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

March 28, 1980

Docket No. 50-245

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

Dear Mr. Counsil:

RE: ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

Reference 1: Guidelines for evaluating environmental qualification of Class IE Electrical Equipment in operating reactors - Enclosure 1 to NRC letter to licensees, dated February 15, 1980.

Reference 2: Guidelines for identification of that safety equipment of SEP operating reactors for which environmental qualification is to be addressed - Enclosure 2 to same letter.

In a previous letter, dated March 6, 1980, we provided an accelerated review schedule for this program. We also indicated that with respect to containment environmental conditions and systems required for accident mitigation, we would request additional information and provide some clarification of the guidelines (References 1 and 2).

The clarifications, the information that we will need, and the dates we will need it are described in Enclosures 1, 2 and 3.

In some cases, we need information prior to the nominal "submittal dates" listed on the basic schedule in our letter of March 6, 1980. However, considering the nature of these items, we believe that you can easily provide them when they are needed. One clarification is that the NRC staff will estimate, for each facility, the time it takes for containment temperature and pressure conditions to return to near normal. In addition, our approach for dealing with plant specific containment temperature and pressure analyses is described.

The information requested by this letter and by our previous letter dated March 6, 1980, is being requested pursuant to 10 CFR 50.54(f). Please provide the information described in the enclosures by the dates indicated. As stated in the enclosures, we will be discussing some of the items with your personnel in the near future. Contact us if you have any questions or comments on these matters.

Sincerely,

Dennis L. Ziemann

Dennis L. Ziemann, Chief
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ENCLOSURE 1

SCHEDULE FOR AND DISCUSSION OF SUBMITTALS

Plant	Emergency Procedures(1)	Data for Calculation of Containment Pressure and Temperature Decay(2) Enclosure 2	Information on Systems to Mitigate Events	Information on Containment Temperature and Pressure(6) Enclosure 3
Palisades	Already provided	Currently under review (3)	Currently under review(4)	May 1
Oyster Creek	Already provided	Currently under review(3)	May 1(5)	May 1
Ginna	Already provided	Currently under review(3)	*	*
Zion 2	Already provided	*	*	*
Indian Point 3	Already provided	Not needed	*	*
Zion 1	Already provided	*	*	*
Indian Point 2	Already provided	*	*	*
Millstone 1	Already provided	Not needed	*	*
Haddam Neck	Already provided	May 1	*	*
Dresden 2	As soon as possible	Not needed	*	*
San Onofre	Already provided	May 1	*	*
Dresden 1	As soon as possible	May 1	*	*
Yankee Rowe	As soon as possible	May 1	*	*
LaCrosse	As soon as possible	May 1	*	*
Big Rock Point	As soon as possible	May 1	*	*

*Denotes submittal dates which are the same as the general submittal dates given in on overall schedule in our letter of March 6, 1980.

See following pages for numbered notes.

NOTES:

1. We have previously discussed the emergency procedures with your personnel. They are part of the main submittal as defined in item (4) of Reference 2. We are requesting them earlier simply as an aid to begin considering, as soon as possible, the systems required to mitigate postulated events. In this light, send copies of the procedures that are currently in effect, regardless whether or not you may be changing them in the future. If you revise them prior to the site visit by adding or deleting equipment, please let us know. However, we do not intend for these to be formal file copies that require updating.

2. The data needed for the calculation of containment temperature and pressure decay are defined in Enclosure 2. This is a basic requirement for judging whether or not the qualification tests meet the guidelines as discussed in Section 5.2 of Reference 1. Since the data relate only to the most current LOCA analysis on the docket that defines the service conditions for equipment qualification, they should be readily available and may have already been submitted in many instances.

3. Since we need the Enclosure 2 information on Palisades, Oyster Creek and Ginna quite early, we will telephone your personnel to request, specifically, the items we cannot readily find in the docket.

4. The systems required to mitigate events are currently under review for Palisades. The material submitted on this subject for this plant will subsequently be elevated to the level of other plant submittals by specific questions.

5. In relation to our other letter on the basic schedule, Oyster Creek should consider this as a further specific request for information; i.e., submit the listings related to systems needed to mitigate the postulated events the same as most of the other facilities.

6. Enclosure 3 pertains only if performing a new plant-specific containment analyses. With respect to containment pressure and temperature conditions, all plants will have previously identified the most current approved LOCA analysis that has been submitted and will have provided pertinent data (see Note 2 and Enclosure 2).

   According to the guidelines (Reference 1):

   A. Some plants (PWRs with prompt automatic redundant containment spray systems) simply use the existing LOCA analysis as the basis for qualification.

   B. Other plants (PWRs that do not have such spray systems) are to include a plant specific steam line break analysis in the basis for qualification.

   C. BWRs are to use 340°F for 6 hours as the basis for judging whether individual component qualifications meet the guidelines. However, at the meeting on February 21, 1980, some licensees indicated that they might want to use plant specific analyses to justify less severe conditions. This would be an exception to the guidelines rather than something required or permitted in the guidelines. In the long run, the technical issue is the same - whether or not a plant specific analysis justifies less severe conditions than 340°F for 6 hours.

We plan to pursue the following matters with each licensee within about the next month:

1) Whether PWR containment spray system features, such as time delays, single failure vulnerabilities or high pressure setpoints, might be changed rather than performing plant specific analyses.

2) Whether some of the BWRs sho'ld simply be treated under the PWR guidelines due to their unique design. For example, Oyster Creek appears to have an effective containment spray system that meets our guidelines and would suppress high temperatures.

3) Which BWR licensees plan to use plant specific analyses to justify less severe conditions.

4) Whether any plant specific analyses that may already exist (for PWRs or BWRs) appear to be suitable.

5) Whether newer analyses done elsewhere appear suitable. For example, since Zion and Indian Point are relatively modern Westinghouse plants there may be existing analyses on similar plants that could quickly provide reasonable temperature estimates.

   It may turn out that in some cases that plant specific analyses are needed and a new analysis will have to be performed. If it is not possible to submit the new analysis by the submittal dates listed, your best estimate of the conditions that you believe you can eventually justify should be provided, along with the schedule that you can meet for providing the new analysis results.

   In the meantime, Enclosure 3 describes the information that we will need for review in those cases where plant specific analyses are to be used - either to satisfy the guidelines (PWRs without automatic redundant spray) or to justify an exception to the guidelines (BWRs that choose to justify 340°F for 6 hours). As indicated in the guidelines, where the most current LOCA analysis is to be used (PWRs with automatic redundant sprays), we need no furthe information and plan no further review of that analysis for the purpose of this accelerated environmental qualification review program. Later, however, we will evaluate the conta' ment integrity analyses under SEP Topics VI-2.d and VI-3.

ENCLOSURE 2

DATA NECESSARY FOR THE STAFF CALCULATION OF CONTAINMENT TEMPERATURE AND PRESSURE DECAY TIME

One of the early items in our review consists of the staff calculating, prior to the site visit where possible, the time that it will take for containment temperature and pressure conditions to return to essentially the conditions that existed prior to the assumed accident. This will be needed in order to judge the adequacy of the qualification test duration as discussed in Section 5.2 of Reference 1.

In order to perform these calculations quickly, we will base them on the current LOCA analysis and we will need the following information with respect to that analysis (by submittal or reference to previous submittals).

I. Reference the most current LOCA analysis on the docket that defines the service conditions to be used in equipment qualification. With respect to that analysis, provide the following:

A. Containment Net Free Volume

B. Passive Heat Sinks

Identify structures, components and equipment that act as passive heat sinks within the containment. Provide the following information:

1) total exposed heat transfer surface area with clarification if the exposed area is for one or both sides of the material

2) total equivalent thickness

3) thermo-physical properties (i.e., density, specific heat and thermal conductivity).

C. Initial Containment Conditions

Initial containment atmosphere conditions for:

1) temperature

2) pressure

3) relative humidity

D. Containment Spray System

1) Parameters and their setpoints to activate spray

2) Spray system activation time

The time associated with each of the following is needed (indicate whether or not they are additive):

a) time elapsed until signal to activate spray system is reached

b) time elapsed between reaching signal to activate spray and contact closure (total instrumentation lag time)

c) time required for diesel generator to attain full operating speed

d) time required for loading of containment spray pump

e) time required to open isolation valve

f) time required for containment spray pump to achieve full speed

g) time required to fill spray system piping and deliver water to spray header

3) Identify the spray heat exchanger type, such as U-tube, crossflow, or counterflow.

E. Fan Cooler System

1) Delay time before the fan cooler becomes effective for heat removal (similar information to Item D.2 above)

2) Heat removal capability of the fan cooler. Provide a curve or table of the energy removal rate as a function of containment temperatures. The containment temperature should be in the range of 70°F to 400°F.

F. Identify any other containment heat removal system that affects the containment temperature response. Provide the same type of information as in Item D above.

G. Provide a discussion of the single failure assumed in the analysis.

H. Mass and Energy Release Data

Provide the mass and energy release rate data for the postulated pipe break considered.

II. Figure 1 and 2 represent typical ECCS and spray systems relied on to mitigate the consequences of a pipe break. Provide the information indicated in the figures; if the plant specific systems differ from the attached figures, revise the drawings to represent your facility and provide the appropriate information.

When providing system parameters, indicate whether the values given assume a single failure and specify the single failure assumption.

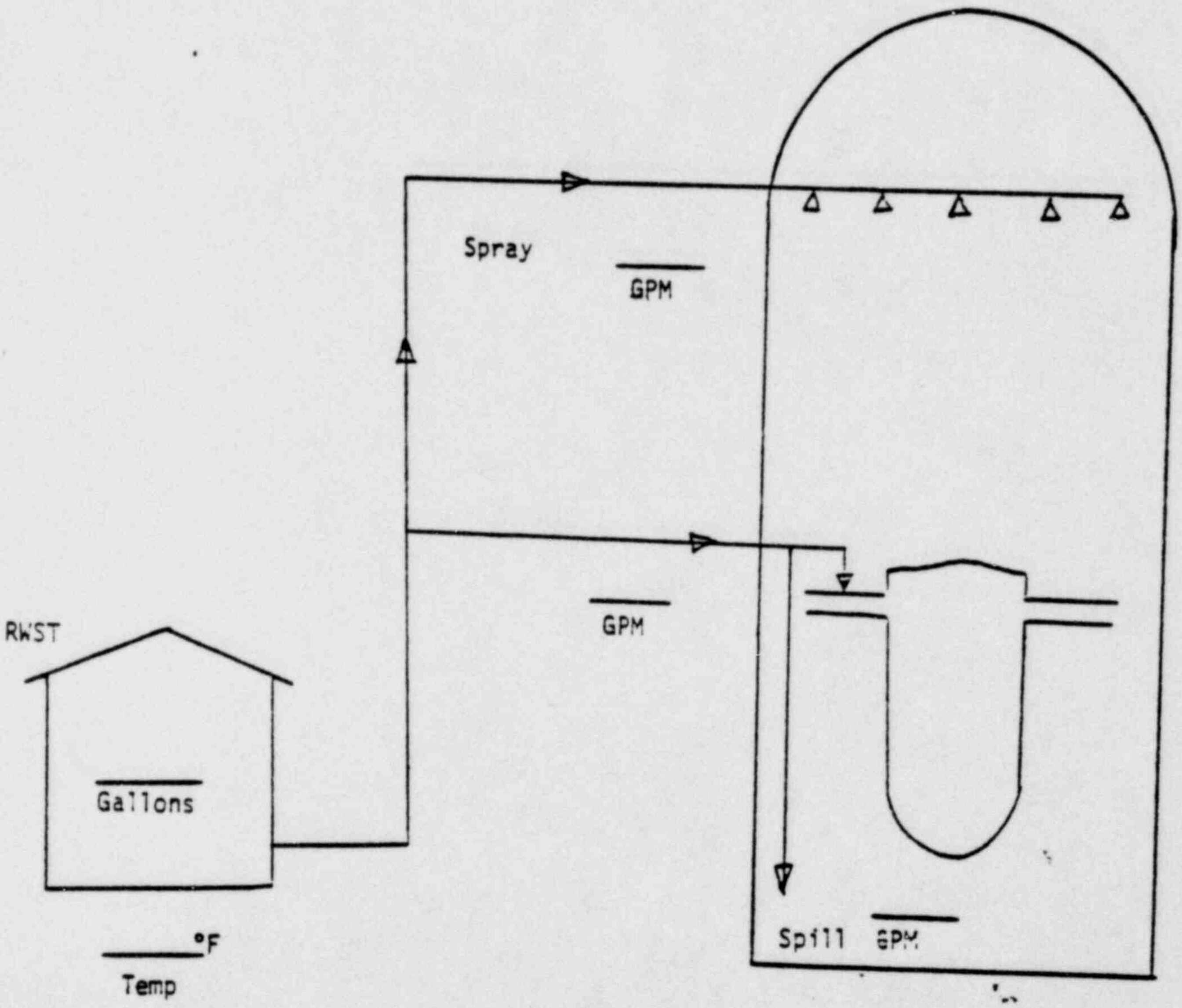
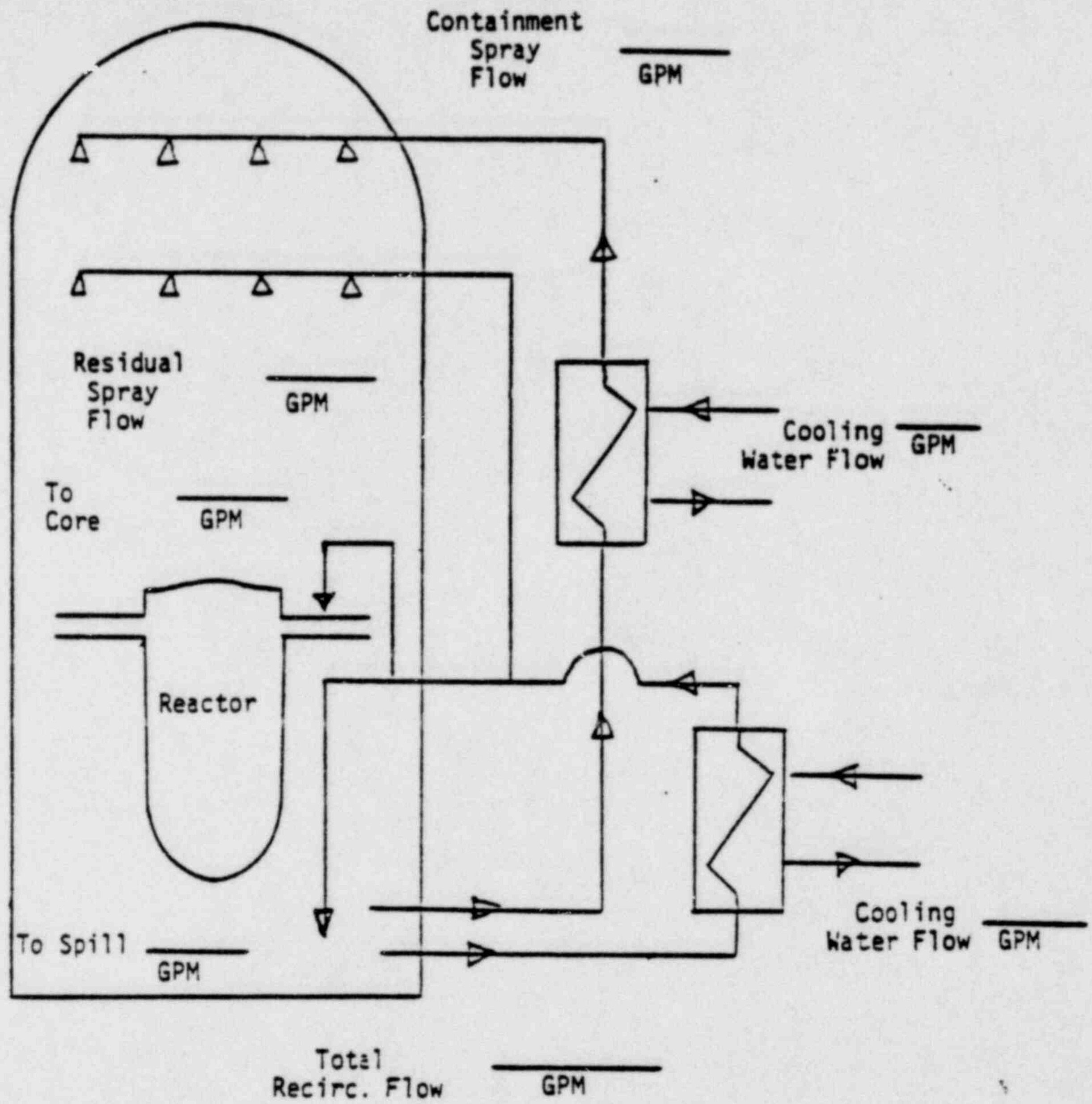


FIGURE 1 INJECTION PHASE



Containment Spray HX UA ________ $x10^6$

Cooling Water Temp ________ °F

RHR (Shutdown) HX UA ________ $x10^6$

Cooling Water Temp ________ °F

RECIRCULATION
PHASE

FIGURE 2 RECIRCULATION PHASE

ENCLOSURE 3

INFORMATION NECESSARY FOR STAFF REVIEW OF PLANT SPECIFIC CONTAINMENT ANALYSES

In some cases (described in Note 6 of Enclosure 1), plant specific containment analyses (other than the current LOCA analyses) will be needed. For those cases, we will need the following information about the plant specific analyses for our review:

I. Any changes to the information provided in response to Enclosure 2, including Figures 1 and 2.

II. Mass and Energy Release Data

Provide the mass and energy release rate data for the pipe breaks considered. Reference to existing data previously submitted to the staff is acceptable. Reference or describe methods used to calculate mass and energy releases.

Additional information required which describes the plant mass and energy inventories (PWR):

1) Reactor rated power

2) Steam flow rate per steam generator at full speed

3) Fluid mass in each steam generator at full power and hot shutdown

4) Fluid energy in each steam generator at full power and hot shutdown

5) Steam line flow area

6) Time when steam isolation valves will close following a main steam line break

7) Mass of unisolated steam between a steam generator and the isolation valve following closure of main steam isolation valves.

8) Additional mass of unisolated steam if the main steam isolation valve nearest the break fails to close.

9) Main feedwater line flow area

10) Main feedwater enthalpy

11) Time when main feedwater isolation valves will close following a main steam line break

12) Mass and temperature of feedwater between a steam generator and the feedwater isolation valve

13) Mass and temperature of feedwater above 240°F between a steam generator and any redundant feedwater isolation valve

14) Mass and temperature of all feedwater above 240°F

15) Time when auxiliary feedwater injection will begin following a main steam line break

16) Auxiliary feedwater flow rate and enthalpy

17) Time when core flooding system will begin injection following a LOCA

18) Fluide mass in the reactor system at full power and hot shutdown

19) Fluid energy in the reactor system at full power and hot shutdown

20) Hot and cold leg line flow areas

21) Core flooding system flow rate and temperature

22) Sensible heat in the core and reactor system metal that is above 240°F at full power operation

23) Initial hot and cold leg temperatures

Additional information required which describes the plant mass and energy inventories (BWR - except dual cycle):

1) Reactor rated power

2) Steam flow rate at full power

3) Fluid mass in the reactor system at full power and hot shutdown

4) Fluid energy in the reactor system at full power and hot shutdown

5) Steam line flow area

6) Time when steam isolation valves will close following a main steam line break

7) Mass of unisolated steam between the reactor vessel and the isolation valve following closure of main steam isolation valves.

8) Additional mass of unisolated steam if the main steam isolation valve nearest the break fails to close

9) Main feedwater line flow area

10) Main feedwater enthalpy

11) Time when main feedwater isolation valves will close following a main steam line break

12) Mass and temperature of feedwater between the reactor vessel and the feedwater isolation valve

13) Mass and temperature of feedwater above 240°F between the reactor vessel and any redundant feedwater isolation valve

14) Mass and temperature of all feedwater above 240°F

15) Time when core spray injection will begin following a main steam line break

16) Core spray flow rate and temperature

17) Time when core flooding system will begin injection following a main steam line break

18) Core flooding system flow rate and temperature

19) Sensible heat in the core and reactor system metal that is above 240°F at full power operation

When providing system parameters, indicate whether the values given assume a single failure and specify the single failure assumption.

Figures 1 and 2 represent typical ECCS and spray sytstems relied on to mitigate the consequences of a pipe break. Provide the information indicated in the figures, if the plant specific systems differ from the attached figures, revise the drawings to represent your facility and provide the appropriate information.

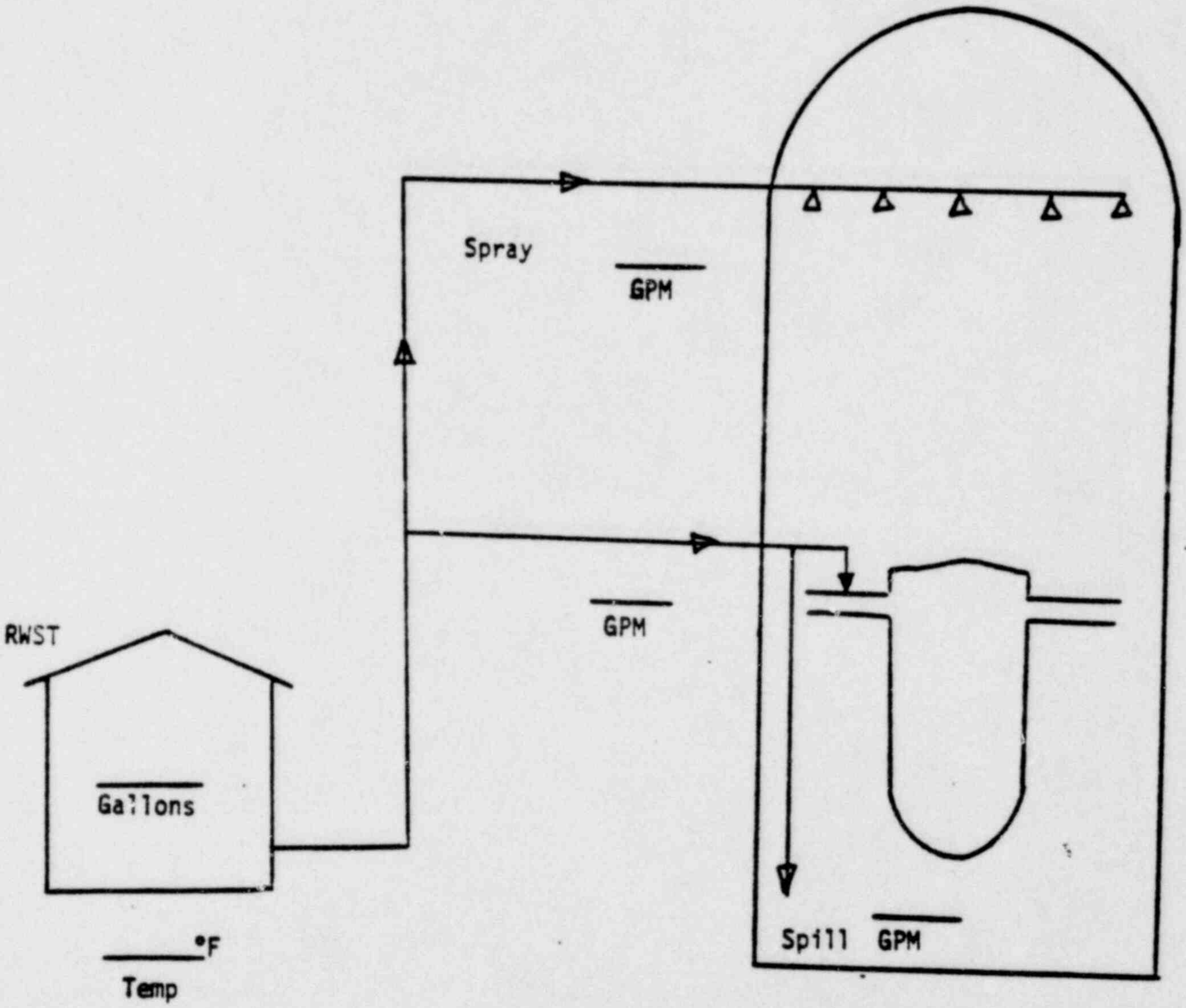
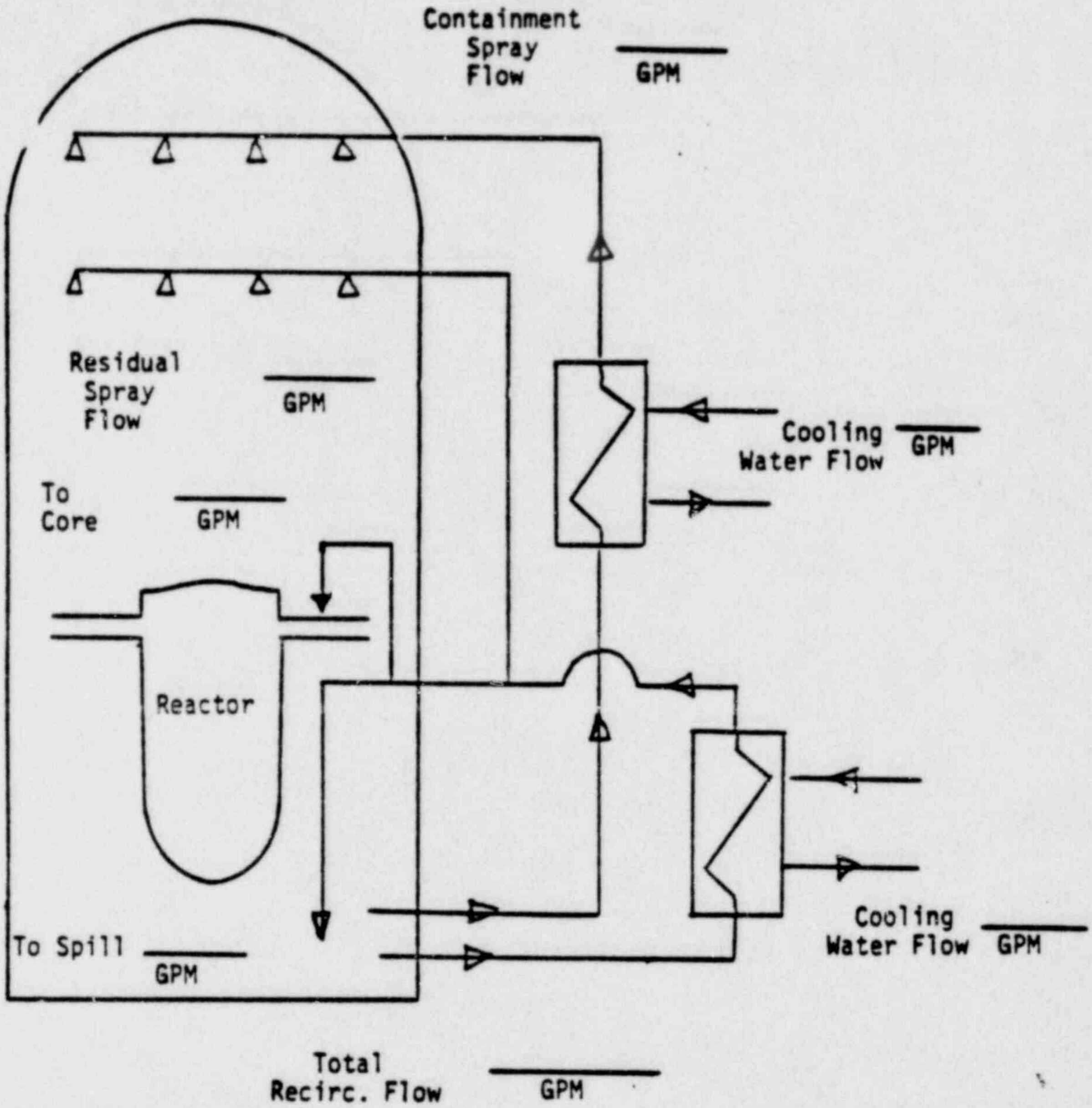


FIGURE 1 - INJECTION PHASE



Containment Spray HX UA ________ $x10^6$

Cooling Water Temp ________ °F

RHR (Shutdown) HX UA ________ $x10^6$

Cooling Water Temp ________ °F

RECIRCULATION
PHASE

FIGURE 2 - RECIRCULATION PHASE