Duke Power
A Duke Energy Company

D.M. JAMIL
Vice President

Duke Power
Catawba Nuclear Station
4800 Concord Rd. / CN01VP
York, SC 29745-9635

803 831 4251
803 831 3221 fax

October 9, 2003

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

Subject: Duke Energy Corporation
Catawba Nuclear Station, Unit 1
Docket Number 50-413
Notice of Enforcement Discretion (NOED) Request
Technical Specification (TS) 3.6.6 Containment Spray System (CSS)

This letter documents the background and technical information supporting the Catawba Unit 1 request for Notice of Enforcement Discretion (NOED) for TS 3.6.6. This information was initially discussed with the NRC staff during telephone conference calls on October 8, 2003 at 1630 and 2100. Duke Energy received verbal approval for the Notice of Enforcement Discretion from the NRC at 2125 EST that same day.

As discussed in detail in Attachment 1, Catawba is requesting discretion from enforcing TS Limiting Condition for Operation (LCO) 3.6.6 as it pertains to Required Action A.1. This Required Action applies to the case of one containment spray system (CSS) train inoperable. At present, Catawba is engaged in inspection and restoration efforts on CSS heat exchanger 1B and the Completion Times for the above Required Actions expire on October 9, 2003 at 0400 hours. Necessary inspection, maintenance activities and subsequent testing will not be completed by October 9, 2003 at 0400 hours; therefore, this NOED request is being submitted. The details of the circumstances surrounding this NOED request are contained in Attachment 1. As shown in Attachment 1, Duke Energy maintains the granting of discretionary enforcement in this case is safety risk neutral and will not result in an undue risk to the safety and health of the public.

A001

This request for enforcement discretion was approved by the Catawba Plant Operations Review Committee (PORC) on October 8, 2003.

The requested duration of this enforcement discretion is for 336 hours beginning upon NRC approval. During this period Catawba will be engaged in activities to restore the 1B CSS heat exchanger to service and submit a Technical Specification change to address future plant operation. Absent the exercise of enforcement discretion, TS 3.6.6 requires Unit 1 to be in HOT STANDBY by 1000 on October 9, 2003 and in COLD SHUTDOWN by 1600 on October 12, 2003.

Catawba understands that, if granted, the requested enforcement discretion is for the conditions described in this request. For any other conditions that would cause the Unit 1 CSS train B to become inoperable, the appropriate Technical Specification Required Action would apply.

This request was prepared in accordance with the NRC Staff guidance included in the NRC Inspection Manual Part 9900 Technical Guidance Operations - Notices of Enforcement Discretion (Issue Date 11/02/01) and Regulatory Issues Summary (RIS) 2001-20 dated 11/14/01.

Catawba commits to replace the 1B CSS heat exchanger during the upcoming Unit 1 refueling outage scheduled to begin later this fall.

Should you have any questions concerning this request, please call G.D. Gilbert at (803) 831-3231.

Very truly yours,

Dhiaa M. Jamil

Attachment

xc (with attachment):

L.A. Reyes
U.S. Nuclear Regulatory Commission
Regional Administrator, Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

E.F. Guthrie
Senior Resident Inspector (CNS)
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

R. E. Martin
NRC Senior Project Manager (CNS/MNS)
U.S. Nuclear Regulatory Commission
Mail Stop O8-G9
Washington, D.C. 20555-0001

H.J. Porter
Assistant Director
Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

bxc (with attachment):

G.D. Gilbert (CN01RC)
R.D. Hart (CN01RC)
K.E. Nicholson (CN01RC)
M.T. Cash (EC05O)
D.J. Goforth (EC05N)
C.J. Thomas (MG01RC)
L.E. Nicholson (ON03RC)
NCMPA-1
NCEMC
PMPA
SREC
Document Control File 801.01
RGC Date File
ELL-EC05O

Attachment 1
Catawba Nuclear Station, Unit 1
Request for Enforcement Discretion
TS 3.6.6 Containment Spray System

Duke Energy hereby requests that the NRC grant discretion in enforcing TS LCO 3.6.6 relative to compliance with the 72-hour Completion Time of Required Action A.1 and allow the unit to remain in Mode 1 (Power Operation) until the work is completed for the remaining maintenance activities and conduct required subsequent testing. The 1B containment spray system (CSS) heat exchanger was taken out of service on October 6, 2003 at 0400 hours to allow for installing inspection ports. Inspection ports were being added in preparation for cleaning of the heat exchanger during the upcoming Unit 1 refueling outage. During the installation of the additional inspection ports, an initial inspection found the baffle plates were significantly degraded. The condition of the baffle plates was not what was expected because the recent inspections of the 1A CSS heat exchanger showed that the baffle plates were intact and not significantly degraded. Engineering, Operations and Maintenance investigated the cause of the baffle plate degradation. Necessary inspection, debris removal, maintenance activities and subsequent testing will not be completed to restore the 1B CSS heat exchanger to available status by October 9, 2003 at 0400 hours.

Duke Energy is requesting that the Completion Times of the above Required Actions be extended from the current 72 hours by an additional 336 hours from NRC approval of this NOED request. The basis for this request is delineated in the discussion below.

1. TS that will be violated

Catawba is requesting enforcement discretion from TS LCO 3.6.6. This LCO governs the containment spray system for Modes 1, 2, 3, and 4. LCO 3.6.6 requires in part that two CSS trains be operable. Condition A for this LCO states that with one CSS train inoperable, the CSS train must be restored to operable status within 72 hours. Condition B states that with the Required Action and associated Completion Time of Condition A not met, the unit must be in Mode 3 within 6 hours and in Mode 5 within 84 hours.

2. Circumstances surrounding the situation, including root

causes, the need for prompt action and identification of any relevant historical events.

At Catawba, the Containment Spray System provides containment atmosphere cooling to limit post accident pressure and temperature in containment to less than the design values. Reduction of containment pressure and the iodine removal capability of the spray reduce the release of fission product radioactivity from containment to the environment, in the event of a Design Basis Accident (DBA).

The containment spray system (CSS) consists of two separate trains of equal capacity, each capable of meeting the system design basis spray coverage. Each train includes a containment spray pump, one containment spray heat exchanger, spray headers, nozzles, valves, and piping. Each train is powered from a separate Engineered Safety Feature (ESF) bus. The refueling water storage tank (RWST) supplies borated water to the Containment Spray System during the injection phase of operation. In the recirculation mode of operation, containment spray pump suction is transferred from the RWST to the containment recirculation sump(s). When the containment spray system suction is from the containment recirculation sump, its associated heat exchanger receives nuclear service water system (NSWS) flow for cooling.

The CSS heat exchangers are of the shell and U-tube design. Borated water from the RWST or containment recirculation sump circulates through the tubes, while NSWS circulates through the shell. The shell side has several baffle plates installed to redirect the NSWS flow to ensure that the flow is directed across the tube bundle. During normal operation the NSWS side of the CSS heat exchangers is maintained in wet lay-up condition with the NSWS side isolated and treated water recirculated through the heat exchanger to the extent practicable.

At Catawba, the residual heat removal (RHR) system has been designed to include a provision for diversion of a portion of the RHR pump flow from the low head injection path to auxiliary spray headers in the upper Containment volume. For this mode, the RHR pumps continue to supply recirculation flow from the Containment sump to the core via the safety injection and centrifugal charging pumps. The diversion of the RHR flow from the low head injection path to the auxiliary spray headers occurs only after the switchover to the recirculation mode and no earlier than 50 minutes after initiation of the LOCA.

During the Unit 1 refueling outage 1EOC13 in May of 2002, Catawba

performed eddy current testing of both the 1A and 1B CSS heat exchangers. This included 100% of the tubes including the u-bends. In May of 2003, fouling was discovered in the 1A CSS heat exchanger that resulted in degraded performance. At that time Catawba requested and received a NOED to allow cleaning and restoration activities. This event was documented in licensee event report (LER) 413/03-004 submitted on July 10, 2003. As a result of this event Catawba installed additional inspection ports on the 1A CSS heat exchanger in August of 2003 for additional inspections. Engineering has reviewed the results of these inspections and concluded that the 1A CSS heat exchanger remains structurally sound and capable of performing its intended function. Engineering determined that inspections should be performed on the 1B CSS heat exchanger to document the as-found condition in preparation for heat exchanger cleaning scheduled for the upcoming refueling outage.

The root cause of the degradation of heat exchanger baffle plates is not known at this time. Duke Energy has formed an independent root cause team. This team is gathering data and evaluating potential root causes. Some contributing factors include a decreasing water quality in Lake Wylie and it is believed that during the initial startup of Unit 1, the 1B CSS heat exchanger had higher than normal NSWS flow through it to support minimum flow requirements for the NSWS.

A brief synopsis of events related to the 1B CSS heat exchanger issue is presented below:

Date/Time	Event Description
10/06/2003 0400	Operations removed the 1B CSS heat exchanger from service to allow maintenance to install inspection ports to support upcoming Unit 1 refueling activities.
10/06/2003 ~1900	Inspections of the 1B CSS heat exchanger revealed degradation of the baffle plates and tube support plates.
10/06/2003 ~2200	A unit threat team was formed to evaluate the results and determine the next course of action. Maintenance was requested to install some additional inspection ports.
10/07/2003 ~0400	The additional inspection ports were installed as requested on the 1B CSS heat exchanger. Inspection of the heat exchanger revealed similar degradation of the baffle

	plates and tube supports.
10/07/2003	Engineering continued its review of the inspection data to determine the extent of condition and its effect on the 1B CSS heat exchanger. Engineering identified additional inspection ports that would be required to support documenting the as-found condition.
10/08/2003 ~0428	Maintenance completed installing the additional inspection ports requested by Engineering. Engineering began additional inspection of the heat exchanger and collecting additional data.
10/08/2003	The Plant Operations Review Committee reviewed and approved the NOED request.
10/08/2003 ~1630	A telephone conference was held between the NRC and Catawba to request the NOED for the 1B CSS heat exchanger.
10/08/2003 2125	The NRC verbally granted the NOED request.

3. The safety basis for the request, including the evaluation of the safety significance and potential consequences of the proposed action.

Engineering has reviewed the events associated with the baffle plate degradation of the 1B CSS heat exchanger and reviewed the past operating history of this heat exchanger as well as the other CSS heat exchangers. The inspection results available from the 1A CSS heat exchanger cleaning completed in May of 2003 and subsequent inspections in August of 2003 indicate that the baffle plates were still intact and retained sufficient structural integrity to perform their intended function. No operability concerns exist for the 1A CSS heat exchanger.

Quantitative Risk Analysis

Duke Energy has evaluated the effect of remaining at power for an additional 336 hours with the 1B CSS heat exchanger out of service using an Internal and External Events probabilistic risk assessment with average unavailabilities. The Containment Spray System (CSS) has no impact on the calculated core damage frequency (CDF). The CSS is not included in the Level One PRA model. The CSS has no significant impact on the calculated large

early release frequency (LERF). At Catawba, LERF is dominated by sequences involving inter system loss-of-coolant-accidents (ISLOCAs) or pressure spikes due to hydrogen burns. It is unlikely that the CSS could handle the pressure spikes due to a hydrogen burn.

Large Late Release Frequency (LLRF)

The CSS system may have some impact on Large Late Releases. However, the impact of one CSS train unavailable is expected to be small. Generally, accidents that lead to core damage involve loss of support systems and the independent failures are not large contributors. These systems support both the core damage mitigation systems as well as CSS.

The increase in the Large Late Release Frequency can be approximated by multiplying the frequency of the Intact Containment release categories with sprays available by the failure probability of CSS with only one train (2.3E-02). Note that this approximation is conservative since it assumes that a CSS train failure will move a sequence from the Intact Containment category to the Late Containment Failure category.

The increase in the Large Late Release Frequency is approximately 2.2E-08 for a 14 day CSS extension. This increase is approximately 0.08 percent of the total late containment failure probability for a year.

Compensatory Actions

A qualitative assessment of the risks that were not considered in the quantitative analysis resulted in the development of several compensatory measures. These will be implemented during the period of non-compliance with the Technical Specifications. They include:

- The core damage frequency (CDF) at Catawba is dominated by the risk from the turbine building flood initiator. This risk will be mitigated by controlling the work performed on associated systems and increased turbine building rounds on Unit 1 and Unit 2 by Operations during the period of time this NOED is in effect which will reduce the likelihood of this initiator below the random occurrence rate. This includes no discretionary maintenance performed on the Unit 1 or Unit 2 Condenser Circulating Water System and Cooling Towers that would increase the probability of a turbine building flood. This action results in a reduction of risk.

- An operator will be assigned to control the Unit 1 auxiliary feedwater flow control valves in the event that flow control is lost following a loss of offsite power on Unit 1. Continuing to use steam generators to remove heat from the core and to provide steam to the turbine driven auxiliary feedwater pump is preferable to shutdown cooling as the turbine driven auxiliary feedwater pump provides the capability to mitigate a station blackout in conjunction with the standby shutdown system (SSS). One of the more important operator actions as identified in the PRA is manually throttling the auxiliary feedwater flow to the steam generators following a turbine building flood or loss of offsite power. Improved operator awareness of the importance of this action and improved operator response to these events results in a reduction of risk over that identified in the PRA.

- The PRA also identifies two additional operator actions that if not performed could adversely impact an event. They are failure to swap to high pressure recirculation and failure to cross-connect off-site power via transformers SATA/SATB following a loss of all AC power. Operations will provide just-in-time training to the operators on shift on the importance of these actions and review the procedure actions to be taken. This will heighten the awareness of these actions to the operators and the actions they will be required to take. This will commence during the day shift beginning October 9, 2003.

- No discretionary maintenance or testing on the offsite power system (switchyard) and maintaining operability of required offsite circuits. Limiting the performance of maintenance or testing on the offsite power system and maintaining offsite circuits operable reduces the likelihood of losing off site power and represents a reduction in risk.

- No maintenance will be performed on CSS Train 1A.

- No discretionary maintenance will be performed on the Unit 1 emergency core cooling systems. This action will reduce the risk impact on late releases due to small and medium LOCAs.

- No discretionary maintenance will be performed on the instrument air systems. This action will reduce the risk impact on late releases due to loss of instrument air.

- In the event that an earthquake occurs that produces a peak acceleration value greater than 0.01 g's, Operations will isolate the 1B CSS heat exchanger. This applies during and after the restoration activities for the 1B CSS heat exchanger.

- During the time the NOED is in effect, the activities required to restore the 1B CSS heat exchanger to functional status will be worked on a round the clock basis to ensure timely completion.

- During the time period of this NOED, if for some unrelated reason Catawba Unit 1 experiences a forced outage, the 1B CSS heat exchanger would be replaced.

By limiting the performance of discretionary maintenance or testing there is improved defense-in-depth. This results in a reduction in risk.

Other Considerations

Additional qualitative considerations that were not considered previously resulted in the following observations.

The fact that Catawba is limiting maintenance should reduce the CDF below the average and typically this is approximately 20% below the average CDF.

Additionally, Catawba has replaced the reactor coolant pump seals (with the exception of the 1D reactor coolant pump) with a newer model with the high temperature o-ring material. This material significantly reduces the probability of a reactor coolant pump seal LOCA following a loss of all seal cooling.

Entry into and operation of shutdown cooling is not without risk as it involves significant plant manipulations and evolutions on both the primary and secondary side by Operations personnel. This risk is averted by remaining at power.

Conclusion:

Taking into consideration the proposed compensatory actions and other considerations noted above, it is concluded that the qualitative risk reduction offsets the quantitative risk assessment such that this request is overall safety and risk neutral and represents no net increase in radiological risk as a result of having the 1B CSS heat exchanger out of service for an additional 336 hours.

Based on the above discussion it has been determined that the requested period of non-compliance with the Technical Specifications of 336 hours will not present an undue risk to the plant or to the health and safety of the public.

4. Justification for the duration of the noncompliance

The duration of the noncompliance is limited to the time required to complete remaining maintenance activities and conduct required subsequent testing of the 1B CSS heat exchanger plus margin to accommodate unforeseen circumstances. After the inspection and debris removal is complete the inspection ports will be covered to restore the pressure boundary of the 1B CSS heat exchanger and the CSS system will be filled and vented. Post maintenance testing will be performed which includes performing the resistance factor and CSS heat exchanger heat balance test. Based on the results of these tests engineering will determine if a NSWS system flow balance is required. Catawba is therefore requesting that the current 72-hour Completion Times be extended by an additional 336 hours. This will provide for adequate time to complete the activities.

5. The basis for the licensee's conclusion that noncompliance will not be of potential detriment to the public health and safety and that no significant hazard consideration is involved.

NRC granting of this request for enforcement discretion will not have any adverse consequences from the standpoint of public health and safety. Relief from the applicable 72-hour Completion Times to support the remaining corrective maintenance and testing activities is preferable to the transient that would be incurred if Unit 1 were forced to shut down while the CSS heat exchanger work is in progress. Duke Energy has evaluated the consequences of this request and determined it to be risk neutral. Should any unplanned adverse situation occur which renders the 1A CSS train inoperable, Unit 1 would then comply with the Required Action and Completion Time of Condition B of LCO 3.6.6 or TS 3.0.3 which ever is applicable.

There are no significant hazards considerations associated with this request for enforcement discretion. This is demonstrated as follows:

This request for enforcement discretion does not involve a significant increase in the probability or consequences of an accident previously evaluated. Granting of this request will have no effect on accident probabilities, since the 1B CSS heat

exchanger is not considered accident initiating equipment and no physical changes are being made to the plant which would impact accident probabilities. Granting of this request would not result in any adverse impact from the standpoint of availability or reliability of the 1A CSS train. The RHR capability for auxiliary containment spray will still be available to supplement any containment spray requirements during the recirculation phase of an accident. Also, this request was evaluated and found to be risk neutral. Therefore, there will be no significant increase in any accident consequences. This request for enforcement discretion does not create the possibility of a new or different kind of accident from any accident previously evaluated. No new accident causal mechanisms are created as a result of the NRC granting of this request for enforcement discretion. No changes are being made to the plant which will introduce any new accident causal mechanisms.

This request for enforcement discretion does not involve a significant reduction in a margin of safety. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. At Catawba the ice condenser is designed to limit the containment pressure below the design pressure for all reactor coolant pipe break sizes up to and including a double-ended severance. The CSS supplements the ice condenser until all the ice is melted by which time the residual spray headers from the RHR system are also available to remove energy directly from containment. The 1A CSS is operable and will remain operable through out the time this NOED is in effect. The 1A CSS is fully redundant to the 1B CSS. Catawba will hydro test the tubes in the 1B CSS heat exchanger to ensure that tube integrity is maintained. Both the 1A and 1B CSS heat exchanger tubes were eddy current tested in May of 2002 and any tubes not meeting acceptance criteria were plugged.

Therefore, the performance of these fission product barriers will not be degraded by the NRC's granting of this request. No safety margins will be affected. The risk implications of this request were evaluated and found to be risk neutral.

6. The basis for the licensee's conclusion that the noncompliance will not involve adverse consequences to the environment.

This request for enforcement discretion will not result in any significant changes in the types, or significant increase in the

amounts, of any effluents that may be released offsite. In addition, no significant increase in individual or cumulative occupational radiation exposures will be involved as a result of the request. Therefore, it can be concluded that the NRC's granting of this request for enforcement discretion will not involve any adverse consequences to the environment.

7. Proposed compensatory measures

In conjunction with this request, Catawba has taken or will take the following compensatory measures during the period the NOED is in effect:

- No discretionary maintenance will be performed on the Instrument Air (IA) System.

- No discretionary maintenance will be performed on either train of the Unit 1 Emergency Core Cooling System (ECCS).

- No maintenance will be performed on CSS Train 1A.

- Operations will increase turbine building tours on Unit 1 and Unit 2. This includes no discretionary maintenance performed on the Unit 1 or Unit 2 Condenser Circulating Water System and Cooling Towers that would increase the probability of a turbine building flood.

- A dedicated operator will be assigned to control the Unit 1 auxiliary feedwater flow control valves in the event that flow control is lost following a loss of offsite power.

- Operations will provide just-in-time training to the operators on shift on the importance of the operator actions due to failure to swap to high pressure recirculation and failure to cross-connect off-site power via SATA/SATB following a loss of all AC power. This will include the importance of these actions and a review of the procedure actions to be taken. This will commence during the day shift beginning October 9, 2003.

- No discretionary maintenance or testing on the off site power system (switchyard) will be performed, and offsite circuits will be maintained operable.

- In the event that an earthquake occurs that produces a peak acceleration value greater than 0.01 g's, Operations will isolate the 1B CSS heat exchanger. This applies during and

after the restoration activities for the 1B CSS heat exchanger.

- During the time the NOED is in effect, the activities required to restore the 1B CSS heat exchanger to a functional status will be worked on a round the clock basis to ensure timely completion.

- During the time period of this NOED, if for some unrelated reason Catawba Unit 1 experiences a forced outage, the 1B CSS heat exchanger would be replaced.

8. Statement that the request has been approved by the facility organization that normally reviews safety issues.

This request was reviewed and approved by the Catawba Plant Operations Review Committee in a special meeting on October 8, 2003.

9. Which of the NOED criteria for appropriate plant conditions specified in Section B is satisfied.

This request is intended to avoid an undesirable unit shutdown transient as a result of requiring compliance with the TS and, thus, minimize potential safety consequences and operational risks.

10. If a follow-up license amendment is required, the NOED request must include marked-up TS pages showing the proposed TS changes.

No follow-up license amendment is required in conjunction with this NOED request.

11. Severe weather related or natural phenomena related NOEDs.

This NOED is not related to severe weather or natural phenomena.