

March 4, 1986

Docket No. 50-255

Distribution:	Docket File
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ATHadani	C.WEIL, R III

Mr. J. I. Dotson
 Bechtel Power Corporation
 P. O. Box 1000
 Ann Arbor, MI 48106-1000

Dear Mr. Dotson:

SUBJECT: PALISADES PLANT-CABLE TRAY SUPPORTS

In June 1985 you expressed a concern regarding the adequacy of some cable tray supports at the Palisades Plant to the NRC resident inspector. This concern was raised because of apparent overloading of cable trays by added cables for plant modifications; attachments made to cable trays such as conduit, small piping, or instrument racks as part of plant modifications; and possibly overloading of cable trays during initial construction. The NRC and the licensee met with you and other representatives of Bechtel Power Corporation at the plant site on July 15, 1985. As a result of that meeting, Consumers Power Company committed to certain follow-on activities to address your areas of concern.

Enclosed is a copy of the Consumers Power Company internal correspondence that reports on the results of their on-going efforts in this matter (Memorandum from K. A. Toner to J. L. Kuemin dated September 19, 1985). On page 5, the additional actions planned by the licensee are listed. Upon completion of Item 2, the licensee's analyses from Item 1 and the evaluations of Item 2 will be treated by the NRC as evaluations pursuant to 10 CFR 50.59, that is, an evaluation to determine whether an unreviewed safety question is involved for "changes in the facility as described in the safety analysis report." We intend to review the results of the licensee's evaluation and may select certain of the analyses for worst case loading to review in detail.

As you can see from the enclosed report, the 30 percent fill criterion in the FSAR was not adhered to and the as-built drawings and raceway schedules were not up-to-date. Thank you for bringing this to our attention. Based on the results of the SEP Owners Group Testing Program and the industrial experience of cable tray systems from previous earthquakes, we do not believe that the conditions found present an immediate safety concern. However, we intend to follow up on this to determine that the licensee effects an acceptable resolution. If you have any further comments or concerns, please feel free to contact us.

Sincerely,

TS

Thomas V. Wambach, Project Manager
 PWR Project Directorate #8
 Division of PWR Licensing

cc: See next page

PBD#8
 PKreutzer
 2/26/86

PBD#8 *JVM*
 TWambach
 2/26/86

TAMB
 RBrady
 13/3/86

PD-ISAR *CGI*
 CGrimes
 2/26/86

PBD#8 *AT*
 ATHadani
 3/13/86

8603110143 860304
 PDR ADOCK 05000255
 PDR

March 4, 1986

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Bechtel Power Corporation
P. O. Box 1000
Ann Arbor, MI 48106-1000

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CGrimes
2/26/86

PBD#8 *AT*
ATHadani
3/13/86

To JLKuemin, P 503

From KAToner, Palisades *K.A. Toner*

CONSUMERS
POWER
COMPANY

Date September 19, 1985

Subject PALISADES PLANT - CABLE TRAY SUPPORTS

Internal
Correspondence

CC TJPalmisano, Palisades
RAFenech, Palisades

KKChao, P13-226
DDC 950*05000*37400/5

KAT85*034

As part of a recent Auxiliary Feedwater Project, Bechtel Corporation was charged with the responsibility of investigating the structural capability of cable tray supports in the southeast corner of the 1C Switchgear Room to carry additional fireproofing loads (Attachment 1). Bechtel's structural analysis concluded that the existing supports were not adequately designed for seismic loads. The analysis also concluded that supports west of the trays to be fireproofed were not adequately designed (Reference 1). The purpose of this letter is to describe the actions that Consumers Power Company has taken to resolve the Bechtel concern, to respond to subsequent NRC questions related to this issue, and to resolve the issue of cable tray support adequacy at Palisades.

In response to the conclusions reached in Bechtel's analysis, Consumers Power Company authorized Bechtel to strengthen the supports for only those trays designated to be fireproofed. The additional tray support was installed by Bechtel prior to fireproofing the trays; a project which was closed out on June 18, 1984 (Attachment 1).

Regarding the trays running east to west from the fireproofed tray section (eg, trays XU012, XU014, XU016, etc), Consumers Power Company elected to rely on a continuing Systematic Evaluation Program Owners Group (SEPOG) effort for resolution of the tray supports issue. Plant representative cable tray support systems, selected from detailed plant walkdowns, were evaluated and tested for the SEPOG by URS/Blume & Associates. Based on the results of these evaluations and tests, reports of which were submitted to the NRC (References 2 and 3), the SEPOG concluded that the existing raceway systems in SEP plants possess substantial seismic resistance, and the seismic qualification of raceway systems is not a significant safety issue. This conclusion was submitted to the NRC on October 15, 1984 (Reference 4). We are presently awaiting a final Safety Evaluation Report by the NRC on the SEPOG submittal (Reference 5).

*Copy
Sent to
Bechtel
on 9/20/85*

Not satisfied with the timeliness of the SEP treatment of this issue, Bechtel informed CPCo of its intent to inform the NRC of a potential 10CFR21 condition (References 6 and 7). Upon notification of Bechtel's concern, the NRC Resident Inspector on June 20, 1985, questioned the plant staff as to the effectiveness of design control procedures to ensure that structural evaluations are performed prior to adding weight to cable trays during plant modifications. In addition to the one-time application of a significant load to a tray such as fireproofing, the NRC Resident Inspector was concerned about the addition of individual cables and the accumulation of a significant load on the trays over time.

IC0985-0666A-TC01

In response to the inspector's questions, the plant staff provided the following information:

1. Existing design input documents have been and are effective in prompting an engineer to perform evaluations and make modifications, if necessary, of support systems prior to a substantial load being added to raceway. Attachments 2 and 3 are portions of major and minor modifications and design procedures, respectively. These documents show that design structural loads are required to be evaluated prior to modification implementation.
2. Specification change design procedures are less clear in describing the requirement to evaluate structural loads prior to performing work. As evidenced in Attachment 4, the specification change checklist does, however, require that prior to modification implementation the engineer identify and document any analyses which support the modification design. Nevertheless, the specification change procedures are being revised to provide design structural loading evaluation requirements to a degree of detail consistent with the major and minor modifications' design procedures.
3. A review of recent design changes which added substantial weight to cable trays confirms our belief in that design procedures have been effective in prompting the engineer to perform required structural evaluations. Attachments 5 and 6 provide design documentation for two recent specification changes in which fireproofing was added to cable trays. In each case, the engineer assured that structural evaluations were completed in advance of installing the fireproofing material.
4. Existing design procedures do not specifically require that structural loading evaluations be performed prior to installing an individual cable within a given tray. (It is our opinion that design procedures should not be so prescriptive as to inadvertently narrow the engineer's design considerations to a set of "rules" outlined in cookbook fashion.) Therefore, structural evaluations would not be expected to have been performed for such installations. In the absence of this information, a review of current fill levels of cable in a limited sample of trays in the 1C Switchgear Room was performed to address the Resident Inspector's concern. The current raceway schedule shows trays adjacent to the fireproofed tray section to be filled to approximately 30% by cross-section; an upper fill limit provided in the original FSAR for trays carrying Engineered Safeguards circuits (Attachment 7).
5. The 30% fill requirement is considered conservative since the 1984 National Electric Code allows a fill of 50% for trays carrying multi-conductor control and signal cables only, as do the trays sampled.

6. A visual inspection of the raceway running east to west from the fireproofed tray section was conducted on June 19, 1985. Accessible raceway support were specifically inspected for evidence of raceway overloading (eg, broken concrete around the point where the raceway vertical support strut is affixed to the ceiling, or misaligned struts). Our inspection, which consisted of engineers climbing up into the tray systems, failed to reveal any signs of tray overload.

Only July 15, 1985 members of the NRC's SEP and Operating Reactors Branches visited the plant site to be briefed on the Bechtel concern. During the meeting Consumers Power Company provided the NRC with a review of the information previously given to the Resident Inspector (Items #1 through #5 above). In addition, the NRC was provided with our preliminary structural evaluations which indicated that the trays running east to west from the fireproofed tray section are adequately supported.

In response to an NRC request made during the meeting, Consumers committed to performing a review of recent design changes to identify the modification which resulted in the attachment of specific conduit to trays located within the section to be fireproofed as part of the Auxiliary Feedwater Project. According to Bechtel, this conduit was not part of the original design of the plant and resulted in additional loading on the tray supports. The NRC staff requested that Consumers attempt to identify whether or not design controls were effective in ensuring that a structural analysis was completed for the conduit installation. In addition, Consumers committed to conducting final structural evaluations for the trays running east to west from the fireproofed section.

In response to the NRC requests, Consumers performed the following:

1. Bechtel was contacted to identify the specific conduit that had been reported as supported by the trays within the fireproofed section. Given the conduit designations, the conduit was identified on the applicable layout drawing and the revision record block was then reviewed in an attempt to identify a facility change which may have resulted in conduit installation. Unfortunately, the drawing depicted no such change. Consumers is of the opinion, however, that Attachments 5 and 6 provide ample evidence of design control effectiveness for significant load additions.
2. Final structural (seismic and static) evaluations of the trays running east to west from the fireproofed section were completed (Reference 8) with the results confirming the preliminary evaluations - that the tray supports are not overloaded. As part of these evaluations, the raceway schedules were reviewed to identify the fill level for all of the trays in the IC Switchgear Room. During this review of a sample of trays much larger than previously surveyed, approximately 13 trays were identified as being in excess of the original FSAR's 30% limit; with the greatest fill level documented at 41% by cross-section.

Prompted by this new tray fill information, a review of all trays within the plant was conducted by referring to the raceway schedules. The schedules reveal that approximately 8% of all plant trays are filled greater than 30% and 2% of all plant trays are filled greater than 40% by cross-section. The greatest individual tray fill was identified as 59%. In an effort to extract a subset of the total plant tray population which represents trays carrying safety-related cable, the unique identifiers for the partitioned trays (ie, trays with a metal barrier separating one side of the tray from the other so as to separate individual channels of a particular safety train) serving the Reactor Protection System (RPS) cables were used. Raceway schedules for these trays show that 12% of the RPS trays are filled greater than 30% and 5% are filled greater than 40% with the greatest overall tray fill (ie, the fill considering both partitioned sides together) being 54% by cross-section.

Since the raceway schedules were observed to indicate that a number of trays are filled above 30% and the review also identified specific sides of certain RPS trays being filled in excess of 100%, a walkdown was performed to visually inspect the trays and their supports. Trays selected for inspection were those shown by the schedules to be those filled the most. Trays showing the greatest fills in the plant are RPS trays located in the Cable Spreading Room. Inspections conducted on two occasions (August 1 and August 19, 1985) of approximately five partitioned trays, having fills for a specific tray section ranging from 83% to 111%, revealed the following:

1. Although filled greater than 85% in a given section (per raceway schedule), the trays showed no signs of their supports being overloaded. There was no indication of the support struts breaking away from contact points on the ceiling nor evidence of support strut or tray deformation.
2. There was no indication of cables overheating. All cables were comfortable to the touch and temperature measurements with a probe inserted into the cable bundle showed a maximum temperature of 89°F (cables are typically rated at 90°C).
3. The as-built condition, with regards to fill, differs significantly from the information contained in the raceway schedules. The schedules for the trays inspected show one side of the partitioned tray to be filled in excess of 85% and the other side filled less than 5%. Field inspection, however, reveals that in the case of several trays, both sides of the partition have significant fill levels. Specifically, partitioned tray XR301/3XR301 is filled on both sides of the partition to levels above the tray side-rails. The schedules show the tray sections to be filled to 106% and 1%, respectively.

In response to the aforementioned observations, Consumers plans on taking the following actions:

1. By November to have reviewed and analyzed those trays selected as "outliers" in terms of percent fill. For these trays, analyses will be conducted to confirm that the tray supports are capable of carrying the structural loads. In addition, cables in the trays will be monitored to determine if overheating is occurring due to self-generated and ambient temperatures. Finally, a review will be conducted to determine if the cables at the bottom of the tray can support the long-term dead weight. It is expected that this work will be instrumental in reconfirming that the plant trays and supports are capable of supporting cable for all expected or postulated plant conditions.
2. On a schedule yet to be determined, which takes into account both available resources and the importance of this issue, develop an administrative limit for cable tray fill and include the limit in appropriate design control procedures. It is expected that the limit will be determined by performing a walkdown of representative tray systems and performing structural evaluations of such systems in order to correlate existing tray fills to reserve load-carrying capability of the tray supports.
3. Upon completion of Item 2, either revise the raceway schedules such that identified fill reflects accurately as-built conditions or delete such information from the schedules.

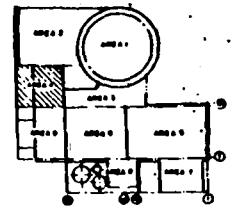
Completion date 4/1/86 per D-NL-85-02C (B) pg 3.6

complete 12/31/86 per D-NL-85-02C pg 3.6.1

Reference List

1. Letter from JIDotson (Bechtel) to TCCooke (CPCo), 7/16/84
2. Letter from RMKacich (Northeast Utilities) to WTRussell (NRC), 4/29/83
3. Letter from RMKacich (Northeast Utilities) to WTRussell (NRC), 8/31/83
4. Letter from RMKacich (Northeast Utilities) to CIGrimes (NRC), 10/15/84
5. Letter from DJVandeWalle (CPCo) to JIDotson (Bechtel), 6/24/85
6. Letter from JIDotson (Bechtel) to JSchneider (CPCo), 4/5/85
7. Record of Telecon: JIDotson to JCorley (CPCo), 6/10/85
8. Engineering Analysis EA-DR-ES-1, "Evaluation of Cable Tray Supports in Switchgear Room 1C....," 7/31/85

FOR CONTINUATION
SEE E-359, SH. 1



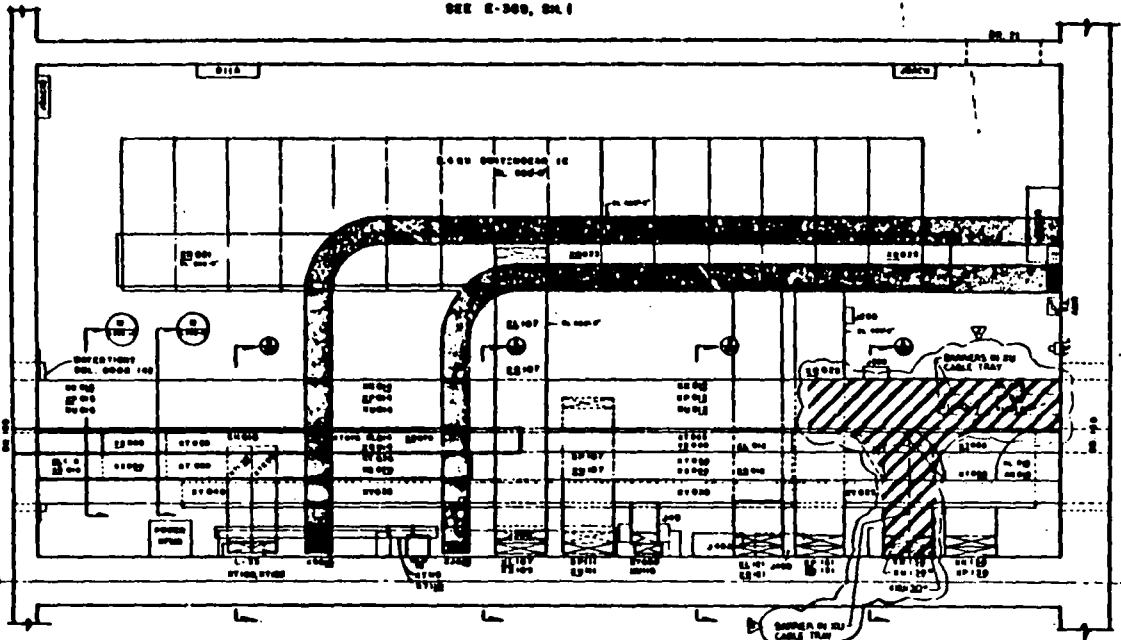
FOR CONT.
SEE E-372

SECTION B-B
SECTION C-C

SECTION B-B

SECTION C-C

SECTION B-B



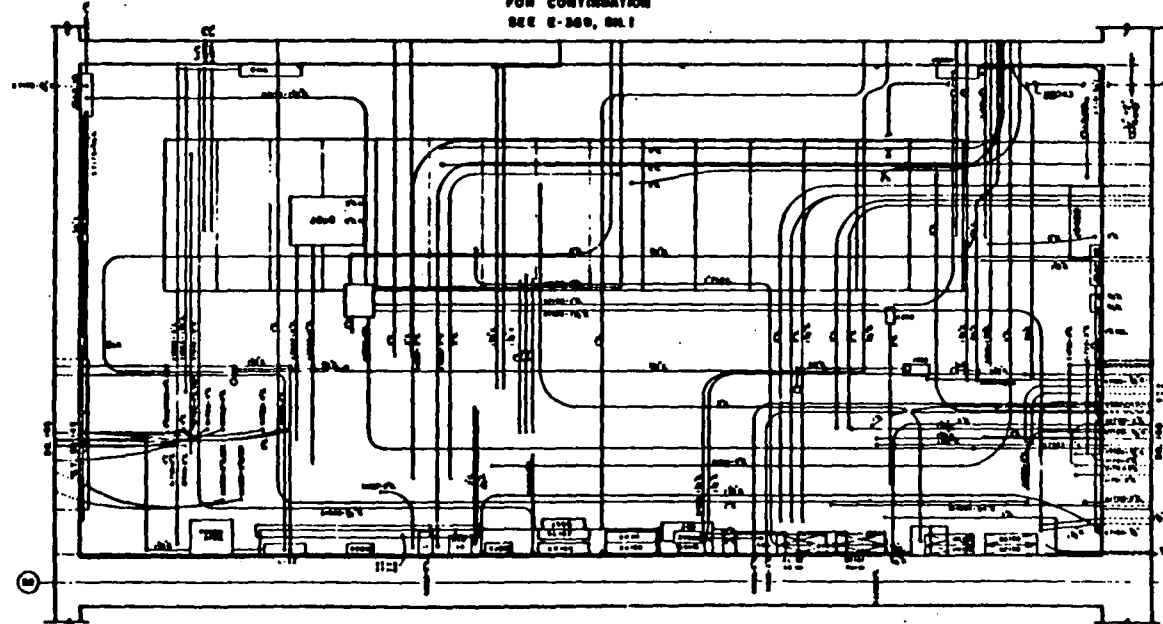
CABLE TRAY LAYOUT

FOR CONTINUATION
SEE E-359, SH. 1

FOR CONT. SEE
E-359 SH. 1

NOTES

- (1)
- (2) FOR EMERGENCY DIESEL GENERATORS AND AUX. BLOC. CENTRAL MALLWAY LAYOUT REFER TO E-360 SH. 1
- (3) FOR GENERAL ARRANGEMENT SEE E-359, SH. 2.



CONDUIT LAYOUT

FOR CONTINUATION
SEE SH. E-372

FOR CONT. SEE
E-359 SH. 1

REFERENCE DRAWINGS
E-359 CONDUIT & TRAY NOTES SYMBOLS & DETAILS

SYMBOLS

- DENOTES FIRE PROTECTED CABLE TRAY - FIRE PROTECTION MATERIAL, INSTALLED PER SPECIFICATION & LOCAL PROCEDURE. HEAT AND INSTALLATION TO BE SEPARATE AND NON-TOI.
- DENOTES CABLE TRAY SECTIONS TO BE WITHIN THE PROTECTIVE ENVELOPE.

FOR CONT.
SEE E-372

KAT 85*034
ATTACHMENT 1

REVISION	NO.	DATE	BY	CHKD.	APP.
1	1				
2	1				
3	1				
4	1				
5	1				

LAWRENCE ENGINEERING ASSOCIATES P.C.
ENGINEERS & CONSULTANTS
HOLLAND, MICHIGAN

PALISADES PLANT
CONSUMERS POWER COMPANY

115°C SWITCHGEAR ROOM
TRAY & CONDUIT LAYOUT
EL. 600'-0"

NO. IN	NO. OF	NO. OF	NO.
1006	E-359	14	2



Consumers Power

PROJECTS, ENGINEERING AND CONSTRUCTION
PLANT MODIFICATIONS AND MISCELLANEOUS PROJECTS
ENGINEERING DEPARTMENT
PROCEDURES

FORMAT GUIDE
DESIGN PLAN

Supplement S3-2.0
ATTACHMENT B
Page 5 of 8
Revision 2
Date 4/19/85

4.1 DESIGN PLAN

Provide a brief description of the scope to allow the Design Plan to be a stand alone document.

4.1.1 Design Reference Documents

Identify the documents by title and revision (and section where applicable) which provide design criteria/constraints.

- 4.1.1.1 MIOSHA
- 4.1.1.2 Plant Technical Specifications
- 4.1.1.3 Codes
- 4.1.1.4 Standards
- 4.1.1.5 Regulatory Requirements and Licensing Commitments
- 4.1.1.6 Regulatory Guides
- 4.1.1.7 Existing Plant Engineering Specifications
- 4.1.1.8 PSAR/PHSA
- 4.1.1.9 Existing Plant Functional Description
- 4.1.1.10 Existing Plant Q-List
- 4.1.1.11 Existing Plant Drawings
- 4.1.1.12 Environmental Control Standards
- 4.1.1.13 Miscellaneous Correspondence

4.1.2 Design External Environmental Conditions

Identify the external conditions which will affect items, systems, structures or components in this design, such as ambient temperature, pressure, humidity, corrosion attack, radiation exposure, and flooding. Discuss the effect and design considerations for such conditions. Also identify Environmental Qualification Test requirements and evaluate the capability of the Trail Street Lab to perform the testing.

KAT 85*034
ATTACHMENT 2



1. DESIGN REFERENCE DOCUMENTS

Identify the documents or sections from which applicable design criteria/constraints are given. Either reference or include such in the design package.

	Applicable	Reference
A. MIOSHA	_____	_____
B. Technical Specifications	_____	_____
C. Codes	_____	_____
D. Standards	_____	_____
E. Regulatory Requirements	_____	_____
F. Regulatory Guides	_____	_____
G. Plant Engineering Specifications	_____	_____
H. FSAR	_____	_____
I. System Lesson Notes	_____	_____
J. Q-List	_____	_____
K. Plant Drawings	_____	_____
L. Pipe and Weld Specs	_____	_____
M. _____	_____	_____

2. DESIGN EXTERNAL-ENVIRONMENTAL CONDITIONS

Identify the external conditions which will affect items, systems, structures or components in this design. Discuss the affect and design considerations for such conditions. Documented environmental qualification of harsh environment safety-related electrical equipment is required by Tech Spec Section 6.

	Applicable	Reference
A. Pressure	_____	_____
B. Temperature	_____	_____
C. Chemical/Corrosion/Protective Coatings	_____	_____
D. Humidity	_____	_____
E. Radiation/Effect on Material/Personnel Exposure/Location or Rad Zone	_____	_____
F. Flooding	_____	_____
G. Harsh Environment	_____	10CFR50.49; IEEE 323-1974
H. Pipe Whip Inside Containment	_____	Reg Guide 1.46
I. _____	_____	_____

3. DESIGN STRUCTURAL LOADS

Identify the structural forces expected to be satisfied by this design. Discuss considerations.

	Applicable	Reference
A. Seismic	_____	FSAR Appendix A
B. Wind	_____	_____
C. Thermal	_____	_____
D. Dynamic	_____	_____
E. Static	_____	_____
F. Anchorage	_____	IE Bulletin 80-21
G. _____	_____	_____

KAT85*034
ATTACHMENT 3



NUCLEAR OPERATIONS DEPARTMENT
Specification Change
Checklist

SC No.

	Applicable		Identify* (Code, FC, EA, DDC, etc)	Close-out
	Yes	No		
1. Request for Modification (RFM)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
2. Safety Evaluation	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
3. Design Reference Documents	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
4. Engineering Analyses (EA)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
5. Interfaces Considered	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
6. QA Requirements	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
7. Codes/Standards**	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
8. Procedural Requirements				
A. Fabrication	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
B. Installation	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
C. Test				
a. Acceptance	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
b. Surveillance	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
c. Preservice	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
d. Inservice	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
9. Copies of Procurement Documents	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
10. Design Document Checklist				
A. Admin Procedure Revisions	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
B. Working Procedure Revisions	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
C. Drawing Revisions	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
D. Equipment Data Base	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
E. Spare Parts List	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
F. FSAR/FHSR	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
11. Implementation Phase				
A. Maintenance Order(s)***	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
B. NOC Forms	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
C. Auth Inspector and Repair Package	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
D. Training Package	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
12. Corrective Action (DR, ER, etc)	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
13. ALARA Review	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

*If additional space is required, identify by Engineering Analysis Number, ie, EA-SC-_____ and record information on the Engineering Analysis.

**ASME Classes 1, 2 and 3 replacements require completion of reverse side.

***Specification changes shall not be closed out prior to closeout of all applicable maintenance orders.

Performed by _____ Date _____ Closeout _____ Date _____
 Technical Review _____ Date _____ Technical Supt _____
 Administrative Review _____ Date _____ Technical Supt _____

*KAT 85*034*
ATTACHMENT 4

NUCLEAR OPERATIONS DEPARTMENT
Specification Change

SC No. **84043**
Page **1** of **1**

FORMS(011) NA		Date March 8, 1989	
Original Item Number/Order Number FC 407-14B / 1980			
Uniform Part Index	System	Equipment	System Code
	2.0.2.5.0	3.7.1.1.0	SW5
Equipment Number	Serial Number	Part Number	Stock Number
11885	N/A	RECEIVED JUN 13 1989 DOCUMENT CONTROL CENTER PALISADES	
Item	Original Requirements	Changed to	
	<i>Conduit for the feed cable to Service Water Pump P7A located in the IC Switchgear Room.</i>	<i>Add Thermo-Tag 330-1 Fire Barrier material to be done following TSI technical note #11266 procedure</i>	
Engineering Project #1000 page 3 of 6 Required by Appendix R to the Fire Protection System modification. Work done under Hus Fuel Project E359 - Sht 13			
Author	Part	Year	Date
<i>T.E. DeWitt</i>	<i>3</i>	<i>82</i>	<i>5/2/89</i>
(1) For Purchase Documents, Completion of Implementation and Operability Section Below Not Required. For Use With Maintenance Orders, Complete Section Below. (2) See Specification Change Checklist.			
Action Change	Date	OP Auth. (Signature)	Date
<i>T.E. DeWitt</i>	<i>5/2/89</i>	<i>M. DeWitt</i>	<i>5/2/89</i>
Dis. Update (Attach Typewritten Letter) Form 459 attached <i>T.E. DeWitt 5/2/89</i> <i>ME DeWitt 6/4/89</i>			

94511673

***KAT 85*34**
ATTACHMENT 5
(PG 1 OF 4)

NUCLEAR OPERATIONS DEPARTMENT
Specification Change
Checklist

SC No. **B1** **043**

	Applicable		Identify* (Code, FC, EA, DDC, etc)	Close out
	Yes	No		
1. Request for Modification (RFM)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>attached</i>	<input checked="" type="checkbox"/>
2. Safety Evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>attached</i>	<input checked="" type="checkbox"/>
3. Design Reference Documents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Eng Project # 5000</i>	<input checked="" type="checkbox"/>
4. Engineering Analysis (EA)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<i>attached Safety Class 1, 2, 3 EA-100-27745-203-1-12</i>	<input checked="" type="checkbox"/>
5. Interface Considered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Swamp Loading</i>	<input type="checkbox"/>
6. QA Requirements	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
7. Codes/Standards**	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
8. Procedural Requirements				
A. Fabrication	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Vendor procedure</i>	<input checked="" type="checkbox"/>
B. Installation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Vendor procedure</i>	<input checked="" type="checkbox"/>
C. Test			<i>T&I Technical Note 052266</i>	
a. Acceptance	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
b. Surveillance	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
c. Records	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
d. Inspections	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
9. Copies of Procurement Documents	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
10. Design Document Checklist				
A. Admin Procedure Revisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
B. Working Procedure Revisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
C. Drawing Revisions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<i>Attached ERC forms</i>	<input checked="" type="checkbox"/>
D. Equipment Data Base	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
E. Spare Parts List	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
F. P&ID/Process	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
11. Implementation Phase				
A. Maintenance Order(s)***	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
B. NOC Forms	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
C. Auth Inspector and Repair Package	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
D. Training Package	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
12. Corrective Action (DR, ER, etc)	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>

*If additional space is required, identify by Engineering Analysis Number, ie, EA-SC-_____ and record information on the Engineering Analysis.
 **ASME Classes 1, 2 and 3 replacements require completion of reverse side.
 ***For closeout, all completed maintenance order packages shall be attached.

Performed by T. E. Lewis Date 3/18/84 Closeout [Signature] Date 4/14
 Technical Review [Signature] Date 2/9/84
 Administrative Review [Signature] Date 3/23/84

Form 3147 6-83

KAT 85*34
ATTACHMENT 5
(Pg 2 of 4)

To: EHLove, Palisades
From: YFChan, P-13-234
Date: March 21, 1984
Subject: PALISADES - FIRE PROTECTION
J-BOX SUPPORT
GWO 5221
CC: SHWade, P-13-231A
File 5221-002; 140

Consumers
Power
Company

INTERNAL
CORRESPONDENCE

Chan-14-84

9 4 5 .
1 6 8 6

With reference to Specification Change SC-84-043, I have performed structural analysis on the J-box support due to adding 1/2" Thermo-lag at 3.5 lb/ft², and found that the supports are adequate.

The structural analysis I performed was based on the J-box and support configuration as shown on the attached sketch. The dimensions shown on the sketch were provided to me by you, either orally or on sketches dated 3/6/84. In the analysis, I considered only the dead load and seismic load of the box, conduit, and supports. A copy of the calculation (calculation #5221-CR-1) is filed in FM&P file #5221-140.

If you have any questions, please call me.

KAT 85*34
ATTACHMENT 5
(Pg 3 of 4)

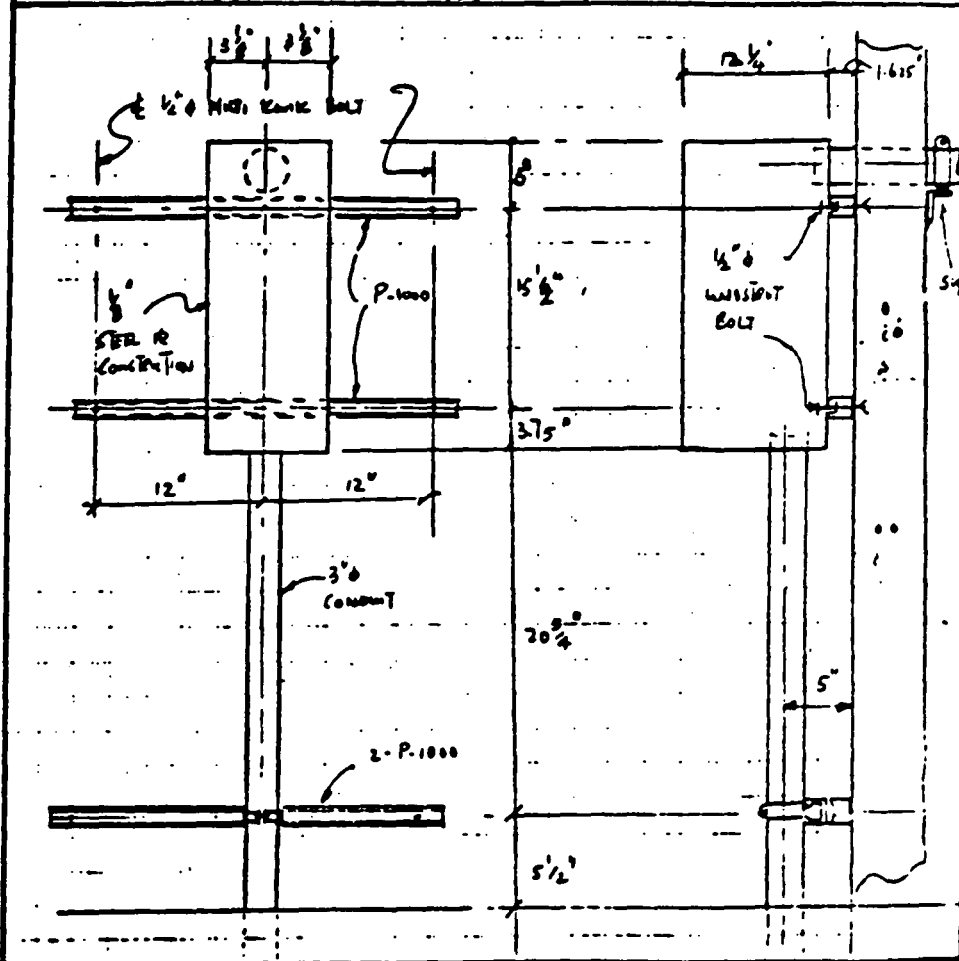


ATTACHMENT TO
MEMO CHAN-14-84

pg 1 of 1

PMSMP ENGINEERING DEPARTMENT
CALCULATION SHEET

Project PALISADES - FIRE PROTECTION		Sheet 4 of 12
Job No. 5221	File No. 5221-140	UFI Area 9m
Subject CONDUIT X1885-3" Pull Box Support		UFI System 023FL
Originator Y FENAN	Date 3/15/84	UFI Equipment -
Reviewer OC DOEPP	Date 3/19/84	Calc. Table No. 5221-6B-1



PMSMP Form 7-83

9-1-87

KAT 85*34
ATTACHMENT 5
(pg 4 of 4)

DEFENSE OPERATIONS DEPARTMENT
Specification Change

EC No **84 122**
Page 1 of 1

CP-250-0084

System Code	System	Equipment	System	Equipment	System Code
	0.5.2.0.0	3.6.3.1.0			M.5.E

Product Number	Serial Number	Part Number	Stock Number
CP 250	1		
	2		
	3		
	4		

Item	Original Requirements	Changed to
1	CABLES ROUTED THROUGH FIRE RATED BARRIER EXCLUSIVELY.	CABLES SPliced ON BOTH ENDS OF THE FIRE RATED BARRIER FOR CABLES RUNNING THROUGH CP250 & revisions to spec E-22 to eliminate the need for jacketed cable.

RECEIVED
AUG 28 1954

DEFENSE CONTROL CENTER
PALMADAR

Reference: **ENGINE SPECIFICATION E-22 - 84-050**

Reason for Change: **CABLES OVERHEATED INSIDE CP250 UNDER FIRE RATED BARRIER.**

Diagrams to Change: **E-22, E-27, E-350, E-381, E-351, E-42**

Author: Bob WINTERASEL	Date: 7/1/54	Approved: Paul B...	Checked: ...	Date: 7/1/54
Checked: Paul B...	Date: 7/1/54	Checked: ...	Date: 7/1/54	Checked: ...
Checked: ...	Date: 7/1/54	Checked: ...	Date: 7/1/54	Checked: ...

* This document not required for Procurement Documents.
** See Specification Change Checklist
Form 2107 5-54

**KAT 854034
ATTACHMENT 6
(PG 10/66)**

To Electrical/I&C Section Head, Palisades

From ~~Engineering Section~~

Date July 26, 1984

Subject PALISADES PLANT: FIRE STOP INSPECTION MADE
ON 7/16/84

CC CECilmer, Palisades
GJDaggett, Palisades
BWRodgers, Palisades
Document Control, 950*43*50/L

CONSUMERS
ENER
COMPANY

Internal
Correspondence

JH84*011

Attached is a copy of EA-FS-CP250 which details results of inspection of the three fire stops in containment that are constructed of Kacwool and Maranite board. Analysis will be filed with SC-84-128 which covers replacement of the fire stop on tray CP250.

This engineering analysis should satisfy point three of confirmatory action letter detailing steps to be taken as a result of CP250 fire stop incident.

9-18-1 2465

IC0784-0237A-TC03

KAT 854 34
ATTACHMENT 6
(Pg 2 of 6)

SC No. **84** **128**
100 101

12-11-79 **84-75-0000 to 0000**
NO 1211

System	Equipment	System	Equipment	System Code
0,0,1,0,9,0,5,7,0,2				F.P.S

Serial Number	Part Number	Stock Number
1		
2		
3		
4		

Item	Original Requirements	Changed to
1	1 1/2 HOUR FIRE RATED BARRIER WITH INSULATING PROPERTIES.	2 HOUR FIRE RATED BARRIER USING 2nd FORM AS SPECIFIED IN F.P.S-M-1.
2	NONE	INSTALL TEMP MEASUREMENT DEVICES INSIDE THE FIRE BARRIER.

RECEIVED
AUG 29 1984

DOCUMENT CONTROL CENTER
PALISADES

Reference: **SC 84-122**
Reason for Change:
PHASE ONE TEST DOES NOT SHOW HEAT GENERATED BY CABLE IN CABLE TRAY TO BE DISAPPEARED. A NEW TYPE OF FIRE BARRIER WOULD BE USED INCORPORATING A FORM MATERIAL OF HIGHER SURVIVAL FIRE RATING AND CONSIDERABLE LESS CABLE TRAY AREA.

Author: Bob HOSBORN	Date: 7/17/84	Agency: Palisades	Q.L. req'd: <input type="checkbox"/> YES <input type="checkbox"/> NO	Cost: 2100
Appr. by: [Signature]	PRC Agency (if Q.L. req'd): 84-75-49	Date: 7/17/84	QA R...: [Signature]	Cost: 711/84
Checked: [Signature]	Date: 7/17/84	Doc Update (Attach Transmittal Letter): [Signature]	Date: 8/10/84	

*These markings not required for Procurement Documents.
**See Specifications Change Checklist
D.A. P.S. 84
MELHUR 8/17/84

XAT 85#34
ATTACHMENT 6
(PG 3 OF 6)

ENGINEERING OPERATIONS DEPARTMENT
Qualification Change
Checklist

SC No. 84 12 B

9484 0970

	Applicable		Identify (Code, FC, EA, DOC, etc.)	Close out
	Yes	No		
1. Request for Modification (RFM)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA	<input type="checkbox"/>
2. Safety Evaluation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ATTACHED	<input checked="" type="checkbox"/>
3. Design Reference Documents	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MAN DRIVING 3-6511 RTV MAN	<input checked="" type="checkbox"/>
4. Engineering Analysis (EA)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LETTER EA SC 84-128	<input checked="" type="checkbox"/>
5. Interfaces Considered	<input checked="" type="checkbox"/>	<input type="checkbox"/>	504 000202	<input checked="" type="checkbox"/>
6. QA Requirements	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	MR DR RWW	<input type="checkbox"/>
7. Codes/Standards**	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA	<input type="checkbox"/>
8. Procedural Requirements				
A. Fabrication	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA	<input type="checkbox"/>
B. Installation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EM-10-1/CUP-T-51 19-05	<input checked="" type="checkbox"/>
C. Test				
a. Acceptance	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	POW 7/20/84 T-175	<input checked="" type="checkbox"/>
b. Surveillance	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
c. Preservation	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
d. Inventory	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
9. Copies of Procurement Documents	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	COPIES ATTACHED	<input checked="" type="checkbox"/>
10. Design Document Checklist				
A. Admin Procedure Revisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
B. Working Procedure Revisions	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
C. Drawing Revisions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	C-30-E-30-E425430	<input checked="" type="checkbox"/>
D. Equipment Data Base	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA	<input type="checkbox"/>
E. Spare Parts List	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
F. PEAR/PWR	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
11. Implementation Plan				
A. Maintenance Order(s)***	<input checked="" type="checkbox"/>	<input type="checkbox"/>	84-FPS-090 COPY ATTACHED 88-90	<input checked="" type="checkbox"/>
B. NDC Forms	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NA	<input type="checkbox"/>
C. Auth Inspector and Repair Package	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
D. Training Package	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
12. Corrective Action (DR, ER, etc)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DR 84-128: E-HAL-14-DSD	<input type="checkbox"/>

*If additional space is required, identify by Engineering Analysis Number, e. EA-SC-_____ and record information on the Engineering Analysis.
 **ASME Class 1, 2 and 3 replacements require completion of reverse side.
 ***For checkout, all completed maintenance order packages shall be attached.

Performed by Bob Webster ME Date 7/10/84 Closeout [Signature] Date 8/1/84
 Technical Review [Signature] Date 7/11/84
 Administrative Review [Signature] Date 7-17-84

KAT 85434
 ATTACHMENT 6
 (PG 4 OF 6)

SEISMIC ANALYSIS OF SUBSTITUTION OF BURE STOP
ORIGINAL TO C250 & C250

Performed by JROakley Date 7/17/04
 Review Method by: Alternate Calculations
 Detailed Review
 Qualification Test
J. Haumann Technical Review by 7/17/04 Date

SC-84-128
 BRIDGING HANDBOOK
 FLUOR ENCL. POCKET HANDBOOK

1
9
0
4
8
9

THE SPEC. ALLOWS 30% FILL OF CABLE TRAYS. TRAC250 IS CURRENTLY CONTAINING 72 CABLES (AVERAGE SIZE @ 2AWG)

THE ANALYZED TRAY SECTION IS 26" (3') LONG.
 NET OF #2 BULK CABLE WEIGHS 202 LBS
 8 FT OF #2 AWG CABLE WEIGHS 406 LBS
 72 CABLES (3' LONG) WEIGHS 436 LBS

ASSUME MAXIMUM DENSITY OF FOAM TO BE 20 #/FT³
 FORMED AREA = 9' X 24' X 34' = 734 IN³ = 125 FT³
 - WEIGHT OF FOAM = 125 X 20 #/FT³ = 85 #

PARANITE BOARD WEIGHS 2 #/FT²
 BOARD AREA 34' X 24' = 12 FT²
 - WEIGHT OF BOARD = 24 #

IBCA CABLE TRAY COVER WEIGHS 216 #/FT²
 COVER AREA 2' X 3' = 6 FT² X 2 = 12 FT²
 - WEIGHT OF COVER = 26 #

OVER THE 26" SECTION THE MAXIMUM ALLOWABLE WEIGHT THAT MAY BE ADDED TO THE TRAY WITHOUT SEISMIC ANALYSIS IS 15% OF THE CABLE FILL (PRESENT FILL IS 15%, ALLOWABLE IS 30%)
 15% (ASSUME #2AWG) = 43.6 #s

TOTAL WEIGHT ADDITION WITH NEW BARRIER IS
 85 # + 24 # + 26 # = 36.9 #s

XAT 85*34
 ATTACHMENT 6
 (PAGE 5 OF 6)

9404 0902

THE ADDITION OF THERMO FIRE BARRIER WILL NOT AFFECT
RESULTS OF THE TEST.

THE ALLOWABLE MARGIN IS $436 - 36.9 = 67^{\circ}$

$67 \div 3 = 22^{\circ}/\text{FT}$
 $22^{\circ}/\text{FT} \div 202^{\circ}/\text{FT}/\text{CABLE} = 10 \text{ CABLES.}$

APPROX SHOULD BE ADDED TO B250. TO LIMIT CABLE
ADDITION TO C0250 AND C1250 TO 10 MORE CABLES.

KAT 85*34
ATTACHMENT 6
(PG 6 OF 6)

circuits and how separation is to be effected. Scheme numbers and relay numbers are coded with odd numbers indicating Channel 1 and even numbers for Channel 2. The allocation for the power source is shown for each scheme. The cables are routed by an engineer and printed by computer with the computer output being carefully reviewed. The computer also prints a cable routing card and connection cards for each interconnecting cable installed in the plant. The cards are sent to the field as the official installation documents. The routing cards are signed and returned to the design engineer for record and to verify that cable was installed in accordance with the design. In the field, the Bechtel Electrical Field Inspector checks that all cables have been pulled in as required on the routing card. The Bechtel Quality Assurance Engineer and Consumers Power Company Quality Assurance Engineer spot-check the routing of all reactor protective and engineered safeguards cables.

The cable and wire connected to devices and instrumentation which are required to operate during a DBA has been proof-tested to assure satisfactory operation through and following the accident.

Tray fill will generally be limited to 30% by cross section. Tray fill greater than 30% by cross section is carefully reviewed to assure that cable damage, either mechanical or thermal will not take place. In the case of large diameter cables, fill may exceed 30% but will be limited to a single cable layer.

Conduit fill will be limited to values as stated in Chapter 9 of the NEC.

Cables are installed in ventilated trays and are thermally sized, in accordance with IPCEA ampacity values of three conductor concentric stranded rubber insulated cable in 40° C air for the conductor operating temperature of the insulation. If ambient temperatures above 40° C are encountered, or multiple power cables are in a tray, the cables are further derated as outlined by IPCEA.

Cables installed in conduit are thermally sized in accordance with IPCEA ampacity values of three identical single-conductor cables in isolated conduit in 40° C air or three-conductor cable in isolated conduit in 40° C air, depending on the cables used. Cables are further derated if the ambient exceeds 40° C or when multiple power cables are pulled into a conduit.

XAT 85*34
ATTACHMENT 7