Consumers Power Company

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0550

October 28, 1985

Director,
Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -
REQUEST FOR APPROVAL TO INSTALL ISOLATION SWITCHES -
COMPLIANCE WITH 10CFR50.48 AND APPENDIX R

10CFR50.48, Paragraph c.5 requires that design descriptions of modifications which affect alternate shutdown capability be submitted for prior review and approval. In the process of complying with that requirement, Consumers Power Company, in the June 19, 1985 fire protection submittal, committed to submit detailed drawings of the location of isolation switches installed in the control circuits of essential safe shutdown equipment. The schematic drawings and design description contained in Attachment I furnish the necessary detail to perform a design review and are being submitted in lieu of detailed drawings. Attachment I provides the design description of switch installations which may be necessary for the isolation of certain remote control circuits and thereby to ensure post-fire alternate shutdown capability. Therefore, prior review and approval of these switches is required.

Furthermore, the installation of isolation switches in the control circuits of certain safety equipment has been determined to be an unresolved safety question as defined in Section a.2. of 10CFR50.59 by the Palisades Plant Review Committee. Pursuant to 10CFR50.59 Section 2.c, Attachment I and II together provide a full description of the desired change and a safety analysis.

Engineering associated with these isolation switches has recently been completed and installation is scheduled to begin as soon as NRC approval is received. Since the installation of these switches must be completed before plant startup from the upcoming refueling outage (startup is planned for mid February, 1986) your prompt attention to this matter is requested.

A006 1/1 w/check $150.00 #505658

OC1085-0007B-NL02

A check in the amount of $150.00 is enclosed as required by 10CFR170.21.

James L. Kuemin

James L Kuemin
Staff Licensing Engineer

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

ATTACHMENT I

Consumers Power Company
Palisades Plant
Docket 50-255

ISOLATION SWITCHES

DESIGN DESCRIPTION OF THE INSTALLATION OF ISOLATION SWITCHES TO COMPLY WITH THE CRITERIA OF 10CFR50.48 AND APPENDIX R

October 28, 1985

12 Pages

ATTACHMENT I
Palisades Plant
DESIGN DESCRIPTION OF THE INSTALLATION
OF ISOLATION SWITCHES TO COMPLY WITH
THE CRITERIA OF 10CFR50.48 AND APPENDIX R

I. General

Alternate safe shutdown capability depends on the transmission of electrical power from the 1-1 diesel generator to either a charging pump or a high pressure safety injection (HPSI) pump. In order to maintain an adequate margin of subcooling in the Primary Coolant System (PCS), the 1-1 diesel must start within 2.25 hours of the time offsite power is lost. Worst case assumption is that offsite power is lost simultaneously with reactor trip.

In the Palisades electrical distribution system, when operating a 480V breaker, local control overrides a remote signal. Locally overriding a remote signal to the larger 2400 volt breakers is not as easily accomplished. Because of breaker design, the magnitude of the power involved, and personnel safety, the remote signal must be isolated from the breaker before local control is accomplished. For example, if a spurious trip signal from the remote circuit has caused the breaker to open, the only safe method of locally closing that breaker is to remove the trip signal by isolating it from the breaker.

A Cable Spreading Room fire, a Control Room fire, a fire in the 590' corridor of the Auxiliary Building or an Engineered Safeguards Panel Room fire, could cause an open or a hot short in the remote control

circuits of equipment which must be operable in order to operate the diesel generator, transmit electrical power from the diesel generator to the 1C bus, transmit power from the 1C bus to a service water pump which cools the diesel generator, and to transmit power from the 1C bus to either a charging pump or a HPSI pump which, in turn, is necessary to maintain pressure, reactivity control, and inventory in the PCS. The service water pump and the HPSI pump receive their power directly from the 1C bus. The charging pump can receive 480V power from a source in the Cable Spreading Room or a source in the Turbine Room. (See attached Sketch No 1.)

To ensure that malfunctions in control circuits will not cause the inoperability of the diesel generator or the breakers which must close to transmit the required power, switches which will isolate the remote control circuits will be installed:

A. In the control circuit for voltage control of diesel generator 1-1.

B. In the control circuit for speed control of diesel generator 1-1.

C. In the control circuit of breaker 152-107 which connects diesel generator 1-1 to the 2400 V 1C bus.

D. In the control circuit of breaker 152-103 which connects the 1C bus to the service water pump P-7B.

E. In the control circuit of breaker 152-110 which connects the 1C bus to Station Power Transformer No. 13, located in the Turbine Room, which can be used to supply 480 volt power to charging pumps P-55 B and C.

The isolation switches described in A and B above are to be located in the 1-1 Diesel Generator Room. The isolation switches described in C, D, and E will be located in the 1C Switchgear Room.

In the case of a worst case fire in the 590' corridor of the Auxiliary Building renders the charging pumps P-55B and P-55C inoperable, HPSI pump P-66B will be used for PCS pressure, reactivity, and inventory control. Neither the control nor power circuits for P-66B are located in the 590' corridor fire area. Therefore, no isolation switch is required in the remote control circuit of HPSI pump P-66B.

II. Design Description

A. Assumptions

Basically, two types of "hot shorts" exist. One is the shorting of one wire to another wire. An example of this is illustrated in Figure 1. The other is the shorting of two wires in a circuit to two wires in another circuit and is referred to as a double "hot short." This situation is illustrated in Figure 2.

The first type of short, ths single hot short, is protected against in the isolation circuit design. Isolation switches are located in control circuits such that they will remove the portion of the circuit which passes through the Cable Spreading Room, Control Room, 590' corridor, or Engineered Safeguards Panel Room. In addition, backup fuses are added to the local circuits to provide a redundant path of control power. The backup fuses are placed by the isolation switches, concurrent with remote circuit isolation, into the local control circuit. Therefore, not only will the isolation switches remove a portion of the faulted or potentially faulted circuit, they will also switch in redundant fuses and allow local operation of the equipment. This design is schematically presented in Figure 3.

The double "hot short" was not protected against in this design because it is not a credible occurrence. This decision was based on several cable design features. One cable carries the conductors (two or more) required for one circuit. The conductors are individually insulated and then are spirally bound within an outer jacket, thus the conductors are never in the same relative position with respect to the outer jacket.

In order to have a double "hot short," the spiralled conductors carrying the required voltage and polarity would have to contact each other in exact locations. This contact would not only have to

be one of exact voltage and polarity, but it would also have to be the correct spiralled conductor in one cable with the correct spiralled conductor of another cable and neither conductor could contact the grounded cable tray or conduit.

Based on the low probability of the concurrent occurrence of these events, the double "hot short" is considered incredible. This position is similar to the established NRC position that a 3-phase motor need not be protected against a 3-phase short.

B. Design Description

The installation of isolation switches results in modification of the control circuits for three breakers and Diesel Generator 1-1 and involves the installation of General Electric Type SBM Transfer Switches. The GE Type SBM switches have two positions, "local" and "remote." When the switches are in the "remote" position, the control circuits will operate as they presently exist - allowing operation from the control room. When the switches are switched to "local" then all control circuits outside the local equipment panels will be electrically isolated.

In all three breaker panels, backup control power fuses are added. These fuses remain isolated from the control circuits until the isolation switches are switched to "local," and ensure that local control power will be available for the required breaker operation.

The panels involved in this project are Breaker Panel 152-103 for power to Service Water Pump 7B, Breaker Panel 152-107 - the Diesel Generator 1-1 Output Breaker, Breaker 152-110 for power to Station Power Transformer # 13, Diesel Generator 1-1 exciter panel C22, and Diesel Generator 1-1 gauge panel G20.

Identical isolation switches are used in each of the five panels. The switches have five contacts which are closed when the switch is in the "local" position and fifteen contacts which are closed when the switch is in the "remote" position. The number of contacts actually used to isolate or enable the remote and local controls is different for each panel as illustrated in Table 1.

TABLE 1

ISOLATION SWITCH CONTACT POSITION

Panel No	Contact Position	Contacts Used — Control Circuit Switch Position Local	Contacts Used — Control Circuit Switch Position Remote	Contacts Spare — Control Circuit Switch Position Local	Contacts Spare — Control Circuit Switch Position Remote
152-103	Open	9	3	6	2
	Closed	3	9	2	6
152-107	Open	8	2	7	3
	Closed	2	8	3	7
152-110	Open	4	4	11	1
	Closed	4	4	1	11
G-20	Open	14	2	1	3
	Closed	2	14	3	1
C-22	Open	15	4	0	1
	Closed	4	15	1	0

As an added security measure, all five switches are equipped with unique removable handles. The handles are removed when the switch is in the "remote" position and the control circuits are operating normally. The switch handles are designed to only fit these control isolation switches and the isolation switches are designed to prevent handles from other switches being used to make them operate. The switches can be moved to the "local" position only when the proper handles are inserted. The handles can not be removed from the switch until the switch is placed back in the "remote" position. Access to these unique handles is to be administratively controlled.

ATTACHMENT II

Consumers Power Company
Palisades Plant
Docket 50-255

ISOLATION SWITCHES

SAFETY ANALYSIS

October 28, 1985

3 Pages

ATTACHMENT II

SAFETY ANALYSIS

Consumers Power Company presents this evaluation of the hazards considerations involved with the installation of isolation switches in the remote control circuits of equipment essential for hot shutdown as defined by 10CFR50.48 and Appendix R. The installation has been determined to be an unresolved safety question by the Plant Review Committee at Palisades.

The following analysis is pursuant to the requirements of 10CFR50.59, and 50.90; and will justify the conclusion that the installation of isolation switches as described in Attachment I does not significantly increase the probability or consequences of an accident previously evaluated; create the possibility of a new or different kind of accident from an accident previously evaluated; or, involve a significant reduction in the margin of safety. Therefore, a prompt approval to install the described isolation switches is justified.

The isolation switches installed in this project are in the control circuits of equipment for which there is redundant equipment that will not be affected by failure of these switches. Accidents previously evaluated have been evaluated with the assumption that one of two redundant trains of equipment is inoperable. Failure of an isolation switch, except during its postfire operation after a worst case fire, can do nothing worse than make a piece of

redundant safe shutdown equipment inoperable. That is the same condition assumed during previously evaluated accident probabilities or consequences. (Note that except for Loss of Offsite Power, the single failure criteria need not be applied to fire scenarios.)

The switches involved are qualified to IEE-344-1975 and are the same type used throughout industry. Installation and testing will meet the same codes and standards as used for other similarly classified equipment at Palisades. Therefore, Consumers Power Company concludes that the installation of isolation switches as described in Attachment I does not significantly increase the probability or consequences of an accident previously evaluated.

The worst case failure of any or all of the switches installed, as described in Attachment I, can result in causing the 1-1 Diesel Generator, the 1C 2400V bus, the P-7B Service Water Pump and the No. 13 Station Power Transformer to be inoperable. The inoperability of this equipment singularly or all at one time does not create the possibility of a new or different kind of accident, because redundant equipment is available. Therefore, no new or different kinds of accident from any accident previously evaluated is created.

Redundant equipment, whose function is not affected by the failure or operability of the newly installed switches, is available to maintain the margin of safety associated with the effected systems. The probability of malfunction or failure of the new switches is small during the time that redundant equipment may be inoperable. The time that this redundant equipment is allowed to be inoperable during plant operation is also restricted by the Technical

Specifications. Switch design and the standards to which each is installed and tested result in a very reliable switching operation. Therefore, the amount of reduction in the margin of safety due to the postulated failure of these switches is considered very small. The overall increase in the margin of safety due to the ability to quickly isolate remote controls after or during a worst case fire may have a more significant effect. The overall margin of safety, therefore, may have a net increase; or if it is reduced, is reduced by an insignificant amount.