location, as provided in Table 1 of Attachment 2 to Reference 1. At the control room West air intake location the X/Qs from the MSIV leak are not bounded by the X/Q for the main vent release location. After the 20-minute control room filtered intake initiation time indicated in Table 5 of Attachment 2 to Reference 1, the applicable X/Qs are those determined by the most favorable intake, divided by a factor of four credit based on the availability of a manually controlled dual intake system. As supported by the Control Room HVAC System description provided in CPS Updated Safety Analysis Report (USAR) Section 9.4.1, the operator will select the control room air intake with the lowest radiation level. It has been determined that, for the first 20 minutes of unfiltered intake, use of a worst case X/Q for an assumed unfiltered intake location in the vicinity of the leaking MSIV, when compared to the X/Qs used for the main plant vent release location in the AST license application, would have resulted in a negligible increase in control room doses. Therefore, no revision to the analysis is necessary to address the MSIV leakage downstream of the outboard MSIV.

b. The upper personnel air lock of the Containment opens into an enclosed walkway that connects to the Control Building. As described in the CPS USAR, the secondary containment is a structure that completely encloses the primary containment (except for the upper containment personnel air lock penetration) and those components that may be postulated to contain primary system fluid. In conjunction with operation of the Standby Gas Treatment System and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment.

The upper containment personnel air lock is part of the primary containment, and is designed to withstand the same loads, temperatures, and peak design internal and external pressures as the primary containment. Each air lock door has been designed and tested to certify its ability to withstand pressure in excess of the maximum expected pressure following a Design Basis Accident in primary containment. Each of the doors has two seals to ensure that they are single failure proof in maintaining the leak tight boundary of primary containment. Technical Specification (TS) 3.6.1.2, "Primary Containment Air Locks," requires that each primary containment airlock shall be operable. Maintaining primary containment air locks operable requires compliance with the leakage rate test requirements of the Primary Containment Leakage Rate Testing Program when in Modes 1 (Power Operation), 2 (Startup), and 3 (Hot Shutdown) to verify that the air lock leakage does not exceed the allowed fraction of the overall primary containment leakage rate. In addition, TS 3.6.1.2 Surveillance Requirement (SR) 3.6.1.2.2 requires verification that only one airlock door can be opened at a time.

On the Control Building side of the upper personnel containment airlock, the upper personnel air lock walkway leads to the southwest corner of the Control Building. This area is isolated from the Control Room HVAC System, as it is served by the Auxiliary Building HVAC system which discharges to the plant stack. Therefore, any containment bypass leakage through the air lock into the Control Building would be exhausted by the Auxiliary Building HVAC system through the common station HVAC stack just like all other potential containment bypass leakages with no different treatment required. These potential containment bypass leakages are accounted for in the LOCA analysis assumption for Primary Containment Bypassing Secondary Containment documented in Table 4 of Attachment 2 to Reference 1.

c. Prior to the initiation of the accident, the Auxiliary Building and Fuel Building Ventilation Systems provide ventilation to the Auxiliary, Control and Fuel Buildings. These buildings are immediately adjacent to the containment and the ventilation systems exhaust to the common station HVAC stack. The plant vent stack is used as the release point from the initiation of the accident, including prior to secondary containment drawdown, because the principal flow from the building during drawdown would be via the SGTS filters and through the stack. For conservatism, no SGTS filtration is credited during drawdown, nor is any holdup in the secondary containment credited at any time.

d. Control Rod Drop Accident (CRDA) sequence 2 is based on the NRC accepted treatment resulting from the review of NEDO-31400A, "Safety Evaluation for Eliminating the Boiling Water Reactor Main Steam Isolation Valve Closure Function and Scram Function of the Main Steam Line Radiation Monitor." This model is based on the very conservative assumption that the reactor continues to steam, indefinitely, with offgas flow continuing through the charcoal delay beds, eliminating iodine release but eventually releasing noble gases.

The CPS Offgas system is designed to process and control the release of radioactive effluents from the main condenser to the environment. Non-condensable gases are removed from the main condenser by the steam jet air ejectors and then flow through a recombiner. From the recombiner section the offgas mixture enters the cooler condenser where it is cooled and condensation is removed from the gas mixture. Following the cooler condenser the offgas mixture flows through a gas dryer which dehumidifies the offgas before the mixture passes through a gas cooler where the temperature of the mixture is cooled. The offgas mixture then flows through the charcoal adsorbers, through a HEPA filter, and then is discharged through the main station HVAC stack. Therefore, the release path for CRDA release sequence 2 would be the normal offgas release path, which is the plant vent stack.

Request 3

Based on its review of the USAR Chapter 12 figures, the staff has reason to believe that the upper personnel air lock opens into an enclosed walkway that connects to the control building. If this understanding is correct, please explain the impact of containment bypass leakage through the air lock on the control room habitability.

Response 3

The NRC is correct that the upper personnel air lock of the Containment opens into an enclosed walkway that connects to the Control Building. The air lock uses double doors, each of which is sufficient to provide a leak tight barrier following postulated events. As described above in the response to Request 2.b, the upper personnel air lock is part of the primary containment, and is designed to withstand the same loads, temperatures, and peak design internal and external pressures as the primary containment.

The upper personnel air lock walkway leads to the southwest corner of the Control Building. The location of this walkway is one floor above and laterally offset from the control room. This area is isolated from the control room by the intervening floor and three closed doors in addition to the airtight access doors with self-closing devices. The common access door is provided with an airlock vestibule (i.e., double doors in series) that provides a control room boundary designed for low leakage. As stated above in the response to Request 2.b, the area is also isolated from the Control Room HVAC System, as it is served by the Auxiliary Building HVAC System which discharges to the main station HVAC stack. Therefore, any containment bypass leakage through the upper personnel air lock into the Control Building would be exhausted by the Auxiliary Building HVAC system through the stack just like all other potential containment bypass leakages that are evaluated.

ATTACHMENT

Additional Information Supporting the Request for License Amendment Related to Application of Alternative Source Term

References

1. Letter from Michael J. Pacilio (AmerGen Energy Company, LLC) to U. S. NRC, "Request for License Amendment Related to Application of Alternative Source Term," dated April 3, 2003 (RS-03-060)

2. Letter from Michael P. Gallagher (AmerGen Energy Company, LLC) to U. S. NRC, "Exelon/AmerGen 180-day Response to NRC Generic Letter 2003-01, 'Control Room Habitability'," dated December 9, 2003 (RS-03-214)