Central

April 30, 1981

Docket No. 50-245
LS05-81-04-055

Mr. W. G. Counsil, Senior Vice President
Nuclear Engineering and Operations
Northeast Nuclear Energy Company
P. O. Box 270
Hartford, Connecticut 06101

Dear Mr. Counsil:

SUBJECT: SEP TOPICS VI-2.D, MASS AND ENERGY RELEASE FOR POSTULATED PIPE BREAKS INSIDE CONTAINMENT AND VI-3, CONTAINMENT PRESSURE AND HEAT REMOVAL CAPABILITY (MILLSTONE 1)

We have been informed by our contractor, LLNL, that additional information (see, enclosure) would be useful in completing their work on SEP Topics VI-2.D and VI-3. Obtaining this information would ensure that our contractor's results reflect your facility's current design and operating conditions. Recognizing that all the information requested may not be readily available, provide that which is available. If the information requested for the analyses is not available, our contractor will model the pipe break spectrum to perform the required analyses. Your timely response (ie. within 30 days of the receipt of this letter) would be appreciated.

Sincerely,

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosure: As stated

cc w/enclosure:
See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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Mr. W. G. Counsil

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East Haddam, Connecticut 06423

Attachment 1

The NRC Systematic Evaluation Program analyses include performing analyses of reactor containments based on current NRC criteria. These analyses include calculations of the containment pressure and temperature response due to water/steam discharges from a reactor blowdown.

The analyses of the reactor blowdown will be performed using the computer code RELAP4-Mod 7 and the containment calculations will be performed using the computer code CONTEMPT-LT/028.

To perform the above calculations, it is desired to obtain a listing of an input deck for a RELAP4 reactor blowdown and reflood calculation. Since such decks probably do not exist the latest RELAP or RETRAN deck used as, for example, a peak cladding temperature calculation will suffice. It is not envisioned that the decks will properly represent the reactor and the coolant system for our purposes but will properly represent the geometry of the system.

A listing of the input deck for a CONTEMPT containment calculation is also desired.

The attachment further describes the type of information desired with each input listing.

REQUIRED PLANT-SPECIFIC INFORMATION
FOR
SYSTEMATIC EVALUATION PROGRAM CONTAINMENT ANALYSIS

The following list of questions/comments are intended to define the plant specific information required with the blowdown and reflood RELAP input decks, and containment analysis CONTEMPT deck.

The specific analysis to be performed will include a double-ended guillotine pump suction break, and a steam line break. Unless otherwise stated, all information provided in the input data deck will be assumed to be that which accurately represents the plant.

Blowdown

(1) Please provide a nodalization diagram for the input deck which identifies the fluid volumes and flowpaths. If available, a diagram defining the heat conductors, fills, valves, etc., would also be helpful.

(2) Please define the purpose (kind of analysis) for which the deck is set up, the basic assumptions for the initial and boundary conditions, and the code version the deck runs on. A copy of a recent document which describes the deck (the model) would also be helpful.

(3) Where special modeling techniques are used, and hence the input parameters are not representative of the physical description of the plant, please define the best estimate values and describe the reason for these special modeling techniques. For instance, if a large flow area was used to eliminate momentum effects, so state and define the most representative flow area.

(4) If the input deck contains any proprietary data which cannot be supplied, please provide an alternate source of nonproprietary data adequate for these analyses.

(5) Define the rated core power and reactor coolant pump power. Also define the safeguards power or the percentage over rated power allowed before an overpower trip would occur.

(6) If known, please define the primary and secondary conditions for the safeguard power operation, e.g., what is the primary system flow rate and the cold and hot leg temperatures, and the secondary pressure or temperature and the feed water and steam line mass flow rates.

(7) Define the maximum inventories which could be available in the system. Are the volumes in the deck defined for cold or hot (considering thermal expansion) conditions? Define the normal and maximum operating levels for the pressurizer and steam generators.

(8) Are the reactor coolant pump definitions in the data deck accurate and complete? State the pump rated conditions, if not accurately defined in the input data deck. If two-phase pump performance data are available, please provide. Otherwise, the Semiscale test data will be used. Please define the friction coefficients for a third order polynomial if known. Does the plant design contain an antireverse rotation mechanism?

(9) A complete and accurate description of the heat conductors should be provided with the input data deck. Please verify that the dimensions for the fuel rod heat conductors are adequately representative of the current plant fuel for the analyses to be performed.

(10) Please define the valve characteristics including the loss coefficients and area versus time characteristics. Of major importance is the time required to close, after receipt of signal, for feedwater and steam line isolation valves.

(11) ECCS physical descriptions. Provide a complete description of the accumulator, HPIS and LPIS performance characteristics and the assumptions which should be used with single active failure criteria.

(a) Accumulators. Verify that the model accurately describes the accumulator and line connecting to the primary system, volumes, flow areas, friction losses, and elevations. Define the nominal and maximum liquid inventory within each accumulator volume and the nominal and maximum expected (tech. spec.) temperature of the water in the accumulator. In addition, the cover gas pressure and injection location in the primary system should be defined.

(b) The HPIS and LPIS flow versus primary system pressure performance curves as defined at the primary system injection location is required. Again, define the total number of pumps normally available and the assumptions used with single active failure criteria. Define the source of water for each system, the nominal and maximum (tech. spec.) temperature, and total inventory available.

(12) Supplied reactor kinetics information should be defined as best estimate or conservative and is usually assumed to be beginning of life for these analyses. Valves appropriate for both the pump suction break and the steam line break should be provided. Because the nature of these two transients is somewhat different, separate information for each transient may be required. For instance, for the pump suction break, the

scram information is of secondary importance because the reactor shuts down due to the density reactivity feedback.

Specific information to be supplied should include the density reactivity, Doppler reactivity, the nominal axial power shape distribution, and the direct moderator heating fraction.

(13) Provide a basic description of the plant safety system operation for normal conditions versus single active failure criteria, and define the effect on these systems due to the loss of outside power. Specific definition is required to model reactor scram, pump trips, and secondary isolation of feedwater and steam line, the activation of HPIS, LPIS, and accumulators. In addition, the activation times for fan coolers and spray coolers in the containment will be required. A description of the signal activating the trip as well as the delay time for initiation of the activity is required.

(14) A description of the trip signal, setpoints, and delay times for initiation of each action must be defined. Please define the normal expected setpoints and delay times and also discuss the reasonable conservatisms which should be assumed for each item.

Reflood

Most of the additional information discussed above for the blowdown deck is also common to that required for the reflood analysis. Hence, the reflood deck should be reviewed relative to the questions and comments defined in the blowdown section above.

(1) Provide a description of the model, identify the type of analysis for which the deck is now defined, and the code version for which the deck will run.

(2) Define the assumptions used in the model, discuss any special modeling techniques used.

(3) Provide a copy of a nodalization diagram.

(4) Define the containment design pressure, and nominal and expected (tech. spec.) operating pressure and humidity.

Containment

Some of the specific information and all of the general information requested above relative to the CONTEMPT input deck will be required. General information includes identifying the version of CONTEMPT for which the deck is defined, the kind of analysis, general assumptions modeled in the input deck, and a description of the purpose for which the deck was used. Additional specific information required is as follows:

(1) Provide a quotable reference for the heat structure data defined in the deck.

(2) Define the normal and maximum expected temperature permitted in the containment drywell during normal operations. If a wet well pool exists, as in the case of BWR's with pressure suppression system, also define corresponding pool temperatures.

(3) Verify that the initiation times, flow rates, and heat removal rates in the deck for the sprays and coolers are currently valid.

(4) Define the maximum temperatures of any and all ECC water injected into the core or sprayed into the containment.

(5) Define the containment spray and fan cooler activation time or activation signal and delay time due to the break and/or loss of

outside power. Also, define the number of spray and cooler systems normally available and the number to be assumed considering single failure criteria.