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TO:	FROM:	
Mr. Edson G. Case	Indiana & Michigan Power Co. New York, N. Y. 10004 John Tillinghast	DATE OF DOCUMENT 11/17/77 DATE RECEIVED 11/18/77

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DESCRIPTION Consists of infomation concerning the use of multi-pin connectors on safety cables at their connection to the inside of containment electrical penetrations... w/att supporting information...Notorized 11/17/77.........

2p + 6p

ENCLOSURE

PLANT NAME: COOK jcm 11/18/77

NOTE: CYS. ALREADY PLACED IN NRC & LOCAL PDR'S PER INSTRUCT. RDIGGS 11/18/77

1 [redacted]. ENCL.

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NEW YORK, N. Y. 10004

November 17, 1977

Donald C. Cook Nuclear Plant Unit No. 1
Docket No. 50-315
DPR No. 58

Mr. Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Case:

This letter and its attachments are submitted in response to the NRC Staff's oral request today for additional information concerning the use of multi-pin connectors on safety cables at their connection to the inside of containment electrical penetrations. The only use of such connectors at Donald C. Cook Nuclear Plant Unit 1 is on instrumentation circuits for a total of seventy (70) instruments. These instruments and their function are listed in Attachment A.

Yesterday, we telecopied to the Staff portions of our Specification DCC-EE-115 QCN describing our post-accident environmental criteria for the electrical penetrations and connectors and the first two (2) pages of Mil. Spec. - C - 5015 which show that the connectors used were qualified for operation at temperatures up to 257° F.

Since documentation is not available to demonstrate that these connectors and their associated circuity will operate in the total post-accident environment, including the effects of pressure, steam and certain chemicals, we are committed to qualifying these connectors for this environment or replacing them with connections that are so qualified. In the interim until this is done, Attachment B provides assurance that we have the capability to safely trip the reactor, initiate safety injection, isolate the containment and monitor the course of the accident without reliance on the connectors in question.

Attachment B also demonstrates an ability to safely shut down the reactor, keep it in a safe shutdown condition and meet all the requirements of 10 CFR 50, Appendix K.

In addition to this, a significant additional public health and safety consideration is the very low likelihood of a high energy pipe break which would call upon the connectors to function. This low probability is documented in WASH - 1400 and is reduced even further by the short period of time to which the current review applies.

Finally, to provide even further assurance that the plant will continue to operate safely, we will immediately implement the administrative procedures set forth in Attachment C.

Very truly yours,

John Tillinghast
Vice President

Sworn and subscribed to before me on this 17th day of November, 1977 in New York County, New York

Notary Public

GREGORY M. GURICAN
Notary Public, State of New York
No. 31-4643431
Qualified in New York County
Commission Expires March 30, 1978

cc: R. C. Callen
P. W. Stekett
R. Walsh
R. J. Vollen
D. V. Shaller - Bridgman
R. W. Jurgensen
G. Charnoff

ATTACHMENT
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Number	Nomenclature	Function
NTP-110	RCS HL RTD Bypass-Narrow Range-Loop 1	Overpower ΔT Rx Trip
NTP-111	RCS HL RTD Bypass-Narrow Range-Loop 1	Overtemp ΔT Rx Trip
NTP-210	RCS CL RTD Bypass-Narrow Range-Loop 1	
NTP-211	RCS CL RTD Bypass-Narrow Range-Loop 1	
NTP-120	RCS HL RTD Bypass-Narrow Range-Loop 2	
NTP-121	RCS HL RTD Bypass-Narrow Range-Loop 2	
NTP-220	RCS CL RTD Bypass-Narrow Range-Loop 2	
NTP-221	RCS CL RTD Bypass-Narrow Range-Loop 2	
NTP-130	RCS HL RTD Bypass-Narrow Range-Loop 3	
NTP-131	RCS HL RTD Bypass-Narrow Range-Loop 3	
NTP-230	RCS CL RTD Bypass-Narrow Range-Loop 3	
NTP-231	RCS CL RTD Bypass-Narrow Range-Loop 3	
NTP-140	RCS HL RTD Bypass-Narrow Range-Loop 4	
NTP-141	RCS HL RTD Bypass-Narrow Range-Loop 4	
NTP-240	RCS CL RTD Bypass-Narrow Range-Loop 4	
NTP-241	RCS CL RTD Bypass-Narrow Range-Loop 4	
NTR-110	RCS HL RTD Well-Wide Range-Loop 1	Recording Only - No Safety
NTR-120	RCS HL RTD Well-Wide Range-Loop 2	
NTR-130	RCS HL RTD Well-Wide Range-Loop 3	
NTR-140	RCS HL RTD Well-Wide Range-Loop 4	
NTR-210	RCS CL RTD Well-Wide Range-Loop 1	
NTR-220	RCS CL RTD Well-Wide Range-Loop 2	
NTR-230	RCS CL RTD Well-Wide Range-Loop 3	
NTR-240	RCS CL RTD Well-Wide Range-Loop 4	
NPP-151	Pressurizer Pressure	SI-Low Pressure coincident with Lo Level
NPP-152	Pressurizer Pressure	Hi Pressure - Rx Trip
NPP-153	Pressurizer Pressure	Lo Pressure - Rx Trip
NLP-151	Pressurizer Level	SI-Low Pressure coincident with Lo Level
NLP-152	Pressurizer Level	Hi Level - Rx Trip
NLP-153	Pressurizer Level	
NLI-151	Pressurizer Level Indicator	Indication only-no safety function
NPS-153	Pressurizer Pressure Switch	Pressurizer Lo pressure-Rx trip
NFP-210	RCS Loop 1 Flow	Loss of Flow - Rx trip
NFP-220	RCS Loop 2 Flow	
NFP-230	RCS Loop 3 Flow	
NFP-240	RCS Loop 4 Flow	
NFP-211	RCS Loop 1 Flow	
NFP-221	RCS Loop 2 Flow	
NFP-231	RCS Loop 3 Flow	

ATTACHMENT A
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Number	Nomenclature	Function
NFP-241	RCS Loop 4 Flow	Loss of Flow - Rx trip
NFP-212	RCS Loop 1 Flow	
NFP-222	RCS Loop 2 Flow	
NFP-232	RCS Loop 3 Flow	
NFP-242	RCS Loop 4 Flow	
NPS-121 (PT-403)	RCS Wide Range Pressure-Loop 2	Permissive on RHR System Open, Auto close on RHR over 600psi & RCS solid water operation Pres. Protection
NPS-122 (PT-405)	RCS Wide Range Pressure-Loop 1	
BLP-110	Steam Generator Level-Narrow Range-Loop 1	Lo-Lo level-Rx trip & auto start auxiliary feedwater; Hi-Level-Turbine trip, Feedwater isolation & trip main feedpump
BLP-120	Steam Generator Level-Narrow Range-Loop 2	
BLP-130	Steam Generator Level-Narrow Range-Loop 3	
BLP-140	Steam Generator Level-Narrow Range-Loop 4	
BLP-111	Steam Generator Level-Narrow Range-Loop 1	
BLP-121	Steam Generator Level-Narrow Range-Loop 2	
BLP-131	Steam Generator Level-Narrow Range-Loop 3	
BLP-141	Steam Generator Level-Narrow Range-Loop 4	
BLP-112	Steam Generator Level-Narrow Range-Loop 1	
BLP-122	Steam Generator Level-Narrow Range-Loop 2	
BLP-132	Steam Generator Level-Narrow Range-Loop 3	
BLP-142	Steam Generator Level-Narrow Range-Loop 4	
BLI-110	Steam Generator Level-Wide Range-Loop 1	Records & Indicates Only-No Safety
BLI-120	Steam Generator Level-Wide Range-Loop 2	
BLI-130	Steam Generator Level-Wide Range-Loop 3	
BLI-140	Steam Generator Level-Wide Range-Loop 4	
MFC-110	Main Steam Flow-Loop 1	Rx trip on Main Steam flow-Feedwater flow mismatch; Hi Steamline Flow-Steamline Isolation
MFC-111	Main Steam Flow-Loop 1	
MFC-120	Main Steam Flow-Loop 2	
MFC-121	Main Steam Flow-Loop 2	
MFC-130	Main Steam Flow-Loop 3	
MFC-131	Main Steam Flow-Loop 3	
MFC-140	Main Steam Flow-Loop 4	
MFC-141	Main Steam Flow-Loop 4	

Attachment B

Capability of Assurance of Reactor Trip, Safety Injection Signals and Ability to Monitor the Course of the Accident Following a High Energy Line Break Inside Containment

1. The Ability to Initiate Safeguards from Inside the Containment

The first point to be considered is that such a high energy line break inside containment is extremely unlikely event particularly in the short period of time required to qualify or replace connectors to resolve this matter. Electrical penetrations exit the containment in 4 quadrants such that the trip signals for the unaffected quadrants could occur before the hostile environment is experienced at their location. With regard to automatic actuation of safety systems and reactor trip, those functions are actuated by containment pressure signals at 1.2 PSI. For an environment more severe than 1.2 PSI, the safety function will have already been initiated by containment pressure signal. It is unlikely that a mild environment of about 1 PSI will fail the connectors. In addition, were all the connectors to fail in the shorted mode, numerous trip signals would occur due to the functional diversity of the protection system. Thus automatic initiation of the required safety functions is assured.

2. Subsequent Operator Action

For operator action required following a loss of coolant accident, a steam line break or a feedwater line break, the following apply: For the loss of coolant accident, the only manual action required is switchover. This action is initiated based on the refueling water storage tank level which is outside containment. For the steam line and feedwater line break, in the absence of normal reactor coolant system and pressurizer instrumentation, the operator can allow auxiliary feedwater and safety injection to run indefinitely. At this point in plant life, the reactor coolant system integrity will be maintained even if the system is pressurized to the relief valve setpoints.

3. The Backup Ability to Detect an Accident and Initiate Safeguards, and the Ability to Monitor the Course of an Accident

A review was conducted of the important variables whose status following a LOCA, steamline break or feedwater line break are needed by the operator for detection of the accident, initiation of safeguards and monitoring the course of the accident and which do not require the operability of the ITT Cannon electrical connectors inside the containment. The variables are:

1. Containment pressure - transmitters are located outside the containment.
2. Steam generator pressure - this parameter is monitored outside the containment and also yields steam temperature because of the saturated state.
3. Reactor coolant system temperature - an approximate temperature is indicated by steam generator pressure (see Item 2 above).
4. Reactor coolant system pressure - this is monitored by a pressure instrument on the discharge of the centrifugal charging pump. This instrument is not isolated by containment isolation. In addition, reactor coolant pressure is available from dead weight tester NPX-151.
5. Pressurizer Water Level - this parameter can be evaluated indirectly through the use of normal charging flow instrumentation outside containment, evaluation of total drain flow from containment sumps by use of sump pump run time counter located outside containment or evaluation of RWST level decrease.
6. Refueling Water Storage Tank Water Level: normal instrumentation located outside containment.
7. Boric Acid Tank Solution level: normal instrumentation located outside containment.
8. Steam Generator Water Levels: approximate water levels will be obtained by installing a differential pressure cell on the steam generator blowdown sample line and the steam outlet sample line, both located in the Nuclear Sample Room. To monitor this variable, an instrumentation and control technician will be available 24 hours a day until such time that the testing of the connectors is completed.

4. Expected response time following a high energy line break inside containment

Question 19 of Appendix N of the FSAR provides the pressure responses for a spectrum of loss of coolant accidents. For the large break, this shows that the containment hi pressure signal of 1.2 psi will be reached in 0.2 seconds or less following the release to the containment. The steam line break response is similar. This coupled with an actual measured instrument response time of less than 0.4 seconds to initiate a safety injection signal is within the envelope of safety injection actuation time assumed in the analysis. Thus the total response following a high energy line break within containment is within the envelope assumed in the safety analysis, and the resulting post accident parameters will be within the limits specified in 10CFR50.46 Appendix K to 10CFR Part 50.

Attachment C

In addition to the ability of the operator to monitor and control the events as noted in the above items 1 through 8, we will also commit to manual emergency shutdown and/or Safety Injection actuation if either of the following occurs:

(1) actuation of the Ice Condenser Door "open" lamps coincident with either low steamline pressure or rise in containment pressure occurs,

(2) an increase in containment humidity of 25% within a period of 5 seconds on both containment humidity detectors coincident with an indication of containment pressure rise.

None of these items would be effected by the failure of the ITT Cannon connectors. The Ice Condenser doors "open" lamps are hard-wired through the containment penetration and the steamline and containment pressure indicators are located outside containment. The time response of the humidity detectors is short, relative to the accident environment reaching the containment penetration feedthrough.

At any time we are below 10% power on Unit 1 until the ITT Cannon connectors are qualified or replaced, we will manually initiate start of auxiliary feedwater pumps and maintain them in operation until shutdown or return to power.