ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9101140271 DOC.DATE: 91/01/10 NOTARIZED: NO DOCKET #
FACIL:50-410 Nine Mile Point Nuclear Station, Unit 2, Niagara Moha 05000410
AUTH.NAME AUTHOR AFFILIATION
TERRY,C.D. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Discusses Rev 2 to secondary containment draw-down analysis.

DISTRIBUTION CODE: A001D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 6
TITLE: OR Submittal: General Distribution

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD1-1 LA	1	1	PD1-1 PD	1	1
	BRINKMAN,D	2	2	OUDINOT,D	2	2
INTERNAL:	ACRS	6	6	NRR/DET/ECMB 9H	1	1
	NRR/DET/ESGB	1	1	NRR/DOEA/OTSB11	1	1
	NRR/DST 8E2	1	1	NRR/DST/SELB 8D	1	1
	NRR/DST/SICB 7E	1	1	NRR/DST/SRXB 8E	1	1
	NUDOCS-ABSTRACT	1	1	OC/LFMB	1	0
	OGC/HDS1	1	0	REG FILE 01	1	1
	RES/DSIR/EIB	1	1			
EXTERNAL:	NRC PDR	1	1	NSIC	1	1

R I D S / A D D S

R I D S / A D D S

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 26 ENCL 24

NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/301 PLAINFIELD ROAD, SYRACUSE, N.Y. 13212/TELEPHONE (315) 474-1511

January 10, 1991
NMP2L 1274

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: Nine Mile Point Unit 2
Docket No. 50-410
NPF-69

Reference:
1. C. D. Terry to Nuclear Regulatory Commission (NMP2L1159), August 26, 1988;
2. C. D. Terry to Nuclear Regulatory Commission (NMP2L1238), June 7, 1990;
3. C. D. Terry to Nuclear Regulatory Commission (NMP2L1251), September 7, 1990.

Gentlemen:

The purpose of this letter is to provide to the Nuclear Regulatory Commission a discussion of a further revision (Revision 2) to the Nine Mile Point Unit 2 secondary containment draw-down analysis. As discussed in Reference 2, Niagara Mohawk determined that the original draw-down analysis contained an unrealistic assumption of a large differential temperature (Delta-T) between secondary containment air and service water and revision was necessary to reflect actual plant conditions. In Revision 1 to the draw-down analysis, the draw-down time was extended from 129 seconds to 360 seconds, and a minimum Delta-T requirement was established. Revision 1 was valid only for the first operating cycle since it did not include the effects of heat load from the spent fuel pool.

In Revision 2 to the draw-down analysis, Niagara Mohawk has reanalyzed the required differential temperature between the secondary containment air and the service water temperature. Revision 2 incorporates the effects of spent fuel heat loads from the first refueling and revises the assumptions concerning relative humidity, distribution of inleakage, and unit cooler efficiencies. These changes have resulted in new Delta-T operating requirements for Unit 2. To support operation during the coming winter months, new Delta-T requirements have been developed for secondary containment temperatures of less than or equal to 85 degrees F. These requirements are included as Attachment A. Prior to June 1, 1991, Delta-T requirements for secondary containment temperatures above 85 degrees F. will be developed. Each of the changes is discussed below.

000530GG1

A001
1/1

Spent Fuel Heat Loads

The required Delta-T is a function of the various heat loads in the secondary containment. Prior to the current refueling outage, Unit 2 had no spent fuel in the fuel pool. Approximately one-third of the core was replaced during the refueling process. Therefore, the analysis requires revision to incorporate the heat load associated with the offloaded spent fuel. The calculated heat load associated with the offloaded spent fuel is 1.75E06 BTU/hr. This heat load is based on a 90-day decay time between reactor shutdown and startup from the refueling outage, which is less than the current length of the refueling outage.

Relative Humidity

Secondary containment relative humidity is a function of the relative humidity and temperature of the outside air, evaporation from the spent fuel pool and evaporation from leaks within the building. The most significant contribution to relative humidity is outside air drawn into the reactor building during normal operation. Since, during normal operation, it takes less than one hour for a complete air change in the reactor building, the absolute moisture content inside the reactor building is essentially the same as the outside atmosphere. The contributions from the spent fuel pool and from leaks within the building are insignificant by comparison.

The maximum outside relative humidity at any given temperature is 100%, and the maximum temperature at which 100% relative humidity occurs with a time duration of one hour is 73 degrees Fahrenheit (F.) (see USAR section 2.3.2.2.8; maximum hourly dew point is 73 degrees F.). This maximum dew point occurs in August when the lake is usually above 70 degrees F. Because of the Delta-T maintained due to drawdown requirements, the reactor building temperature during this time would be greater than 85 degrees F. The resultant relative humidity of the reactor building, after heating the outside air to a reactor building temperature of at least 85 degrees F., would be less than 75%. Therefore, in the drawdown analysis, the reactor building humidity is assumed to be 75% for outside air temperatures above 70 degrees F.

For temperatures below 60 degrees F., it is conservatively assumed that the outside relative humidity is 100% and the reactor building is at the minimum required temperature of 70 degrees F. The secondary containment relative humidity is calculated based on heating the outside air to building temperature. For reactor building temperatures between 60 degrees and 70 degrees F., the relative humidity of the reactor building is assumed to vary linearly between the value at 60 degrees and the value at 70 degrees F.

Distribution of Inleakage

Previous revisions of the drawdown analysis have assumed 100% of the secondary containment inleakage occurs at ground level. The most likely leak path for inleakage at the lower elevations of the building is through door seals. Therefore, in an attempt to reduce inleakage and the corresponding required Delta-T, two (2) airlock mandoors were replaced with new doors and seals. In addition, a second set of seals was added to the track bay doors and 19 other mandoors. Installing a second set of door seals on each door results in four (4) 100% redundant leakage barriers in each penetration. However, a subsequent inleakage test, conducted during the current refueling outage, demonstrated essentially no change in the inleakage.

Since doubling the number of leakage barriers in each man-door penetration and a total replacement of existing door seals did not reduce the overall building inleakage, it is reasonable to assume that the majority of the building inleakage must be from other sources. Since the mandoors are the only major openings at the lower elevations and the exterior walls on the lower elevations of the building are concrete, a significant portion of the inleakage must be coming from the top of the building. After reviewing the results of calculations using various inleakage distributions and considering the test results, Niagara Mohawk has concluded that an inleakage distribution of 50% at the top and 50% at the ground level, when inside and outside air temperatures are approximately equal, is a reasonable design assumption.

Unit Cooler Efficiencies

To assure all secondary unit coolers were modeled conservatively, a 4 degree F. penalty was added to the required Delta-T calculated in Revision 1 of the draw-down analysis (Reference 3). This penalty was based on testing conducted in 1988 on approximately 60% of the unit coolers. In that testing the most limiting of the coolers, one of the recirculation unit coolers, tested at 15.3% under its design capacity. For conservatism, a 17% reduction in capacity was applied to all unit coolers resulting in a 4 degree F. penalty.

The two recirculation unit coolers, which are the largest unit coolers in secondary containment and represent approximately 35% of the cooling capacity of each division, were tested again during the first refueling outage. These unit coolers are air to water and are ducted on both the air inlet and outlet. A factory calibrated ultrasonic flow meter and calibrated resistance thermocouple devices were used to measure water flow rate and temperatures. The air quantity and wet and dry bulb temperatures were also measured. After accounting for inconsistencies in the test data, the unit cooler vendor estimated a unit cooler fouling factor of 0.0005. Based on a 0.0005 fouling factor, the manufacturers computer program calculated a heat removal

rate for accident conditions that is approximately 5% higher than the original design capacity.

The unit cooler performance calculated in 1988 was based on the temperatures determined by testing and on design flows. The testing conducted during the refueling outage utilized a more accurate methodology and provides a more accurate determination of unit cooler performance. Based on this more accurate determination of unit cooler performance, the draw-down analysis has been revised to remove the 4 degree F. penalty and utilize the original design heat removal capacity of the unit coolers. As stated above, the design heat removal rate is still 5% below the actual heat removal rate as determined by the vendor. To assure that the testing discussed above is reflective of the aggregate performance level of all the secondary containment unit coolers, Niagara Mohawk plans on testing additional secondary containment unit coolers by June 1, 1991. If this testing indicates capacities less than 100% of design, appropriate adjustments to the required Delta-T will be made.

Conclusions

Unit 2 is operating under administrative controls which implement the required Delta-T from curves developed in the drawdown analysis. Unit 2 operators, in accordance with the surveillance program, determine the actual Delta-T every four hours and assure that it is within acceptable limits. Plant annunciators also monitor the difference between average reactor building temperature and service water header temperature and alarm upon sensing low Delta-T. A new Delta-T curve (Attachment A) has been calculated to replace the one developed in 1988 (see Updated Safety Analysis Report Figure 6.2-77A). This curve is valid for reactor building temperatures of less than or equal to 85 degrees F. and operation will be restricted to this condition. When considering the 4 degree F. penalty added to the 1988 curve, the new curve is slightly more restrictive at high outside air temperatures (a two degree Delta-T increase at 80 degrees F.) and slightly less restrictive at low outside air temperatures (a one degree Delta-T decrease at -20 degrees F.). The Unit 2 Site Operations Review Committee will review the changes to the analysis and Unit 2 surveillance procedures will be revised to incorporate the new curve prior to startup from the refueling outage.

Once testing of the unit coolers is complete, the analysis will be revised further to provide an additional curve for secondary containment temperatures of greater than 85 degrees. Historically, secondary containment has not exceeded 85 degrees F. until mid to late June. Therefore, the analysis to support operation at secondary containment temperatures of greater than 85 degrees F. with spent fuel in the fuel pool is scheduled for completion prior to June 1, 1991. That revision will also include the effects of any changes in unit cooler performance as determined by the above mentioned testing and

will revise the decay time for the spent fuel offloaded during the refueling outage from 90 days to 300 days.

As stated in our June 7, 1990, submittal (Reference 2), final resolution of the drawdown issue is scheduled for prior to startup from the fourth refueling outage and the analysis and design concepts for any required plant modifications will be submitted to the Staff by June 1, 1992. Niagara Mohawk is currently studying a plant modification which has the potential to resolve the long-term problems associated with secondary containment draw-down and is evaluating the feasibility of installing the modification during the second or third refueling outage. As an additional option, if the permanent resolution cannot be implemented any sooner than the fourth refueling outage, Niagara Mohawk is developing a short term modification to restore the Standby Gas Treatment System capacity, currently 3720 CFM, to its original design value of 4000 CFM (see Reference 3). If installed, this modification will decrease the Delta-T requirements of Attachment A by approximately 2 degrees F. However, because of difficulty in locating a qualified vendor, this modification can be completed no sooner than July of 1992.

Until final resolution is complete, Niagara Mohawk will continue with the current administrative program. The analysis will be revised as appropriate to include the heat load associated with the spent fuel from the next two refueling outages. Plant programs will monitor inleakage and unit cooler performances and revise the analysis as required to account for changes in these areas. Revision 2 to the draw-down analysis maintained the same post-LOCA drawdown time (360 seconds) as Revision 1. Therefore, the calculated post-accident radiological consequences have not changed from Revision 1. The administrative procedures described above will assure compliance with the assumptions and conclusions of the draw-down analysis, thereby assuring continued safe operation of Unit 2.

Very truly yours,

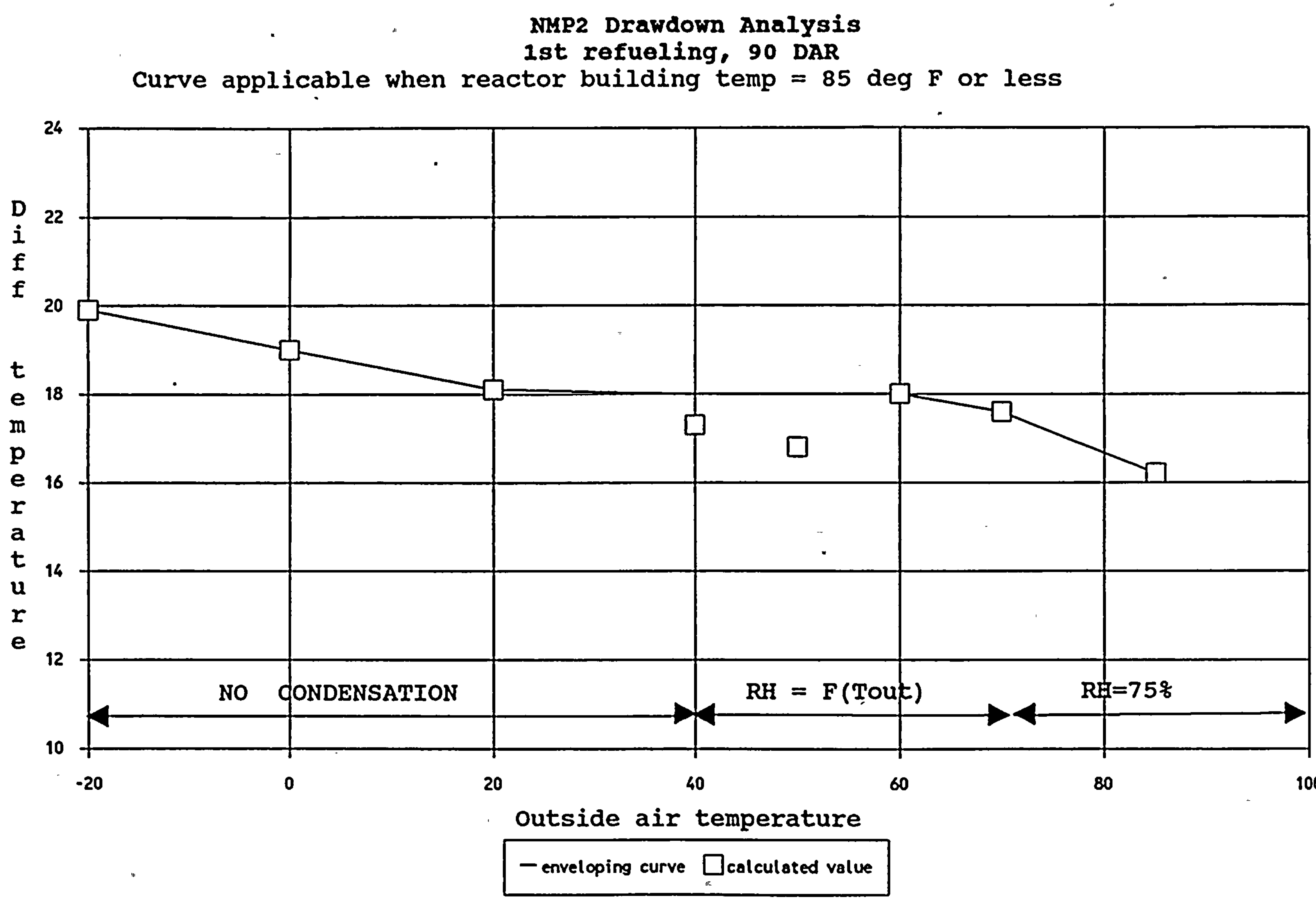
NIAGARA MOHAWK POWER CORPORATION

C. D. Terry
Vice President
Nuclear Engineering

TF/kms

xc: Regional Administrator, Region I
Mr. W. A. Cook, Senior Resident Inspector
Mr. R. A. Capra, Project Directorate No. I-1, NRR
Mr. D. S. Brinkman, Project Manager, NRR
Records Management

000530GG5



ATTACHMENT A