Consumers Power Company

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August 19, 1983

83-02 #3

50-329
50-330

Mr J G Keppler, Regional Administrator
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
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MIDLAND NUCLEAR COGENERATION PLANT -
DOCKET NOS 50-329 AND 50-330
NSSS AND BOP INSTRUMENT CABINETS
FILE: 0.4.9.74 SERIAL: 23768

References: J W Cook letters to J G Keppler, same subject

(1) Serial 20697, dated February 11, 1983
(2) Serial 22189, dated May 16, 1983

This letter, as were the referenced letter, is an interim 50.55(e) report concerning deficiencies in the installation design of certain Class 1E cabinets/panels. The attachment to this letter provides a description of the deficiencies and the corrective actions being taken to resolve this problem.

Another report, either interim or final, will be sent on or before November 2, 1983

James W. Cook

JWC/WRB/cd

Attachment: 1) MCAR 67, Rev 1, Interim Report 3, dated July 18, 1983.

CC Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

AUG 22 1983

OC0883-0009A-MP01

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122289

Attachment 1

Bechtel Associates Professional Corporation

122381

SUBJECT: MCAR 67, Rev 1, issued January 13, 1983
Electrical Control Cabinet/Panel Clearances

INTERIM REPORT 3

DATE: July 18, 1983

PROJECT: Consumers Power Company
Midland Plant Units 1 and 2
Bechtel Job 7220

Introduction

This report addresses the installation design of certain Class 1E cabinets/panels in the Midland plant. The installation design for these Class 1E cabinets/panels did not provide sufficient clearances between adjacent cabinets/panels or building walls to account for deflections during a seismic event. The Class 1E cabinets/panels involved are control panels, instrumentation cabinets, relay cabinets, and motor control centers. The installation design of Class 1E switchgear, power distribution panels, load centers, transformers, battery chargers, and lighting panels was reviewed and found acceptable.

Description of Deficiency

Midland FSAR Subsection 3.2.1.1.1 states:

> Seismic Category I structures, components, and systems are designed to withstand the appropriate seismic loads . . . and other applicable loads without loss of function.

To conform to these criteria, Class 1E electrical control cabinets/panels that are not meant to be physically attached to each other and are seismically qualified independently should not interact with each other or adjacent structures during seismic events to maintain the existing seismic qualification. If there were interaction, the existing seismic qualification could be invalidated and the panel's ability to perform its required safety function rendered indeterminate during and after a seismic event. Those cabinets/panels with existing clearence less than that calculated are considered to pose possible safety/qualification problems subject to additional evaluation.

Historical Background and Summary of Investigation

Modifications to the plant's design resulted in addition of Class 1E cabinets/panels in the Midland plant. Review of the installation design of these cabinets/panels indicated that clearances should be maintained between the Class 1E cabinets/panels to be consistent with the seismic qualification of the cabinets/panels. An evaluation was performed and an investigation of all Class 1E cabinets/panels was undertaken

utilizing BC-TOP-4A (Topical Report, Seismic Analysis of Structures and Equipment for Nuclear Power Plants, Rev 3, November 1974), which states:

> The minimum clearance between any two structures, components or equipment is maintained at twice the absolute sum of the predicted displacements of the two items under consideration.

The ensuing investigation consisted of several multidiscipline meetings, discussions with other Bechtel offices, jobsite trips to measure clearances around Class 1E panels/cabinets and to preliminarily measure panel natural frequencies by in situ testing, review of seismic qualification documents, and calculation of required clearances for Class 1E cabinets/panels. This investigation identified those cabinets/panels with insufficient clearances in accordance with the guideline of BC-TOP-4A. There are a total of 254 Class 1E cabinets/panels of which 41 have been identified as having insufficient clearance with an adjacent cabinet/panel or building wall. An additional 26 of these Class 1E cabinets/panels, which have not yet been installed, did not clearly identify clearances to walls/cabinets. 1/3 1/3

Analysis of Safety Implication

The Class 1E cabinets/panels in question (including the devices mounted inside) perform required safety functions during and after a seismic event. Because of this, these cabinets/panels are required to undergo a qualification program that demonstrates their ability to function during and after a safe shutdown earthquake at the Midland plant. However, the potential effects of the interaction with adjacent cabinets or building walls was not considered during the seismic qualification of the cabinets/panels. Therefore, installation without the minimum clearance may cause impact loads that were not considered in the original seismic qualification of these cabinets/panels. The magnitude of impact loads and their effect on the ability of these cabinets/panels to perform their safety functions is not defined and therefore could invalidate the cabinet/panel original seismic qualification.

Probable Cause

The probable cause for these problems was the failure to identify the potential for interaction between Class 1E cabinets/panels and adjacent cabinets/panels or building walls during a seismic event. In summary, the methods for determining the minimum allowable clearances between Class 1E panels and panels or walls were not clearly defined.

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Corrective Action

1. The methods of resolution for the various proximity problems with Class 1E cabinets/panels are provided in Items a through d below. (Refer to the attached table for the method of resolution selected for each cabinet/panel.)

   a. Relocate the cabinets.

   b. Bechtel is awaiting the results of the study from the equipment vendor. Additional evaluation with possible testing may be necessary.

   c. Minor structural modifications are planned. The existing configuration will be reanalyzed and structural modifications will be made using the cabinets' existing bolt holes wherever possible. The cabinets and internal devices will be requalified for this configuration. Consumers Power Company's consultant is responsible for the requalification and will issue detailed design drawings for the modification to Consumers Power Company.

   d. B&W is evaluating existing test data and will perform an analysis that should resolve the proximity problem. (3)

2. Equipment location drawings were revised to add minimum clearances. [DCN 11 to Drawing 7220-M-5(Q) and DCN 12 to Drawing 7220-M-7(Q), Sh 2 were issued May 5, 1983].

3. To preclude recurrence of these problems, the following has been or will be done:

   a. Project general seismic requirements specifications have been revised to add a statement requiring suppliers to specify a clearance envelope around their Class 1E seismic Category I equipment. [Specifications 7220-G-6(Q), Rev 9, G-7(Q), Rev 11; G-29(Q), Rev 7; and G-30(Q), Rev 6 have been issued.]

   b. All disciplines will be notified of the proximity guidelines.

   c. Because of the actions noted in Items 3a and 3b above, it has been determined unnecessary to revise the Midland Final Safety Analysis Report.

Reportability

Because the seismic qualification of Class 1E cabinets/panels with less than the required clearances is indeterminate, we take the conservative position that the original seismic qualificati may no longer be valid. Thus, this condition, if uncorrected, c ld have a potentially adverse effect on the safety of operations in the event of an earthquake at the Midland plant. This condition was reported to the NRC on January 12, 1983, under the criteria of the Code of Federal Regulations, 10 CFR 50.55(e). 3

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Attachment: Table - MCAR 67 Panel/Cabinet Proximity Status

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MCAR 67 PANEL/CABINET PROXIMITY STATUS

Equipment Number	Proximity Problem With Other Panel/Cabinet	With Wall	Resolution[1]
1C30	1C35	Block wall	1.c
2C30	2C35	Block wall	1.c
1C35	1C30, 1C452	Block wall	1.c
2C35	2C30, 2C452	Block wall	1.c
1C43	1C42	NA	1.a[2]
2C43	2C42	NA	1.a[2]
1C46	1C452	Block wall	1.c
2C46	2C452	Block wall	1.c
1C47	NA	Block and poured walls	1.c
1C452	1C35, 1C46	Block wall	1.c
2C452	2C35, 2C46	Block wall	1.c
2B24	2B56	NA	1.b
2B56	2B24	NA	1.b
1B53	NA	Poured wall	1.b
1B54	NA	Poured wall	1.b
1B23	1B55	NA	1.b
1B55	1B23	NA	1.b
1B24	1B56	NA	1.b
1B56	1B24	NA	1.b
2B23	2B55	NA	1.b
2B55	2B23	NA	1.b
1B63	0B69	NA	1.b
1B64	0B68	NA	1.b
2B63	0B69	NA	1.b
2B64	0B68	NA	1.b
0B65	NA	Poured wall	1.b
0B66	NA	Poured wall	1.b
0B68	1B64, 2B64	NA	1.b
0B69	1B63, 2B63	NA	1.b
2B53	NA	Poured wall	1.b
2B54	NA	Poured wall	1.b
1C42	1C43	NA	1.a
2C42	2C43	NA	1.a
1B91A	1B91C	NA	1.d
2B91A	2B91C	NA	1.d
1B91C	1B91A	NA	1.d
2B91C	2B91A	NA	1.d
1B92B	1B92D	NA	1.d
2B92B	2B92D	NA	1.d
1B92D	1B92B	NA	1.d
2B92D	2B92B	NA	1.d

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Equipment Number	Proximity Problem: With Other Panel/Cabinet	With Wall	Resolution(1)
1C172A	Location drawing did not specify clearances		2
1C172B	Location drawing did not specify clearances		2
2C172A	Location drawing did not specify clearances		2
2C172B	Location drawing did not specify clearances		2
1C171A1	Location drawing did not specify clearances		2
1C171A2	Location drawing did not specify clearances		2
1C171B1	Location drawing did not specify clearances		2
1C171B2	Location drawing did not specify clearances		2
2C171A1	Location drawing did not specify clearances		2
2C171A2	Location drawing did not specify clearances		2
2C171B1	Location drawing did not specify clearances		2
2C171B2	Location drawing did not specify clearances		2
1C171C	Location drawing did not specify clearances		2
2C171C	Location drawing did not specify clearances		2
1C171D	Location drawing did not specify clearances		2
2C171D	Location drawing did not specify clearances		2
0C398A	Location drawing did not specify clearances		2
0C398B	Location drawing did not specify clearances		2
0C398C	Location drawing did not specify clearances		2
0C398D	Location drawing did not specify clearances		2
1C184A	Location drawing did not specify clearances		2
1C184B	Location drawing did not specify clearances		2
1C161A	Location drawing did not specify clearances		2
2C161A	Location drawing did not specify clearances		2
1C161B	Location drawing did not specify clearances		2
2C161B	Location drawing did not specify clearances		2
0C10	NA	NA	NA
0C20	NA	NA	NA
1C11	NA	NA	NA
1C21	NA	NA	NA
2C11	NA	NA	NA
2C21	NA	NA	NA
1C12	NA	NA	NA
1C22	NA	NA	NA
2C12	NA	NA	NA
2C22	NA	NA	NA
1C13	NA	NA	NA
1C23	NA	NA	NA
2C13	NA	NA	NA
2C23	NA	NA	NA
1C14	NA	NA	NA
1C24	NA	NA	NA
2C14	NA	NA	NA
2C24	NA	NA	NA
1C15	NA	NA	NA
1C25	NA	NA	NA
2C15	NA	NA	NA
2C25	NA	NA	NA

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Equipment Number	Proximity Problem: With Other Panel/Cabinet	With Wall	Resolution(1)
0C29	NA	NA	NA
1C31	NA	NA	NA
2C31	NA	NA	NA
1C44	NA	NA	NA
2C44	NA	NA	NA
2C47	NA	NA	NA
1C114	NA	NA	NA
2C114	NA	NA	NA
1C150	NA	NA	NA
2C150	NA	NA	NA
0C151	NA	NA	NA
1C166	NA	NA	NA
2C166	NA	NA	NA
1C175A	NA	NA	NA
1C175B	NA	NA	NA
2C175A	NA	NA	NA
2C175B	NA	NA	NA
0C180	NA	NA	NA
1C447A	NA	NA	NA
1C447B	NA	NA	NA
1C447C	NA	NA	NA
1C447D	NA	NA	NA
1C468	NA	NA	NA
2C468	NA	NA	NA
2C447A	NA	NA	NA
2C447B	NA	NA	NA
2C447C	NA	NA	NA
2C447D	NA	NA	NA
1C453	NA	NA	NA
2C453	NA	NA	NA
1C454	NA	NA	NA
2C454	NA	NA	NA
0C398	NA	NA	NA
1C445A	NA	NA	NA
1C445B	NA	NA	NA
2C445A	NA	NA	NA
2C445B	NA	NA	NA
1Y11	NA	NA	NA
1Y31	NA	NA	NA
1Y32	NA	NA	NA
1Y13	NA	NA	NA
0Y33	NA	NA	NA
0Y34	NA	NA	NA
1C32	NA	NA	NA
2C32	NA	NA	NA
1B43	NA	NA	NA
1B89	NA	NA	NA
1X55	NA	NA	NA
1X51	NA	NA	NA
1X53	NA	NA	NA

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Equipment Number	Proximity Problem: With Other Panel/Cabinet	With Wall	Resolution(1)
0X57	NA	NA	NA
1X17	NA	NA	NA
1B17	NA	NA	NA
1D11	NA	NA	NA
1D12	NA	NA	NA
1Y10	NA	NA	NA
1A05	NA	NA	NA
1Y12	NA	NA	NA
1Y14	NA	NA	NA
1B44	NA	NA	NA
1B90	NA	NA	NA
1X56	NA	NA	NA
1X52	NA	NA	NA
1X54	NA	NA	NA
1X18	NA	NA	NA
1B18	NA	NA	NA
1D27	NA	NA	NA
1D21	NA	NA	NA
1D22	NA	NA	NA
1D20	NA	NA	NA
1Y20	NA	NA	NA
1A06	NA	NA	NA
2Y11	NA	NA	NA
2Y31	NA	NA	NA
2Y13	NA	NA	NA
2B43	NA	NA	NA
2B89	NA	NA	NA
2X55	NA	NA	NA
2X51	NA	NA	NA
2X53	NA	NA	NA
2X17	NA	NA	NA
2B17	NA	NA	NA
2D11	NA	NA	NA
2D12	NA	NA	NA
2Y10	NA	NA	NA
2A05	NA	NA	NA
2Y12	NA	NA	NA
2Y32	NA	NA	NA
2Y14	NA	NA	NA
0Y36	NA	NA	NA
0Y37	NA	NA	NA
2B44	NA	NA	NA
2B90	NA	NA	NA
2X56	NA	NA	NA
2X52	NA	NA	NA
2X54	NA	NA	NA
0X58	NA	NA	NA
2X18	NA	NA	NA
2B18	NA	NA	NA
2D27	NA	NA	NA

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Equipment Number	Proximity Problem With Other Panel/Cabinet	With Wall	Resolution(1)
2D21	NA	NA	NA
2D22	NA	NA	NA
2D20	NA	NA	NA
2Y20	NA	NA	NA
2A06	NA	NA	NA
2D25	NA	NA	NA
2D02	NA	NA	NA
2Y40	NA	NA	NA
2D23	NA	NA	NA
1D25	NA	NA	NA
1D02	NA	NA	NA
1Y40	NA	NA	NA
1D23	NA	NA	NA
2B80	NA	NA	NA
2L121	NA	NA	NA
1L121	NA	NA	NA
1B80	NA	NA	NA
2D01	NA	NA	NA
2D15	NA	NA	NA
2D17	NA	NA	NA
2D10	NA	NA	NA
2Y30	NA	NA	NA
2D13	NA	NA	NA
1D15	NA	NA	NA
1D17	NA	NA	NA
1D01	NA	NA	NA
1D10	NA	NA	NA
1Y30	NA	NA	NA
1D13	NA	NA	NA
1BP03	NA	NA	NA
1BP04	NA	NA	NA
2BD03	NA	NA	NA
2BP04	NA	NA	NA
1L120	NA	NA	NA
1B79	NA	NA	NA
2L120	NA	NA	NA
2B79	NA	NA	NA
0B45	NA	NA	NA
0B46	NA	NA	NA
0Y84	NA	NA	NA
0Y85	NA	NA	NA
0Y86	NA	NA	NA
0X93	NA	NA	NA
0X94	NA	NA	NA
0X95	NA	NA	NA
2C184A	NA	NA	NA
2C184B	NA	NA	NA
1C185A	NA	NA	NA
2C185A	NA	NA	NA
1C185B	NA	NA	NA

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Equipment Number	Proximity Problem: With Other Panel/Cabinet	With Wall	Resolution(1)
2C185B	NA	NA	NA
1C266	NA	NA	NA
2C266	NA	NA	NA
1C111	NA	NA	NA
2C111	NA	NA	NA
1C112	NA	NA	NA
2C112	NA	NA	NA
1C231	NA	NA	NA
2C231	NA	NA	NA
1C232	NA	NA	NA
2C232	NA	NA	NA
1C41	NA	NA	NA
2C41	NA	NA	NA
1C45	NA	NA	NA
2C45	NA	NA	NA

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Notes:

(1) Resolution item numbers refer to corrective action item numbers described in the MCAR Interim Report.

(2) These panels will not be relocated. Resolution of proximity problems is accomplished with relocation of 1/2C42.

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