# REPORT ON CABLE INSTALLATION

# MIDLAND PLANT UNITS 1 AND 2

JUNE 4, 1982

PREPARED BY

BECHTEL POWER CORPORATION

REPORT ON CABLE INSTALLATION

MIDLAND PLANT UNITS 1 AND 2

CONTENTS



ATTACHMENTS

# I. INTRODUCTION

## PURPOSE

This report describes the evaluation of the results of a major overinspection [i.e., an inspection made by Midland Project Quality Assurance Department (MPQAD) of a previous inspection by Bechtel Quality Control (QC) of the installation of Class 1E cable at the Midland site]. It also describes actions to date, and actions yet to be taken, to address the generic implications of any undetected misinstallations in the remainder of the Class 1E cables not overinspected.

## BACKGROUND

NRC Reg on III Inspectors R. Gardner and R. Love participated in a special team inspection at the Midland site May 18 through 22, 1981. One result of this inspection was an NRC question on the adequacy of the qualification of certain QC electrical inspectors and the process by which they were certified. The NRC considered the acceptability of the inspections performed by these inspectors to be indeterminate and requested that MPQAD perform an audit of QC to determine the adequacy of this training, qualifications, and examinations prior to their certifications. This matter was left as an unresolved item (NRC Item Number 50-329/81-12-08; 50-330/81-12-09).

MPQAD performed the requested audit in June 1981. The NRC concluded that the MPQAD audit results were partially "inconclusive" and requested that MPQAD perform another audit. In addition, the NRC requested that MPQAD perform overinspections of selected installations.

MPQAD performed the second audit in November 1981. Bechtel QC began to include on-the-job training as part of the personnel certification records. Subsequently, NRC Inspection Report 50-329/82-06; 50-330/82-06 closed the unresolved item by concluding that the training, qualifications, and examinations for certification meet applicable requirements.

## OVERINSPECTION RESULTS

MPQAD also performed the requested overinspections. Attachment 1 summarizes the results of the overinspections of 1,084 cable installations. Misinstallations identified during that overinspection were documented on nonconformance reports (NCRs), which are given as Attachment 2.

NONCONFORMANCE REPORT DISPOSITIONS

The NCRs identified 55 cables as misinstalled in part. The 55 cables were evaluated by Bechtel project engineering based on the specifics of each case and the appropriate design criteria. Each case was determined to have no impact on safety. Fifty-two cables were dispositioned "use as is," and the remaining three cables were dispositioned "rework." Subsequent review and verification of the disposition actions will be made by MPQAD prior to closure of the NCRs.

## II. CASES NOT OF GENERIC CONCERN - NO FURTHER ACTION NEEDED

Section I described how the 55 specific cases of cable misinstallation were dispositioned. Each type of misinstallation had to be dispositioned generically, as well. In other words, not only must the 55 specific cases be dispositioned, but each type of case also must be dispositioned with the assumption that the misinstallation could occur anywhere in the plant and remain undetected.

This section identifies the types of cases which are generically dispositioned to be of no concern, therefore warranting no further action. For each case of this type, the rationale is provided as to why it is not of generic concern.

Attachment 3 includes a table, definition of terminology and a list of each of the 55 specific cases. This table also identifies each case as belonging to one of two categories - "No Further Action Needed" or "Further Action Needed." Cases described in this section of the report all fall into the "No Further Action Needed" category.

The cases not of potential generic concern are as follows:

1. Five cables were found to enter or leave tray in locations other than as specified in Drawing 7220-E-37. These cable installations did not use all designed tray vias (raceway sections) but also did not use any additional trays. These were evaluated as no potential generic concern because the absence of a cable in a tray via would make the thermal analysis more conservative. These cases are identified in the table of Attachment 3 under the subheading "Covered by Analysis."

2. Five cables were misinstalled in that installation to turn from one raceway section into another, resulting in a small length of the cable protruding into the adjacent raceway section. These were determined to constitute no potential generic concern because project engineering's method for determining which trays are to be wrapped will include the requirement for wrapping a portion of the adjacent trays. These cables are listed in the table of Attachment 3 under the subheading "Wrapping Criteria."

3. Eight cables involved airlining (limited routing of cable without using raceway) at the motor control center (MCC). Although these cables did not conform to the detailed routing in 7220-E-37, they did conform to the design criteria in 7220-E-42, Sheet 5, which gives

notes and defines the proper use of 7220-E-37. Because 7220-E-42 takes precedence over 7220-E-37, these cases were determined to constitute no potential generic concern. These cases are listed in the table of Attachment 3 under the subheading "Airlining at MCCs."

4. Four cables were determined to constitute no potential generic concern because, although the cable was pulled, additional construction processes and inspections already planned at the time of the overinspection would have identified these conditions. These cases are listed in the table of Attachment 3 under the subheading "Construction Incomplete."

   Two of these four cases were related to cables which had been neither final trained in accordance with Procedure FPE-4.000 nor inspected in accordance with PQC E-3.0.

   Two cases involved cables that could not be terminated. One cable entered the wrong compartment of a control panel and the other was pulled to the incorrect penetration.

   In each of the four cases above, the subsequent construction activities could not have been accomplished and construction would have corrected the conditions.

5. Sixteen cables had nonconformances directly related to extensive successive rework. This was determined to be a unique case and not repeatable, and thus not a potential generic concern. For more details on this case, refer to Sketch 25 of Attachment 3. A second unique case involves a cable being tied to the bottom rung of a riser. We are unaware of this situation ever occurring elsewhere in the plant. These cases are listed in the table of Attachment 3 under the subheading "Unique Case."

6. None of the misinstalled cables were evaluated to be a source of potential generic concern relative to 10CFR, Appendix R (fire protection) because of the wrapping design of the trays. Whenever any two Class 1E trays (of different channels) are within 20 feet of each other, one tray will be wrapped. Therefore, a misinstalled cable would be located in another 1E tray of the same channel already evaluated for fire protection and it would be wrapped, if required. A subheading is given for this condition in the table of Attachment 3, but none of the specific 55 cases exhibited this condition.

7. Channel separation, in accordance with Regulatory Guide 1.75, was determined not to be a potential generic concern because the design is based on cable tray spacing. When trays from different channels are determined to be less than the required distance apart, one tray will be wrapped to provide an adequate barrier. Therefore, a misinstalled cable located in another tray of the same channel will be adequately separated (or protected) from trays of other channels. A subheading is given for this condition in the table of Attachment 3, but none of the specific 55 cases exhibited this condition.

   It should be noted that, of the 1,084 cables subject to overinspection, no cases of channel mixing due to misinstalled cables were detected. This is because 1E cables are color-coded, which makes this type of error apparent and it would thus be detected and corrected by construction or QC.

The remaining 17 of the 55 cables represented a potential generic concern for which further actions are required as described in Section III of this report.

# III. CASES OF POTENTIAL GENERIC CONCERN - FURTHER ACTION NEEDED

Section III identifies the types of cases that are evaluated to be of potential generic concern, and therefore warranting further action. This section is written in two parts - the first part dealing with potential voltage violations and the second part dealing with potential adverse thermal effects.

1. Six cables were installed into incorrect trays at transition points. If repeated elsewhere, this could result in a voltage violation, mixing power and instrument cable. Thus, this is of potential generic concern for which further action is required to remove the concern.

   QC will add to the area walkdown inspection procedure (PQCI 7220-E-3.0), a requirement to inspect all cable transitions from raceways to ensure that no voltage violations occur. Therefore, this type of misinstallation will be corrected or subject to Project Engineering evaluation on a case-by-case basis. These cases are identified in the table of Attachment 3 under the subheading "QC Area Walkdown."

2. The remaining 11 cables also represented a potential generic concern of derating of cables due to thermal effects for which further actions are required to remove the concern. The conditions represented by these cables might result in nonconservative thermal analysis for trays that are subject to wrapping (for fire protection according to 10CFR, Appendix R, or channel separation according to Regulatory Guide 1.75) or have tray fill greater than 30% by volume (FSAR Table 8.3-44). Thirty percent tray fill is considered to be a conservative level for initiating analysis and is the most widely accepted value in the industry.

According to FSAR Appendix 9A, a 20-foot horizontal separation is required between redundant safe shutdown cables. According to Regulatory Guide 1.75, a 3-foot horizontal and a 5-foot vertical separation are also required. Raceway (cable tray) is wrapped when the configuration does not meet these separation requirements.

In reviewing raceway drawings, a subject raceway is picked and reviewed in every direction to determine if another Class 1E raceway of a different channel does not meet the separation requirements. The process is repeated throughout the length of the raceway. When two sections of raceway are found to be less than the required distance apart, both raceways will be analyzed for thermal effects, and the tray with the lower energy level (wattage per square foot) will be identified for wrapping (in Drawing Series E-2500 and E-2600).

The thermal analysis is based on the cables designed to be in a given tray (in accordance with Raceway Schedule 7220-E-36). To acquire an additional level of confidence that wrapped trays or overfilled raceways will not be degraded, the number of power cables that have the potential for being misinstalled in a pull will be determined. This information will be used to identify cable tray sections which may be analyzed considering the potential for misinstallation. This added step will identify tray sections that require verification because of potential thermal derating of the cables. Therefore, when a tray is to be wrapped, it must be verified that the cables designed to be in that tray are present. This verification will be accomplished by inspecting identified tray sections to confirm that the population of cables in each specific tray section is the same quantity and size as established by Drawing 7220-E-36.

When a raceway is determined by verification to have a population different from that specified in Drawing 7220-E-36, additional inspections will be performed to identify the specifics of the population variance. The specifics will be referred to project engineering for evaluation and disposition.

These 11 cases are listed in the table of Attachment 3 under the subheading "Thermal Analysis."

## IV. ACTION PLANS

The following is a list of the specific actions which are to be taken, with the organization primarily responsible for the action and the action completion date given parenthetically:

1. Revise PQCI E-3.0 to add a QC area walkdown inspection to verify that no cable transitions result in voltage violations (QC, complete).

2. Submit the revised PQCI E-3.0 to MPQAD for review and approval and through MPQAD to NRC for review (QC, complete/MPQAD, June 14, 1982).

3. Establish the method of thermal analysis by which to identify the cable trays to be inspected by QC (Project Engineering, 6/11/82).

4. Perform the thermal analysis to identify the cable trays to be inspected by QC (Project Engineering, 7/1/82 through 12/31/82).

5. Issue the drawing (or revisions) which identifies cable trays to be inspected by QC (Project Engineering, 12/31/82).

6. Prepare the PQCI for the inspections to be made per drawing in Item 5 and for trays to be wrapped per E-2500 and E-2600 (QC, 2 weeks after the completion of item 5).

7. Submit the PQCI to MPQAD for approval and through MPQAD to NRC for review (QC, 1 day later/MPQAD, 2 weeks later).

8. Issue the PQCI for implementation (QC, 2 days after MPQAD approval).

9. Schedule and conduct training to the PQCI per Paragraph 8.5 of PSP G-6.1. Notify MPQAD prior to the training so they may attend. (QC, 2 days after MPQAD date in item 7).

10. After training has been documented as required by Paragraph 8.5 of PSP G-8.1, notify MPQAD, who, in turn, will notify the NRC. (QC, 2 days after the completion of training/MPQAD, 1 week thereafter).

11. Perform the inspections per the PQCI in Item 6 above (QC, per construction schedule).

12. Issue the MPQAD plan for the overinspection of the inspections being performed by QC (MPQAD, 2 weeks after MPQAD approval of the PQCI per item 7).

13. Perform the overinspections (MPQAD, per construction schedule).

14. In accordance with the existing procedures, prepare the FSAR revision (Project ENgineering, FSAR Review Schedule).

15. Begin the overinspection of the remainder of the cable installations previously inspected by QC Engineer #1 (MPQAD & QC, June 7, 1982).

# V. CONCLUSIONS

Based on the foregoing, the following conclusions are drawn.

1. The misinstallations detected by the overinspection are minor departures from design criteria, usually one incorrect via on a cable routing. None of the specific 55 misinstalled cables had any adverse impact on safety.

2. The generic implications of the misinstalled cables were evaluated. Either there was no generic concern for the majority of cases or the generic concern is being resolved by the additional actions, and thus has no adverse impact on safety.

# VI. MEETING MINUTES

A meeting was held on May 14, 1982, in Glen Ellyn, Illinois, between Consumers Power Company, Bechtel, and the NRC, to discuss this report on cable installation. Meeting attendees are listed in Attachment 4.

The results of the meeting were that the NRC, in general, favored our approach. However, certain additional conditions must be met for the approach to be officially accepted. The conditions were as follows.

1. That, in addition to the 43% of inspections made previously, the remaining 57% of the cable installations originally inspected by Bechtel QC Engineer #1, be reinspected. (Subsequent to the meeting, on May 17, 1982, B.W. Marguglio advised C. Norelius that this reinspection would be made.)

2. That the NRC review PQCI E-3.0, which will be revised to reflect the inspection of all cable transitions from raceways to ensure that no voltage violations occur

3. That the NRC review the approach to be used for the thermal analysis to identify raceways, by type, that will be subject to QC inspection for cable count

4. That the FSAR be revised to be consistent with other construction activities

5. That the NRC review the PQCI for inspection of the cables in selected raceways

6. That the Nuclear Reactor Regulation (NRR) review this entire matter

7. That Consumers Power Company provide the specific schedule for each action given in the action plan of Section IV

7120

## TABLE 2 - CABLE TERMINATION CHARACTERISTICS

| Type of Characteristic | Number of Each Type of Characteristic |
|---|---|
| Cable scheme number identification | 1 |
| Cable type identification | 1 |
| Cable code identification | |
| Cable reel number | 1 |
| Cable minimum bend radius | 1 |
| Cable permanent identification tag | 1 |
| Lug integrity | 1 |
| Termination integrity | 1 |
| Crimp integrity | 1 |
| -ect termination per wiring diagram | 1 |
| Shield and drain wires | 1 |
| Insulation | 1 |
| TOTAL | 12 |

## TABLE 1 - CHARACTERISTICS ASSOCIATED WITH CABLE PULL

| Type of Characteristic | Number of Each Type of Characteristic |
|---|---|
| Cable jacket color band | 1 |
| Cable jacket color stripe | 1 |
| Cable identification tagging at each end | 2 |
| Cable reel number | 1 |
| Minimum cable bend radius[a] | 1[a] |
| Cable vias[b] | 15[b] |
| Cable ties[a] | 1[a] |
| Cable tray damage | 1 |
| Cable damage | 1 |
| TOTAL | 24 |

(a) There are multiple points at which the cables are bent or at which the cables are tied but, in the interest of conservation, these are each counted as one characteristic.

(b) For each cable pull, it is estimated that there is an average of 15 vias. This is considered to be a conservative estimate, although it was not arrived at by an actual count of the vias for each of the jobs overinspected.

Disposition

A. Of the 157 individual nonconforming characteristics, 145 were dispositioned by Bechtel Project Engineering to be "used as is." The basis for this disposition for the cable routing nonconformances is that they have no impact on separation, segregation, physical loading and thermal loading and, therefore, no impact, whatsoever, on plant safety. The disposition of these cable routing nonconformances also calls for the drawings to be changed to reflect the "as built" conditions.

B. Twelve characteristics were dispositioned to be "reworked." Ten of these were for cable pulls involving ten different cables. The other two were for cable terminations. In each of these cases, Bechtel Project Engineering stated that there was no public safety impact, ie, that these nonconformances could not have caused an accident or impeded the ability to ameliorate the consequences of an accident. As a matter of fact, in the opinion of Bechtel Project Engineering, it was doubtful that any of these nonconformances would have impaired the functionability of the circuits involved. Attachment A provides the specifics of the Bechtel Project Engineering disposition and the jurisdiction for that disposition.

VII. Conclusions

On the basis of the above information, the undersigned believe that the Bechtel certification process for the nine Bechtel Quality Control Engineers was adequate. In the interest of further improvement, on-the-job training is now being documented and MPQAD, on a sampling basis, is overviewing the Bechtel Quality Control Engineer certification process. However, in each case for which the ANSI N45.2.6-1973 education and experience criteria are not met, MPQAD is now overviewing the Bechtel certifications.

M J Schaeffer, Section Head
Electrical/I&C, MPQAD

3/26/82
Date

E L Jones, Group Supervisor
Electrical/I&C, MPQAD

3/26/82
Date

BWM/da

071298

C. Therefore, a total of 26,016 cable pull characteristics were overinspected (24 x 1,084).

D. There were 91 nonconforming via characteristics and 66 nonconforming recordings of cable reel numbers, for a total of 157 nonconforming characteristics. Therefore, 0.60 percent (157 ÷ 26,016) of the cable pull characteristics were nonconforming.

E. There were 55 misrouted individual cables in 1 or more vias, resulting in 5.07 percent (55 ÷ 1,084) of the cables being misrouted at 1 or more points.

III. Cable Terminations

A. For each cable termination, 12 characteristics were overinspected, as enumerated in Table 2 (attached).

B. MPQAD overinspected 282 cable terminations.

C. Therefore, a total of 3,384 characteristics (12 x 282) were overinspected.

D. There were 2 nonconforming characteristics, or 0.06 percent (2 ÷ 3,384).

E. Each of the termination nonconformances was on a different cable. Therefore, 0.71 percent (2 ÷ 282) of the terminations was nonconforming with regard to 1 characteristic.

IV. Cable Tray Supports

For each of the 2 cable tray support overinspections, there are 8 inspection characteristics, resulting in the overinspection of 16 characteristics. There were no nonconformances.

V. Totals

For all jobs overinspected, there were 159 individual nonconforming characteristics, from a total of 29,416 individual characteristics. Therefore, 0.54 percent (159 ÷ 29,416) of the characteristics were nonconforming.

# RESULTS OF THE SPECIAL ELECTRICAL OVERINSPECTION REQUESTED BY NRC

7123S

## I. Introduction

A. NRC requested that MPQAD perform special overinspections of the inspections made by 4 Bechtel Electrical Quality Control Engineers whose certifications were questioned by NRC because of the amount of training which was documented in their certification files.

B. NRC requested also that MPQAD perform special overinspections of the inspections made by any other Bechtel Electrical Quality Control Engineers whose original inspections were impacted by any then existing Nonconformance Reports originated by MPQAD. This resulted in the identification of 5 additional Bechtel Electrical Quality Control Engineers whose inspections were to be subject to the MPQAD special overinspection.

C. In a telephone conversation with Mr William Little of the NRC, it was agreed that 250 of these overinspections could be accomplished by Bechtel Electrical Quality Control Engineers, other than the 9 Engineers whose work was subject to this special overinspection.

D. MPQAD performed overinspections of 1,118 original inspections for cable pulls, cable terminations and cable tray supports. Each of these original inspections was documented on a Bechtel Quality Control Inspection Report (QCIR).

E. Bechtel Quality Control overinspected 250 cable pulls which were originally inspected by one Engineer. Each of these original inspections also was documented on a QCIR.

F. Therefore, 1,368 original inspections were overinspected by either MPQAD or Bechtel Quality Control.

## II. Cable Pulls

A. For each cable pull, 24 characteristics were overinspected by either MPQAD or Bechtel Quality Control. These characteristics are enumerated in Table 1 (attached).

B. MPQAD overinspected 834 cable pulls and Bechtel Quality Control overinspected 250 cable pulls, for a total of 1,084.

Attachment 1 to
Report on Cable Installation

71298

TO: Distribution

M. J. Schaeffer

FROM: MJSchaeffer, MPQAD

DATE: March 24, 1982

SUBJECT: [redacted]

File 10.0

Enclosed is the revised report on the results of the Special Electrical Overinspection requested by the NRC to support their testimony as to the adequacy of the certification/qualification process of Bechtel Electrical Quality Control Inspectors.

This report was revised to reflect that a total of 55 cables were misrouted, in lieu of 61, which was originally reported on the now superseded report dated February 25, 1982.

Distribution: WRBird, P14-418A
JWCook, P26-336B
RCook, NRC Inspector on Site
PCorcoran, Bechtel-Midland
MLCurland, Midland
LHCurtis, Bechtel-Ann Arbor
LEDavis, Bechtel-Midland
MADietrich, Bechtel-Midland
RGardner, NRC Region III
BWMarguglio, Midland
DBMiller, Midland
JARutgers, Bechtel-Ann Arbor
ESmith, Bechtel-Midland

Attachment 2 to
Report on Cable Installation

Consumers Power Company
0427-0

# NONCONFORMANCE REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

SUS: OGLH Trend: B-3, (B-5) 1-3 1-5 Priority: 5 AI: S-1270 PAGE 1 OF 2

| PROJECT NAME: | 7. NONCONFORMING PART NO: | 8. NONCONFORMING PART NAME: | 1. NCR SERIAL NO: M01-9-2-013 |
|---|---|---|---|
| Midland 1 and 2 | OAB 4511 H | Electrical Cables | 2. DATE: 2/3/82 CLOSED 4/16/82 |
| MATERIAL NUMBER: N/A | 10. ORG. CONCEIVING NC: Bechtel Construction/ Bechtel Quality Control | 11. AREA/LOC. OF NC: Lower Cable Spreading Room | 3. DATE OF REV: N/A |
| | | | 4. FILE NO: 16.0 KPH |

"AS IS" NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

Bechtel Electrical Circuit Schedule Drawing E-37, Revision 52, Run 07 gives the first five vias for routing cable scheme OAB 4511 H as: AWW024, AFB07, AFB08, AFB09 and AFA09. Bechtel PQCI 7220/E-4.0 gives identical routing requirements.

Contrary to the above requirements, actual cable routing of this cable for the first seven vias is AWW024, AFC06, AFC07, AFC08, AFC09, AFA10, AFA09

5. DISTRIBUTION

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MADietrich ALAB-2
BWMarguglio MJSchaeffer
REMcCue ~~CPollin~~ BHPeck
DBMiller RDJohnson
~~BHPeck~~ MLCurland
JARutgers
DATaggart
~~DMTurnbull~~
RAWells

QA RECOMMENDATION FOR PART CA:

Bechtel Engineering evaluate routing of cable OAB 4511 H. Take appropriate action to make E-37 and routing of cable agree. (LHCurtis)

PROJECT/PROJECT ENG. DISPOSITION REQUIRED [X] NOT REQUIRED [ ]

HOLD APPLIED YES [ ] NO [X] REMOVE, LOCATION & TYPE OF HOLD TAGS APPLIED:

IS PROCESS CA REQUIRED: YES [X] NO [ ] IF NO, ENTER JUSTIFICATION BELOW:

| | | | |
|---|---|---|---|
| DOES NC AFFECT Q-LIST ITEM: YES [X] NO [ ] | | 17. IS NC REPORTABLE PER 50.55(e): YES [ ] NO [X] | |
| IS NC REPORTABLE PER PART 21: YES [ ] NO [X] | | 19. IF YES, DATE & TIME OF REPORT TO NRC: N/A | |
| IF YES, WHO MADE REPORT TO NRC: N/A | | 21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A | |
| NCR ORIGINATED BY: L.A. Natt 2/3/82 | 23. WRITTEN REPLY REQUIRED BY: 2/24/82 TO ESTABLISH CA COMPLETION DATE | 24. SUPERVISOR'S SIGNATURE/DATE: M 9. Schaefer 2/3/82 | |

PART CA DISPOSITION, JUSTIFICATION & COMPLETION DATE:

Curtis response dated 2/23/82 attached.

| | | | |
|---|---|---|---|
| DESIGN/PROJECT SIG. AUTH. DISP.: See Block 25 | 27. PMO SIG. AUTH. DISP.: N/A | 28. PROCUREMENT SIG. CONC. DISP.: N/A | 29. SIG. OF ORG. RESP. FOR C/A: See Block 25 |
| QA SIG. AUTH. DISP. DISP.: See Block 25 | 31. SIG. OF TEST GROUP ACTION. CONDITION: N/A | 32. FOR MAJOR MOD - PLT. SUPT. SIG. AUTH. DISP.: N/A | 33. QA AUTH. SIG. TO DOCUMENT DISP.: |

METHOD OF PART CA VERIFICATION:

Verified DCN-884 and latest Revision of Drawing E-37 reflect the as pulled vias of Cable 4511H.

Attachment 2 to
Report on Cable Installation

To: B. W. Marguglio

Consumers Power Company

# NONCONFORMANCE REPORT

From: L. H. Curtis

SUS: 71398 OGLN Trend: B-3, (B-5) Priority: 5 AI: S-1270 PAGE 1 OF 2

| UNIT NAME: | 7. NONCONFORMING PART NO: | 8. NONCONFORMING PART NAME: | 1. NCR SERIAL NO: 81-9-2-013 |
|---|---|---|---|
| land 1 and 2 | OAB 4511 H | Electrical Cables | 2. DATE: 2/3/82 |
| 4. XREFS: N/A | 10. ORG. CONCERNED: Bechtel Construction/ Bechtel Quality Control | 11. AREA/LOC. OF NC: Lower Cable Spreading Room | 3. DATE OF REV: N/A |
| | | | 4. FILE NO: 16.0 |

6. NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

tel Electrical Circuit Schedule Drawing E-37, Revision 52, Run gives the first five vias for routing cable scheme OAB 4511 H as: 24, AFB07, AFB08, AFB09 and AFA09. Bechtel PQCI 7220/E-4.0 gives tical routing requirements.

rary to the above requirements, actual cable routing of this e for the first seven vias is AWW024, AFC06, AFC07, AFC08, 9, AFA10, AFA09

5. DISTRIBUTION

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BWMarguglio
REMcCue/CFollin
DBMiller
BHPeck
JARutgers
DATaggart
DMTurnbull
RAWells

DISPOSITION FOR PART CA:

tel Engineering evaluate routing of cable OAB 4511 H. Take opriate action to make E-37 and routing of cable agree. (LHCurtis)

CA/ NCT ENG. DISPOSITION REQUIRED [X] NOT REQUIRED [ ]

TEMP. APPLIANCE YES [ ] NO [X] NUMBER, LOCATION & TYPE OF HOLD TAGS APPLIED:

ACCESS CA REQUIRED: YES [X] NO [ ] IF NO, ENTER JUSTIFICATION BELOW:

| | |
|---|---|
| NC AFFECT 3-MILE ISLAND: YES [X] NO [ ] | 17. IS NC REPORTABLE PER 50.55(e): YES [ ] NO [X] |
| NC REPORTABLE PER PART 21: YES [ ] NO [X] | 19. IF YES, DATE & TIME OF REPORT TO NRC: N/A |
| 18. WHO MADE REPORT TO NRC: N/A | 21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A |

INITIATED BY: R. Natt 2/3/82

23. WRITTEN REPLY REQUIRED BY: 2/24/82 TO ESTABLISH CA COMPLETION DATE

24. SUPERVISOR'S SIGNATURE/DATE: M 9. Schneider 2/3/82

CA DISPOSITION, JUSTIFICATION & COMPLETION DATE:

is is Project Engineering's complete response. The actual 'as built' routing for cable 4511H has been evaluated and is acceptable as is. DCN number 884 to E-37 has been issued /12/82) to reflect the 'as built' route.

: D. Borlaza P. Corcoran
D. Holler G. Warner
L. Curtis

| | |
|---|---|
| ACTION PRINT | DAN |
| INFO PRINTS | |
| MPQA ROUTING | DANT |
| PRINT TO FILE | |
| ORIG TO FILE | 16.0 |

| | | | |
|---|---|---|---|
| 25. PROJECT SIG. AUTH. DISP.: P. Corcoran for L. Curtis 2/12/82 | 27. PMO SIG. AUTH. DISP.: N/A | 28. PROCUREMENT SIG. COMC. DISP.: N/A | 29. SIG. OF CMG. REAP. FOR CA: P. Corcoran for L. Curtis |
| CONST. SIG. AUTH. DEP. DISP.: | 31. SIG. OF TEST GROUP ACTION. CONDITION: N/A | 32. FOR MAJOR MOD - PLT. SUPT. SIG. AUTH. DISP.: N/A | 33. QA AUTH. SIG. TO IMPLEMENT |

SIGN OF PART CA VERIFICATION:

Consumers Company

# NONCONFORMANCE REPORT
## PROCESS CORRECTIVE ACTION

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT
M01-9-7



OUT OF ROOT CAUSE(S):

C71298

Bechtel Construction did not follow correct routing for cable scheme CAB 4511 H. QC Engineer did not verify correct routing of the cable.

UAL ROOT CAUSE(S), IF DIFFERENT FROM ABOVE (TO BE COMPLETED BY ORG. RESPONSIBLE FOR PROCESS CA):

CESS CA REQUIRED FROM:

TION ☐ FABRICATION ☐ CONSTRUCTION ☒ PROCUREMENT ☐ INSPECTION ☒

ER

RECOMMENDATION FOR PROCESS CA:

(1) Determine if there were other cables in this pull which may not be routed other than as specified by E-37. Inform MPQAD of results. (LEDavis)

(2) Review PQCI E-4.0, "Installation of Electrical Cables" with cable pulling QCEs, emphasis to be placed on Activity 2.5. Inform MPQAD when action is complete. (ESmith)

CESS CA TO BE TAKEN BY ORG(S) CHECKED IN BLOCK #1 & DATE OF COMPLETION:

METHOD OF PROCESS CA VERIFICATION:

Attachment 2 to Report on Cable Installation

B 7220 MIDLAND PROJECT

BECHTEL POWER CORP.

# TRANSMITTAL FORM

№ 20275

PLEASE RECEIPT AND RETURN BLUE COPY IMMEDIATELY

071298

DATE 4/12/82

* ACTION

| ACTION FOR VENDORS | ACTION FOR OTHERS |
|---|---|
| 1. ☐ APPROVED - MFG. MAY PROCEED | 6. ☐ FOR APPROVAL |
| 2. ☐ APPROVED SUBMIT FINAL DWG. MFG. MAY PROCEED | 7. ☐ CONSTRUCTION |
| 3. ☐ APPROVED EXCEPT AS NOTED. MAKE CHANGES AND SUBMIT FINAL DWG. MFG MAY PROCEED AS APPROVED | 8. ☐ PRELIMINARY USE |
| 4. ☐ NOT APPROVED. CORRECT AND RESUBMIT | 9. ☐ REFERENCE |
| 5. ☐ REVIEW NOT REQUIRED MFG. MAY PROCEED. | 10. ☒ Complete response |

| SUBJECT | CODE |
|---|---|
| ☐ BECHTEL DRAWINGS | B |
| ☐ VENDOR DRAWINGS | V |
| ☐ MATERIAL REQUISITION | MR |
| ☐ SPECIFICATIONS | S |
| ☐ BID REQUEST | BR |
| ☐ QUOTATIONS | Q |
| ☐ PURCHASE ORDER | PO |
| ☐ CONFERENCE NOTES | CN |
| ☐ BID SUMMARY | RS |
| ☐ SUBCONTRACTS | SC |
| ☐ _____ | X |
| ☐ _____ | Y |

NTION VENDORS: ALL FINAL DRAWINGS SUBMITTED TO BECHTEL MUST BE CERTIFIED TRANSPARENCIES.

| F. P. PREFIX | BECHTEL FOREIGN PE. NO. ☐ BECHTEL DRAWING NO. ☐ | REV. NO. | TITLE | VENDOR NO. | ACTION | CODE |
|---|---|---|---|---|---|---|
| | | | MPQAD NCR M-01-9-2-013<br>QA AI S-1270<br>QC AI 1503 | | | |

MICHIGAN GAS & ELECTRIC COMPANY

RECEIVED

APR 14 1982

FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

MENTS: cc: W. R. Bird
R. W. Marguglio

| | |
|---|---|
| ACTION PRINT | DAN |
| INFO PRINTS | |
| [illegible] ROUTING | MLC |
| [illegible] TO FILE | |
| [illegible] TO FILE | 16.0 |

THIS COPY FOR

FROM

D. M. Turnbull, MPQAD
Consumers Power Company

ESmith, Quality Control
Bechtel Power Corp.

☐ VENDOR PRINT
☐ OTHER

BY D.S.T. E. Smith

71230

QC AI 1503

MPQAD NCR M-01-9-2-013

A review of PQCI E-4.0 Rev. 9, "Installation of Electrical Cables" with cable pulling QCE's was performed on 3/12/82. Special emphasis was placed on activity 2.5, verification of correct vias.

T/N 20275

JOB 7220 MIDLAND PROJECT

Attachment 2 to Report on Cable Installation

BECHTEL POWER CORP.

# TRANSMITTAL FORM

№ 22997

PLEASE RECEIPT AND RETURN BLUE COPY IMMEDIATELY

DATE February 17, 1

| * ACTION | ACTION FOR VENDORS | ACTION FOR OTHERS |
|---|---|---|
| | 1. ☐ APPROVED - MFG. MAY PROCEED | 6. ☐ FOR APPROVAL |
| | 2. ☐ APPROVED SUBMIT FINAL DWG. MFG. MAY PROCEED | 7. ☐ CONSTRUCTION |
| | 3. ☐ APPROVED EXCEPT AS NOTED. MAKE CHANGES AND SUBMIT FINAL DWG. MFG MAY PROCEED AS APPROVED | 8. ☐ PRELIMINARY USE |
| | 4. ☐ NOT APPROVED. CORRECT AND RESUBMIT | 9. ☐ REFERENCE |
| | 5. ☐ REVIEW NOT REQUIRED MFG. MAY PROCEED. | 10. ☒ complete response |

| SUBJECT | CODE |
|---|---|
| ☐ BECHTEL DRAWINGS | B |
| ☐ VENDOR DRAWINGS | V |
| ☐ MATERIAL REQUISITION | MR |
| ☐ SPECIFICATIONS | S |
| ☐ BID REQUEST | BR |
| ☐ QUOTATIONS | Q |
| ☐ PURCHASE ORDER | PO |
| ☐ CONFERENCE NOTES | CN |
| ☐ BID SUMMARY | BS |
| ☐ SUBCONTRACTS | SC |
| ☐ _____ | X |
| ☐ _____ | Y |

ATTENTION VENDORS: ALL FINAL DRAWINGS SUBMITTED TO BECHTEL MUST BE CERTIFIED TRANSPARENCIES.

| QTY. | P. P. PREFIX | BECHTEL FOREIGN PR. NO. ☐ BECHTEL DRAWING NO. ☐ | REV. NO. | TITLE | VENDOR NO. | * ACTION | CODE |
|---|---|---|---|---|---|---|---|
| | | | | NCR M-01-9-2-013 A.I. S-1270 | | | |

RECEIVED
FEB 19 1982
FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

COMMENTS: _____

| | |
|---|---|
| ACTION PRINT | DAN |
| INFO PRINTS | BWM/ELJ/MTS |
| MTGS ROUTING | DIAT |
| PRINT TO FILE | |
| ORIG TO FILE | 16.0 |

THIS COPY FOR

B.W. Marguglio
Jackson - CPCo
W.R. Bird
D.M. Turnbull

FROM
L.E. Davis
Midland Jobsite

☐ VENDOR PRINT

BY _____

71298

NCR M-01-9-2-013 A.I. S-1270

A complete review of all cables in the A-276 pull package revealed 1AA-0503M and 1AA-504L were also incorrectly routed. The actual routing was determined to be acceptable. PCN 6388 has been written to correct E-37 to the "as built" condition.

To: B. W. Marguglio

From: L. H. Curtis

# NONCONFORMANCE REPORT

Priority: 1 Start Up: CD-88 Trend: I-3, (I-5) AI: S-1273 PAGE 1 OF 5

| | | | |
|---|---|---|---|
| 5. NAME: land 1 & 2 | 7. NONCONFORMING PART NO: See below | 8. NONCONFORMING PART NAME: Electrical Cables | 1. NCR SERIAL NO: M-CUT-82-016 |
| 6. NUMBER: N/A | 10. ORG. CONDITION NO: Bechtel Construction/ QC/Project Engineering | 11. AREA/LOC. OF NC: Various Class 1E Locations | 2. DATE: 2/11/82 |
| | | | 3. DATE OF REV: N/A |
| | | | 4. FILE NO: 16.0 |

12. NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

MPQAD overinspections have determined that the actual routing of the listed cables does not conform to the required routing.

The "AS IS" condition of cable routing and the "AS REQUIRED" cable routing, taken from Electrical Circuit Schedule E-37, Rev 52, are listed adjacent to the cable scheme numbers and routing inconsistencies underlined.

The "AS IS" condition of cable routing does not also conform to the "AS REQUIRED" routing referenced in Bechtel PQCI 7220/E-4.0, which was used by Bechtel for inspection and acceptance of cables. The cable routing given by E-37, Rev 52, is identical to that referenced by PQCI/E-4.0 for each of the listed cables.

13. DISPOSITION

ACTION COPY:

LHCurtis/PCorcoran
LEDavis
ESmith

INFO COPY:

WRBird DMTurnbull
JWCook RAWells
MLCurland JLWood
MADietrich ALAB-2
RDJohnson MJSchaeffer
BWMarguglio
REMcCue
DBMiller
BMPeck
JARutgers
DATaggart

JUSTIFICATION FOR PART CA:

Bechtel Engineering is requested to evaluate the impact of the "AS IS" cable routing to determine acceptability and advise Bechtel Construction accordingly.(LHCurtis)

(Continued on page 5)

PROJECT ENG. DISPOSITION REQUIRED [X] NOT REQUIRED [ ]

HOLD TAGS APPLIED: YES [ ] NO [X] NUMBER, LOCATION & TYPE OF HOLD TAGS APPLIED:

CLASS CA REQUIRED: YES [X] NO [ ] IF NO, ENTER JUSTIFICATION BELOW:

| | |
|---|---|
| QC AFFECT Q-LIST ITEM: YES [X] NO [ ] | 17. IS NC REPORTABLE PER 50.55(e): YES [ ] NO [X] |
| REPORTABLE PER PART 21: YES [ ] NO [X] | 18. IF YES; DATE & TIME OF REPORT TO NRC: N/A |
| 19. WHO MADE REPORT TO NRC: N/A | 21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A |

| | | |
|---|---|---|
| 22. ORIGINATED BY: M. J. Schaeffer / J Schaeffer | 23. WRITTEN REPLY REQUIRED BY: 2/15/82 TO ESTABLISH CA COMPLETION DATE | 24. SUPERVISOR'S SIGNATURE/DATE: M. J. Schaeffer 2/11/82 |

25. DISPOSITION, JUSTIFICATION & COMPLETION DATE:

See attached for Project Engineering's response.

| | |
|---|---|
| ACTION PRINT | MJS |
| INFO PRINTS | |
| MPQA ROUTING | DMT |
| PRINT TO FILE | |
| ORIG TO FILE | 16.0 |

cc: D. Borlaza
D. Hollar
L. Curtis
P. Corcoran
G. Warner
[redacted]

THIS COPY FOR

| | | | |
|---|---|---|---|
| 26. PROJ ENG. SIG. AUTH. DISP.: P. Corcoran for L. Curtis 2/13/82 | 27. PMO SIG. AUTH. DISP.: N/A | 28. PROCUREMENT SIG. CONC. DISP.: N/A | 29. SIG. OF ORG. RESP. FOR CA: P. Corcoran for L. Curtis 2/ |
| 30. CONST. SIG. AUTH. DEP. DISP.: | 31. SIG. OF TEST GROUP ACCEPT. CONDITION: N/A | 32. FOR MAJOR NCR - PLT. SUPT. SIG. AUTH. DISP.: N/A | 33. QA AUTH. SIG. TO IMPLEMENT: |

34. PART CA VERIFICATION:

Consumers Power Company

# NONCONFORMANCE REPORT
## PROCESS CORRECTIVE ACTION

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT
M-01-9-2-016
NCR SERIAL NUMBER:



ASSIGNMENT OF ROOT CAUSE(S):

Bechtel Construction and QC in conjunction with Project Engineering to determine the root cause and inform MPQAD. (LEDavis & ESmith)

ACTUAL ROOT CAUSE(S), IF DIFFERENT FROM ABOVE (TO BE COMPLETED BY ORG. RESPONSIBLE FOR PROCESS CA):

PROCESS CA REQUIRED FROM:

DESIGN [ ] FABRICATION [ ] CONSTRUCTION [X] PROCUREMENT [ ] INSPECTION [X]

OTHER _____

RECOMMENDATION FOR PROCESS CA:

Determine the need for additional Process Corrective Action in view of the fact that MPQAD NCR M-01-9-2-013, dated 2/3/82, addressed a similar problem. Inform MPQAD of the decision and action taken to preclude reoccurrence of the cable routing discrepancies. (LEDavis & ESmith)

PROCESS CA TO BE TAKEN BY ORG(S) CHECKED IN BLOCK #1 & DATE OF COMPLETION:

RESULTS OF PROCESS CA VERIFICATION:

671298



12. "AS IS" NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

| CABLE SCHEME NUMBER | AS REQUIRED ROUTING: |
|---|---|
| OAB6501N | ASL135, AJB041, AJB02, AJB01, AJB025, AAC27, AMH006, AAC63, AJ1059, ASA027, ASA09, ASA08, ASA07, ASA06, ASA05, ASA04, ASA03, ASA014 and ASL968. |
| | AS IS ROUTING: |
| | ASL135, AJB041, AJB02, AJB01, AJB025, AAC27, AMH006, AAC63, AJ1059, ASA027, ASA08, ASA07, ASA06, ASA05, ASA04, ASA03, ASA014 and ASL968. |
| 2AB6302K | AS REQUIRED ROUTING: |
| | AKA054, AKA04, AKA03, AKA02, AKF01, AJF02, AJF01, AFD01, AFD02, AFD03, AFD04, AFD05, AFD06, AFV07, AFV08, AFU99, AFA09, AFD09 and ASL921 (Per DCN 657). |
| | AS IS ROUTING: |
| | AKA054, AKA04, AKA03, AKA02, AKA01, AJF01, AFD01, AFD02, AFD03, AFD04, AFD05, AFD06, AFV07, AFV08, AFU99, AFA09, AFD09 and ASL921. |
| OAB6502M | AS REQUIRED ROUTING: |
| | ASL921, AFD09, AFA09, AFU99, AFV08, AFV07, AFD06, AFD05, AFD04, AFD03, AFD02, AFD01, AJF01, AJF02, AKF01, AKA02, AKA03, AKA04 and AKA054. |
| | AS IS ROUTING: |
| | ASL921, AFD09, AFA09, AFU99, AFV08, AFV07, AFD06, AFD05, AFD04, AFD03, AFD02, AFD01, AJF01, AKA01, AKA02, AKA03, AKA04 and AKA054. |
| OBY3614A | AS REQUIRED ROUTING: |
| | BSL936, BDB01, BDA02, BDA01, BJ419, BAO32, BJ524, BJA073, BJA05, BJA04, BJA03 and BJA035. |
| | AS IS ROUTING |
| | BSL938, BDB01, BDA02, BDA01, BJ419, BAO32, BJ524, BJA073, BJA05, BJA04, BJA03 and BJA035. |

"AS IS" NONCONFORMING CONDITIONS VERSUS "AS REQUIRED" CONDITION WITH REFS:

| CABLE SCHEME NUMBER | |
|---|---|
| 1AB5301K | AS REQUIRED ROUTING:<br>ASL944, ADB01, ADA02, ADA01, AJ424, AAC33, AFK01, AJL01, AFE01, AFF01, AFF02, AFB01, AFB02, AFB03, AFB04, AFB05, AFB06, AFB07, AFB08, AFB09, AFA09, AFA08, AFA07, AFA06, AFA05, AFA04, AFA03, AFA02, AFA01, AFL01, AFL03, AFL10, AJS07, ASL935.<br><br>AS IS ROUTING:<br>ASL945, ADB01, ADA02, ADA01, AJ424, AAC33, AFK01, AJL01, AFE01, AFF01, AFF02, AFB01, AFB02, AFB03, AFB04, AFB05, AFB06, AFB07, AFB08, AFB09, AFA09, AFA08, AFA07, AFA06, AFA05, AFA04, AFA03, AFA02, AFA01, AFL01, AFL03, AFL10, AJS07 and ASL935. |
| 1DQ157A | AS REQUIRED ROUTING:<br>DTB005, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21, DTA22.<br><br>AS IS ROUTING:<br>DTB005, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DFA08, DJA07, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DJA01, DC002, DTA003, DTA21, DTA22. |
| 1DQ396D<br>1DQ396F<br>1DQ396H<br>1DQ396L<br>1DQ396T | AS REQUIRED ROUTING:<br>DTB004, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA01, DC003, DTA002, DTA21, DTA22.<br><br>AS IS ROUTING:<br>DTB004, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DFA08, DJA07, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DJA01, DC002, DTA003, DTA21, DTA22. |
| 1DQ177E | AS REQUIRED ROUTING:<br>DSL907, DGA01, DWW001, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21.<br><br>AS IS ROUTING:<br>Coil, DTB03, DFA08, DJA07, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DJA01, DC002, DTA003, DTA21. |

7 1 2 9 6

3. QA RECOMMENDATION FOR PART CORRECTIVE ACTION: (Continued from page 1)

B)

1. Bechtel Construction is requested to comply with the E-37 Rev 52, or direction from Project Engineering par (A) above. (LEDavis)

2. Bechtel QC is requested to update the applicable QCIRs to reflect the nonconforming condition identified. (ESmith)

JR M-01-9-2-016
AI: S-1273
Attachment

This is Project Engineering's complete response:

| CABLE SCHEME NUMBER | EVALUATION |
|---|---|
| 0AB6501N<br>2AB6302K<br>0AB6502M<br>1AB5301K | 'As built' routes as stated are acceptable. Use as is: E-37 revised, reference DCN number 884 (2/12/82). |
| 0BY3614A | 'As built' via BSL938 is stated incorrectly on NCR.<br>'As built' via (verified by Resident Engineering) is BSL937.<br>This via is acceptable as is. E-37 revised, reference DCN number 884 (2/12/82). |
| 1DQ157A<br>1DQ396D<br>1DQ396F<br>1DQ396H<br>1DQ396L<br>1DQ396T<br>1DQ177E | a) 'As built' vias...DFA08, DJA07... are unacceptable. (Instrument cable installed in control raceway) Field Engineering has been directed to rework cables into vias as stated in E-37.<br><br>b) 'As built' vias...DJA01, DC002, DTA003...are stated incorrectly on NCR. 'As built' vias (verified by Resident Engineering) are DC002, DTA003... These vias are acceptable as is. E-37 revised reference DCN number 884 (2/12/82). |

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106

059360

BLC 12497

February 18, 1982



Consumers Power Company
P. O. Box 1963
3500 E. Miller Road
Midland, Michigan 48640

Attention: B. W. Marguglio

Subject: Midland Plant Units 1 & 2
Consumers Power Company
Bechtel Job 7220
Additional Response to CPCo
NCR M-01-9-2-016 and Bechtel
NCR 3996 AI 5-1073

References: A) CPCo NCR M-01-9-2-016 dated February 17, 1982
B) Bechtel NCR 3996 dated February 17, 1982

As requested, the following is additional information to the response which we provided to the above-referenced NCRs.

Cables 1DQ157A, 1DQ396D, 1DQ396F, 1DQ396H, 1DQ396L, 1DQ396T, 1DQ177E, (NCR M-01-9-2-016) 1DQ403E, 1BQ403D, and 2BB5626A (NCR 3996) have been reviewed for control/power and instrument cables being routed together. Based on an induced voltage calculation for the power cable (2BB5626A), cable characteristics, and length of run, engineering has determined that if these cables were to have been left in the as-installed condition, they would not adversely affect the safety operation of the plant through its design life.

If you have any questions on the subject, please advise.

L. H. Curtis
Project Engineering Manager

LHC/PJC/GDW/sll

Written Response Required: No

cc: M. Schaffer
D. Turnbull
W. Bird
D. Taggart

| | |
|---|---|
| ACTION PRINT | AFS |
| INFO PRINTS | |
| ROUTING | ONT |
| TO FILE | |
| ORIG TO FILE | 16.0.11 |

THIS COPY FOR →

JR M-01-9-2-016
AI: S-1273
Attachment

This is Project Engineering's complete response:

| CABLE SCHEME NUMBER | EVALUATION |
|---|---|
| 0AB6501N<br>2AB6302K<br>0AB6502M<br>1AB5301K | 'As built' routes as stated are acceptable. Use as is: E-37 revised, reference DCN number 884 (2/12/82). |
| 0BY3614A | 'As built' via BSL938 is stated incorrectly on NCR.<br>'As built' via (verified by Resident Engineering) is BSL937.<br>This via is acceptable as is. E-37 revised, reference DCN number 884 (2/12/82). |
| 1DQ157A<br>1DQ396D<br>1DQ396F<br>1DQ396H<br>1DQ396L<br>1DQ396T<br>1DQ177E | a) 'As built' vias...DFA08, DJA07... are unacceptable. (Instrument cable installed in control raceway) Field Engineering has been directed to rework cables into vias as stated in E-37.<br><br>b) 'As built' vias...DJA01, DC002, DTA003...are stated incorrectly on NCR. 'As built' vias (verified by Resident Engineering) are DC002, DTA003... These vias are acceptable as is. E-37 revised reference DCN number 884 (2/12/82). |

Consumers Power Company

# NONCONFORMANCE REPORT

To: R. W. Marguglio
From: L. H. Curtis

QMT-0 Priority: 1 SU: CD-88 Trend: B-3 (B-5) I-3, (I-5) AI: S-1289



| 6. CLIENT NAME: | 7. NONCONFORMING PART NO: | 8. NONCONFORMING PART NAME: | 1. NCR SERIAL NO: MCAR-9-2-021 |
|---|---|---|---|
| Midland 1 & 2 | See below | Electrical Cables | 2. DATE: 2/16/82 |
| 3. SERIAL NUMBER: N/A | 10. ORG. CONCERNED: Bechtel Construction/ QC/Project Engineering | 11. APPLICABILITY OF NC: Various Class 1E Locations | 12. QTY. OF NCP: N/A |
| | | | 4. FILE NO: 16.0 |

5. IF NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

MPQAD overinspections have determined that the actual routing of the listed cables does not conform to the required routing.

The "AS IS" condition of cable routing and the "AS REQUIRED" cable routing, taken from Electrical Circuit Schedule E-37, Rev 52, are listed adjacent to the cable scheme numbers and routing inconsistencies underlined.

The "AS IS" condition of cable routing does not also conform to the "AS REQUIRED" routing referenced in Bechtel PQCI 7220/E-4.0, which was used by Bechtel for inspection and acceptance of cables. The cable routing given by E-37, Rev 52, is identical to that referenced by PQCI/E-4.0 for each of the listed cables. (Cont'd)

RECOMMENDATION FOR PART CA:

Bechtel Engineering is requested to evaluate the impact of the "AS IS" cable routing to determine acceptability and advise Bechtel Construction accordingly. (LHCurtis)

(Continued on page 5)

13. ACTION COPY:
LHCurtis/PCorcoran
LEDavis
ESmith

INFO COPY:
DScott
DATaggart
WRBird
DMTurnbull
JWCook
RAWells
MLCurland
JLWood
MADietrich
ALAB-2
RDJohnson
BWMarguglio
REMcCue
DSMiller
BHPeck
JARutgers
MJSchaeffer

FIELD/PROJECT ENG. DISPOSITION REQUIRED: [X] NOT REQUIRED: [ ]

APPLIES: [ ] NO: [X]

SKETCH, LOCATION & SIZE OF HOLD TAGS APPLIED:

RECEIVED
FEB 19 1982
FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

PROCESS CA REQUIRED: YES [X] NO [ ] IF NO, EXPL. JUSTIFICATION BELOW:

| | |
|---|---|
| 16. DOES NC AFFECT Q-LIST ITEMS: YES [X] NO [ ] | 17. IS NC REPORTABLE PER 50.55(e): YES [ ] NO [X] |
| 18. IS NC REPORTABLE PER PART 21: YES [ ] NO [X] | 19. IF YES, DATE & TIME OF REPORT TO NRC: N/A |
| IF YES, WHO MADE REPORT TO NRC: N/A | 21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A |

| 22. ORIGINATOR: | 23. WRITTEN REPLY REQUIRED BY: 2/18/82 TO ESTABLISH CA COMPLETION DATE | 24. SUPERVISOR'S SIGNATURE/DATE: |
|---|---|---|
| M J Schaeffer mjs | | Michael J Schaeffer 2/18/82 |

PART CA DISPOSITION, JUSTIFICATION & COMPLETION DATE:

PROJECT ENGINEERING'S COMPLETE RESPONSE IS ATTACHED.

cc: D. Borlaza P. Corcoran
R. Hollar G. Warner
L. Curtis J. Horsch
D. Turnbull J. Kovach

| | |
|---|---|
| ACTION PRINT | MTS |
| INFO PRINTS | |
| MPQA ROUTING | DMT |
| PRINT TO FILE | |
| ORIG TO FILE | 16.0 |

THIS COPY FOR →

| 25. DESIGN/PROJECT SIGN. AUTH. DISP.: 2/17/82 | 27. PROD SIGN. AUTH. DISP.: N/A | 28. PROCUREMENT SIGN. CONC. DISP.: N/A | 29. SIG. OF ORG. RESP. FOR C/A: D.S. Thompson for L.H. Curtis 2/17/82 |
|---|---|---|---|
| 30. QA SIGN. AUTH. DISP.: | 31. SIG. OF TEST GROUP ACTION. CONCURRENCE: N/A | 32. FOR MAJOR MOD - PLT. SUPT. SIGN. AUTH. DISP.: N/A | 33. QA AUTH. SIG. TO DOCUMENT DISP.: |

SIGNED OF PART CA VERIFICATION:

| 35. SIG. OF ORG. RESP. FOR PART C/A VERIFYING COMPLETION: | 36. SIG. VERIFYING PART C/A & HOLD TAG REMOVAL/DATE: | 37. NCR CLOSED BY/DATE: (PART & PROCESS CA COMPLETE) |
|---|---|---|

71298

Consumers Power Company

# NONCONFORMANCE REPORT
## PROCESS CORRECTIVE ACTION

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

M-01-9-2-021

NCR SERIAL NUMBER: _____



1A. ASSESSMENT OF ROOT CAUSE(S):

Bechtel Construction and QC, in conjunction with Project Engineering, to determine the root cause and inform MPQAD. (LEDavis & ESmith)

1B. ACTUAL ROOT CAUSE(S), IF DIFFERENT FROM ABOVE (TO BE COMPLETED BY ORG. RESPONSIBLE FOR PROCESS CA):

2A. PROCESS CA REQUIRED FROM:

DESIGN [ ] FABRICATION [ ] CONSTRUCTION [X] PROCUREMENT [ ] OTHER [X]

OTHER: _____

2B. RECOMMENDATION FOR PROCESS CA:

Determine the need for additional Process Corrective Action in view of the fact that MPQAD NCR M-01-9-2-016, dated 2/11/82, addressed a similar problem. Inform MPQAD of the decision and action taken to preclude re-occurrence of the cable routing discrepancies. (LEDavis & ESmith)

3A. PROCESS CA TO BE TAKEN BY ORG(S) CHECKED IN BLOCK #2 & DATE OF COMPLETION:

3B. METHOD OF PROCESS CA VERIFICATION:

4A. PROCESS CA COMPLETION VERIFIED BY/DATE:

4B. PROCESS CA COMPLETION VERIFIED BY/DATE:

12. "AS IS"NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

| CABLE SCHEME NUMBER | |
|---|---|
| | AS REQUIRED ROUTING: |
| 1DQ 173 D<br>1DQ 173 E<br>1DQ 173 F | DSL907, DGA01, DWW001, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21. |
| 1DQ 177 F<br>1DQ 181 B<br>1DQ 181 D<br>1DQ 181 F<br>1DQ 181 H | AS IS ROUTING:<br>Coil at DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC002, DTA003, DTA21. |
| | AS REQUIRED ROUTING: |
| 0AB 6502 M<br>2AB 6302 K | ASL921, AFD09, AFA09, AFU99, AFV08, AFV07, AFD06, AFD05, AFD04, AFD03, AFD02, AFD01, AJF01, AJF02, AKF01, AKA02, AKA03, AKA04, AKA054. |
| | AS IS ROUTING: |
| | ASL921, AFD09, AFA09, AFU99, AFV08, AFV07, AFD06, AFD05, AFD04, AFD03, AFD02, AFD01, AJF01, *, AKA01, AKA02, AKA03, AKA04, AKA054. |
| | AS REQUIRED ROUTING: |
| 2BI 002 A<br>2BI 004 A | BG042, BJ637, BG043, BG044, BG045, BJ1371, BG046, BA045, BVA005, BVA01, BVA98, BVA99. |
| | AS IS ROUTING: |
| | BG042, BJ637, BG043, BG044, BG045, BJ1371, BG046, BA045, BVA005, *, *, BVA99. |
| | AS REQUIRED ROUTING: |
| 1AG 1113 E | ASL151, ADA005, ADA05, ADA04, ADA03, ADA02, ADA01, AJ424, AA033, AKF01, AJL003, AJL01, AFP01, AFP02, AFP03, AFN02, AFN01, AFL01, AFL03, AFL10, AJS07, AJS08, AJS09, ASL933. |
| | AS IS ROUTING: |
| | ASL151, ADA005, ADA05, ADA04, ADA03, ADA02, ADA01, AJ424, AA033, AKF01, AJL003, AJL01, AFP01, AFP02, AFP03, AFN02, AFN01, AFL01, AFL03, AFL10, AJS07, AJS08, AJS09, ASL935. |

* Denotes that via was skipped

12. "AS IS" NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

| CABLE SCHEME NUMBER | AS REQUIRED ROUTING: |
|---|---|
| 1BG 1213 B | BDA005, BDA05, BDA04, BDA03, BDA02, BDA01, BJ419, BA031, BJ524, BJA073, BJA05, BJN05, BJP01, BFH01, BFH02, BFH03, BFH04, BFH05, BFH06, BFH07, BFH08, BFH09, BFH10, BFH11, BFH12, BFH13, BFH14, BFA13, BFA14, BFA15, BFA002, BFF09. |
| | AS IS ROUTING: |
| | BDA005, BDA05, BDA04, BDA03, BDA02, BDA01, BJ419, BA031, BJ524, BJA073, BJA05, BJN05, BJP01, BJP02, BFH02, BFH03, BFH04, BFH05, BFH06, BFH07, BFH08, BFH09, BFH10, BFH11, BFH12, BFH13, BFH14, BFA13, BFA14, BFA15, BFA002, BFF09. |
| | AS REQUIRED ROUTING: |
| 1BB 5610 C | BSL922, BJH01, BKA06, BKA05, BKE01, BJF03, BFB01, BFB02, BFB03, BFB04, BFB05, BFB015, BJ106. |
| | AS IS ROUTING: |
| | BSL922, *, *, BKA05, BKE01, BJF03, BFB01, BFB02, BFB03, BFB04, coiled. |
| | AS REQUIRED ROUTING: |
| 1BA 0012 A | BFF09, BFA002, BFA15, BFA14, BFH14, BFH13, BFH12, BFH11, BFH10, BFH09, BFH08, BFH07, BFH06, BFH05, BFH04, BFH03, BFH02, BFH01, BJP01, BJN05, BJA05, BJA073, BJ524, BA031, BJ419, BDA01, BDA02, BDA03, BDA04, BDA05, BDA06, BDA07, BDA10. |
| | AS IS ROUTING: |
| | BFF09, BFA002, BFA15, BFA14, BFA13. BFH14, BFH13, BFH12, BFH11, BFH10, BFH09, BFH08, BFH07, BFH06, BFH05, BFH04, BFH03, BFH02, *, BJP01, BJN05, BJA05, BJA073, BJ524, BA031, BJ419, BDA01, BDA02, BDA03, BDA04, BDA05, BDA06, BDA07, BDA10. |
| | AS REQUIRED ROUTING: |
| 1BI 067 A | BG083, BJ1763, BVA022, BVA16, BVA15, BVA14, BVA13, BVA12, BVA001, BVA06, BVA05, BVA04, BVA03, BVA02, BVA01 to 1Z132. |
| | AS IS ROUTING: |
| | BG083, BJ1763, BVA022, BVA16, BVA15, BVA14, BVA13, BVA12, BVA001, BVA06, BVA05, BVA04, BVA03, BVA02, |

12. "AS IS" NONCONFORMING CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFS:

| CABLE SCHEME NUMBER | AS REQUIRED ROUTING | |
|---|---|---|
| | FROM | TO |
| 2BA0001F | 2C46 | 2J1145 |

BGF08, BWW023, BGC01, BGB02, BGB01, BTG01, BTB06, BTB011, BJ924, BA035, BJ690, BN054

AS IS ROUTING:

| FROM | TO |
|---|---|
| 2C46 | 2C232 |

BN054, BJ690, BA035, BJ924, BTB011, BTB06, BTG01, BGB01, BGB02, BGC01, BWW023, BGF08

13. QA RECOMMENDATION FOR PART C:

B)

1. Bechtel Construction is requested to comply with the E-37 Rev 52, or direction from Project Engineering per (A) above. (LEDavis)

2. Bechtel QC is requested to update the applicable QCIRs to reflect the nonconforming condition identified. (ESmith)

71296

NCR M-01-9-2-02
AI: S-1289
Attachment

This is Project Engineering's complete response.

| Cable Scheme Number | Evaluation |
|---|---|
| 1DQ173D<br>1DQ173E<br>1DQ173F<br>1DQ177D<br>1DQ177F<br>1DQ181B<br>1DQ181D<br>1DQ181F<br>1DQ181H<br>0AB6502M<br>2AB6302K<br>2BI003A<br>2BI004A<br>1AG113E<br>1BB5610C<br>1BA0012A | "As-built" routes as stated are acceptable. Use as is; E-37 has been revised; Reference DCN Number 885 dated February 17, 1982 |
| 1BG1213B | "As-built" via 1BJP02 is incorrectly stated on the NCR. The as-built route is ...BJP01, BFH02...; E-37 has been revised to reflect this route; Reference DCN Number 885 dated February 17, 1982 |
| 1BI067A | The scheme cable number is incorrectly stated on the NCR. The cable number should be 2BI067A. The as-built route for 2BI067A as stated is unacceptable. Field Engineering has been directed to rework the cable into the vias as stated in E-37. |
| 2BA0001F | The "To Location" (2C232) as stated on the NCR is incorrect. The cable is pulled and terminated per the as required routing (2J1145). Therefore, a nonconforming condition does not exist for this cable. |

# NONCONFORMANCE REPORT

| | | | | | |
|---|---|---|---|---|---|
| 1. PROJECT NAME: MIDLAND UNITS 1 & 2 | JOB NO. 7220 | | | 19. NO. 3996 | 20. PAGE 1 OF 1 |
| 2. UNIT(S): 1 & 2 | 3. DRAWING/PART NO.: N/A | REV | 4. ITEM DESCRIPTION: CABLES PULLED THROUGH UNSPECIFIED V/As | 5. ITEM LOCATION: VARIOUS | |
| 6. P.O. OR SPEC NO.: N/A | 7. SERIAL NO.: N/A | 8. REPLACEMENT PART P/N ____ REV ____ SER NO. N/A | 9. SOURCE: CONSTRUCTION | 10. CONTRACTOR/SUPPLIER: N/A | |
| 11. INSPECTION CRITERIA ( ) DWG ( ) SPEC ( ) OTHER IR NO. NO. EPP 4.000 Rev. 5 | | 12. ASME AUTHORIZED INSPECTION REQ'D ( ) YES (X) NO | 13. SKETCH ATTACHED ( ) YES (X) NO | 14. Discovered During ( ) Rec's (X) Const ( ) Test | 15. Equip Furnished By ( ) Client (X) Eng ( ) FLD |

16. NONCONFORMING CONDITION: OVER-INSPECTION IN SUPPORT OF MPQAD, REVEALED THE FOLLOWING NON-CONFORMING ITEMS:

SEE CONTINUATION SHEETS FOR LIST OF NONCONFORMANCES.

24. DISPOSITION CONCURRENCE

| rework | reject | repair | use as is |
|---|---|---|---|
| | | | X |

PROJECT FIELD ENGINEER — DATE 2/19/82
PROJECT ENGINEER — DATE 2/17/82
D.S.P. — DATE 2/24/82
PROJ CONSTR QC ENGINEER — DATE
AUTHORIZED INSPECTOR — DATE

17. REPORTED BY: Dale E. Peeler — DATE: 2-17-82

18. VALIDATED BY: D.S.P. — DATE: 2/17/82

21. ROUTING: (X) TO FIELD ENGINEERING ( ) TO OTHERS (SPECIFY)

22. (X) Field Engineering Disposition Item 17, 28, & 29 (X) Field Engineering Recommended Disposition to Project Engineering Item 1 thru 16, 18 thru 27

Field ENGINEERING recommended disposition TO PROJECT ENGINEERING for cables ON CONTINUATION sheet for block 16. Cable numbers follow: Cables 1 THROUGH 16, 18 THROUGH 27 inclusive. See CONTINUATION for block 22 for cables 17, 28, & 29.

23. PROJECT ENGINEERING DISPOSITION

ITEMS 1,2,3,4,5,7,8,10,11,12,13,14,15,16,20,21,22,23,24,25,26,& 27 HAVE BEEN RE-RATED PER DCN #885 to E37 to REFLECT AS INSTALLED CONDITION. USE AS IS

ITEMS 6 & 9 REFLECT AS BUILT CONDITION PER REV 52 OF E37-NO DWG. REVISION REQ'D. USE AS IS

ITEMS 18 & 19 HAVE BEEN DELETED PER DCN #885 to E37

JGK 2/17/82 — 2/17/82 — 2/17/82

28. QC ACCEPTANCE

QC ENGINEER — DATE

AUTHORIZED INSPECTOR — DATE

Attachment 2 to Report on Cable Installation

Rock 16 (continued)

(1) Cable 2BB4 05 B 2GTB
Requirements: Per E-37 Rev. 52, Vias ..... BJM01, BJB03 .....
Contrary to the above, cable installed in vias .... BJM01, BJM02, BJB03 ....

(2) Cable 2BB4406 B 2GTC
Requirements: Per E-37 Rev. 52, Vias .... BJM01, BJB03 ....
Contrary to the above, cable installed in vias .... BJM01, BJM02, BJB03 ....

(3) Cable 2BB4402 B 2GTB
Requirements: Per E-37 Rev. 52, Vias ... BJM01, BJB03 ....
Contrary to the above, cable installed in vias .... BJM01 BJM02, BJB03 ....

(4) Cable 2BB4409 B 2GTE
Requirements: Per E-37 Rev. 52, Vias BSL95?, BJK01, BJA04, BJM01, BJB03 ....
Contrary to the above, cable installed in vias BSL953, BJK01, BJA04, BJM01, BJM02, BJB03 ....

Block 116 (continued)

(5) Cable 1AB5514 B 1BNA
Requirements: Per E-37 Rev. 52, Vias ..... 1JA05, AJC01 ... AZ077 ...
Contrary to the above, cable installed in vias .... AJA05, AJA06, AJC01 .... AZ076 ....

(6) CABLE 1AB5514 A 1BNA
REQUIRMENTS: PER E-37 REV. 52 VIAS .... AJL05, AJC01
CONTRARY TO THE ABOVE, CABLE INSTALLED IN VIAS .... AJL05, AJL06, AJC01

(7) CABLE ZBB4401 B ZGSB
(A) REQUIRMENTS: PER E-37 REV. 52 VIAS .... BJM01, BJB03
CONTRARY TO THE ABOVE, CABLE INSTALLED IN VIAS .... BJM01, BJM02, BJB03
(B) REQUIRMENTS: PER E-37 REV. 52 VIAS BSL951 ....
CONTRARY TO THE ABOVE, CABLE INSTALLED IN VIAS BSL952 ....

(8) Cable 1AB1704 B 1BKA
Requirements: Per E-37 Rev. 52 VIAS .... AKC07, AKC041 ....
Contrary to the above, cable installed in vias .... AKC07, AKC08, AKC041 ....

Attachment 2 to Report on Cable Installation

Back 16 (CONTINUED)

(9) Cable 1AB1704 A 1BKA
Requirements: Per E-37 Rev. 52, Vias .... AKC07, AKC040 ....
Contrary to the above, cable installed in vias .... AKC07, AKC08, AKC040 ....

(10) Cable 1AB2327 A 1EAC
Requirements: Per E-37 Rev. 52, Vias ASL396, AJM05, AKA05 ....
Contrary to the above, cable installed in vias ASL396, AJM03, AKA05 ....

(11) Cable 2BB4401 E 2BSA
Requirements: Per E-37 Rev. 52, Vias ..... BJF01, BKA04, ....
Contrary to the above, cable installed in vias .... BJF01, BKA03, BKA04, ....

(12) CABLE 1AFW082 E 1ALA
REQUIREMENTS: PER E37 REV 52, VIAS ------AJB01B, AJB14 ....
CONTRARY TO ABOVE, CABLE INSTALLE IN VIAS -----AJB01B, AJT14, AJB14 --

(13) Cable 1AFW021 B 1ALA
Requirements: Per E-37 Rev. 52, Vias .... AJB01B, AJB14 ....
Contrary to the above, cable installed in vias .... AJB01B, AJT14, AJB14 ....

(14) Cable 1BB5638 A 1ABA
Requirements: Per E-37 Rev. 52, Vias BSL927, BJH06, BKAC4 ....
Contrary to the above, cable installed in vias BSL927, BKA04 ....

(15) Cable 1BB2444 Q 1BGC
Requirements : Per E-37 Rev. 52, Vias BSL430, BKA06 ....
Contrary to the above, cable installed in vias BSL430, BJH11, BKA06 ....

(16) Cable 1BB5605 B 1ECB
Requirements : Per E-37 Rev. 52, Vias BSL921, BJH01, BKA06 ....
Contrary to the above, cable installed in vias BSL921, BKA06 ....

(17) Cable 2BB5626 A 2ALA
Requirements : Per E-37 Rev. 52, Vias BSL926, BKF03, BKA03, BKA04 BKA05, BKA06 ....
Contrary to the above, cable installed in vias BSL930, BKF01, BTB06, BJB06, BKA06 ....

(18) Cable 1BB5626 A 1ALA
Requirements : Per E-37 Rev. 52, Vias BSL926, BJH04, BKA05 ....
Contrary to the above, cable installed in vias BSL926, BKA05 ....

(19) Cable 1BB5626 B 1ALA
Requirements : Per E-37 Rev. 52, Vias BSL926, BJH04, BKA05 ....
Contrary to the above, cable installed in vias BSL926, BKA05 ....

(20) Cable 1BB5605 A 1ECB
Requirements : Per E-37 Rev. 52, Vias BSL921, BJH01, BKA06 ....
Contrary to the above, cable installed in vias BSL921, BKA06 ....

Block 16 (Continued)

(21) Cable 1AB5526 A 1ALA
Requirements: Per E-37 Rev. 52, Vias .... AKA05, AJC01 ....
Contrary to the above, cable installed in vias .... AKA05, AKA06, AJA06, AJC01 ....

(22) Cable 1BB2441 B 1BGC
Requirements: Per E-37 Rev. 52, Vias .... BJA20, BJE01 ....
Contrary to the above, cable installed in vias .... BJA20, BJA21, BJE01 ....

(23) Cable 1AB2341 B 1BGC
Requirements: Per E-37 Rev. 52, Vias ASL399, AJM01, AJA06, AJC01 ....
Contrary to the above, cable installed in vias ASL399, AJM01, AJC01 ....

(24) Cable 1AB5512 B 1BGE
Requirements: Per E-37 Rev. 52, Vias .... AJA05, AJC01 ....
Contrary to the above, cable installed in vias .... AJA05, AJA06, AJC01 ....

(25) Cable 2AB5531 A 2PHK
Requirements: Per E-37 Rev. 52, Vias ... AJH02, AKA05 ... ASA03, ASB01, ASL973
Contrary to the above, cable installed in vias ... AJH02, AKA06, AKA05 .... ASA03, IASL968

(26) Cable OAB6909 A OEAA
Requirements: Per E-37 Rev. 52, Vias .... ASA02, ASA03, ASA04 ....
Contrary to the above, cable installed in vias ... ASA02, ASA04 ....

Attachment 2 to Report on Cable Installation

(BLOCK 22 CONTINUED) ( )

(27) Cable OAB6909B OEAA

Requirements: Per E-37 Rev. 52, Vias .... ASA02, ASA03, ASA04 ....

Contrary to the Above, Cable installed in Vias .... ASA02, ASA04 ....

(28) Cable IBQ403E ISAB

Requirements: Per E-37 Rev. 52, Vias BSL170, BJA045, BJA01, BJA02, BJA03, BJA04, BJM01, BJF03 ....

Contrary to the Above, Cable installed in Vias BSL170, BJA045, BTA01, BTA02, BTA03, BTA04, BJF03 ....

(29) Cable IBQ403D ISAB

Requirements: Per E-37 Rev. 52, Vias BSL169, BJA044, BJA02, BJA03, BJA04, BJM01, BJF03 ....

Contrary to the Above, Cable installed in Vias BSL169, BJA044, BTA02, BTA03, BTA04, BJF03 ....

58 hold tags applied Q-list Nos 3.003
3.007

BLOCK 22 (CONTINUED)

CABLES 27, 28 & 29 WILL BE REWORKED PER E37 REV E2 (I.C.) 2/17/82

Attachment 2 to Report on Cable Installation

| | | | NO POTENTIAL GENERIC CONCERNS | | | | | | | | POTENTIAL GENERIC CONCERNS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cable | SK | Loc | Covered by Analysis | Wrapping Criteria | Air Lining at MCCs | Construction Incomplete | Unique Case | Separation, Appendix R | Separation, RG 1.75 | No Concerns Total | QC Area Walkdown | Thermal Analysis | Concerns Total | Remarks |
| 1AB5514B | 1 | GA | | | | | | | | | X | | X | |
| 0AB6909A | 2 | SH | X | | | | | | | X | | | | |
| 0AB6909B | 2 | SH | X | | | | | | | X | | | | |
| 1BB2441B | 3 | GA | | X | | | | | | X | | | | |
| 2BB4401E | 4 | SG | | X | | | | | | X | | | | |
| 2AB5531A | 5 | SG | | X | X | | | | | X | | | | Both ends of cable (b) |
| 1AB5301K | 6 | DG | | | X | | | | | X | | | | |
| 0BY3614A | 7 | DG | | | X | | | | | X | | | | |
| 1AG1113E | 8 | SE | | | | X | | | | X | | | | See footnote (c) |
| 1BA0012A | 9 | SR | | X | | | | | | X | | | | |
| 1BB5605A | 10 | SG | | | X | | | | | X | | | | |
| 1BB5605B | 10 | SG | | | X | | | | | X | | | | |
| 1BB5626A | 10 | SG | | | X | | | | | X | | | | |
| 1BB5626B | 10 | SG | | | X | | | | | X | | | | |
| 1BB5638A | 10 | SG | | | X | | | | | X | | | | |
| 1AB2327A | 12 | SG | | | | | | | | | | X | X | |
| 2BB5626A | 12 | SG | | | | | | | | | X | | X | Cable was reworked |
| 1BB5610C | 13 | SG | X | | | | | | | X | | | | |
| 1AB1704B | 14 | SG | | X | | | | | | X | | | | |
| 1BB2444Q | 15 | SG | | | | | X | | | X | | | | Unique (a) |
| 1AFW021B | 16 | GA | | | | X | | | | X | | | | |
| 1AFW082E | 16 | GA | | | | X | | | | X | | | | |
| 2B1067A | 17 | R | | | | X | | | | X | | | | Cable was reworked |
| 2B1004A | 18 | R | | | | | | | | | X | | | |
| 2B1003A | 18 | R | | | | | | | | | X | | | |
| 0AB6501N | 19 | SH | X | | | | | | | X | | | | |
| 1AB5526A | 20 | SG | | | | | | | | | | X | X | |
| 1AB5512B | 20 | SG | | | | | | | | | | X | X | |
| 2BB4401B | 21 | SG | | | | | | | | | | X | X | |
| 2BB4402B | 21 | SG | | | | | | | | | | X | X | |
| 2BB4406B | 21 | SG | | | | | | | | | | X | X | |
| 2BB4405B | 21 | SG | | | | | | | | | | X | X | |
| 2BB4409B | 21 | SG | | | | | | | | | | X | X | |
| 0AB6502M | 22 | SG | | | | | | | | | | X | X | |
| 2AB6302K | 22 | SG | | | | | | | | | | X | X | |
| 0AB4511H | 23 | SR | | | | | | | | | | X | X | |
| 1BQ403D | 24 | SG | | | | | | | | | X | | X | Cable was reworked |
| 1BQ403E | 24 | SG | | | | | | | | | X | | X | Cable was reworked |
| 1DQ157A | 25 | SR | | | | | X | | | X | | | | |
| 1DQ396D | 25 | SR | | | | | X | | | X | | | | |
| 1DQ396F | 25 | SR | | | | | X | | | X | | | | |
| 1DQ396H | 25 | SR | | | | | X | | | X | | | | |
| 1DQ396L | 25 | SR | | | | | X | | | X | | | | |
| 1DQ396T | 25 | SR | | | | | X | | | X | | | | |
| 1DQ177E | 25 | SR | | | | | X | | | X | | | | |
| 1DQ177D | 25 | SR | | | | | X | | | X | | | | |
| 1DQ177F | 25 | SR | | | | | X | | | X | | | | |
| 1DQ173D | 25 | SR | | | | | X | | | X | | | | |
| 1DQ173E | 25 | SR | | | | | X | | | X | | | | |
| 1DQ173F | 25 | SR | | | | | X | | | X | | | | |
| 1DQ181B | 25 | SR | | | | | X | | | X | | | | |
| 1DQ181D | 25 | SR | | | | | X | | | X | | | | |
| 1DQ181F | 25 | SR | | | | | X | | | X | | | | |
| 1DQ181H | 25 | SR | | | | | X | | | X | | | | |
| 1AB2341E | 26 | SG | X | | | | | | | X | | | | |
| TOTAL | | | 5 | 5 | 8 | 4 | 17 | | | 38 | 6 | 11 | 17 | |

LEGEND

| | | | | | |
|---|---|---|---|---|---|
| GA | General Auxiliary | DG | Diesel Generator | R | Reactor |
| SH | Service Water | SE | Safety Equipment | | |
| SG | 1E Switchgear Room | SR | Spreading Room | | |

NOTES

(a) Tied to last rung of riser

(b) Although the total of the "No Concerns" column is 38, the total of the bottom row is 39 because Sketch 5 has a dual condition.

(c) The cable routing as designed was to the wrong control panel compartment, Construction discovered and corrected the error during termination.

# DEFINITIONS

1. Covered by Analysis

The actual cable installation did not utilize all the designed raceway vias. Therefore, the absence of a cable would only make the thermal analysis required for tray wrapping and overfilled raceway more conservative.

2. Wrapping Critaria

The tray wrapping critaria requires wrapping of the affected tray and at least 12 inches in adjacent trays.

3. Airlining at MCCs

Cables may be run unsupported or airlined for a maximum distance of three feet upon leaving the physical confines of scheduled raceway (Reference: E-42Q, Sheet 5).

4. Construction Incomplete

Cable Pulling - When a cable is completely pulled tight into all raceways, the problem with cables looping out from one tray to another will be corrected.

Cable Terminations - When Construction attempts to terminate a cable and discovers that the cable is not in the correct compartment of the panel, or the cable is not at the equipment to which the cable is to be terminated, Field Engineering is notified and the condition is corrected.

5. Separation, Appendix R

The design criteria is based on FSAR, Appendix 9A.1.8.3 for achieving and maintaining safe shutdown after a fire (Reference: General Design Criteria 10CFR, Appendix R).

6. Separation, Regulatory Guide 1.75

The Design criteria is based on FSAR, Appendix 3A for achieving physical independence of electrical systems.

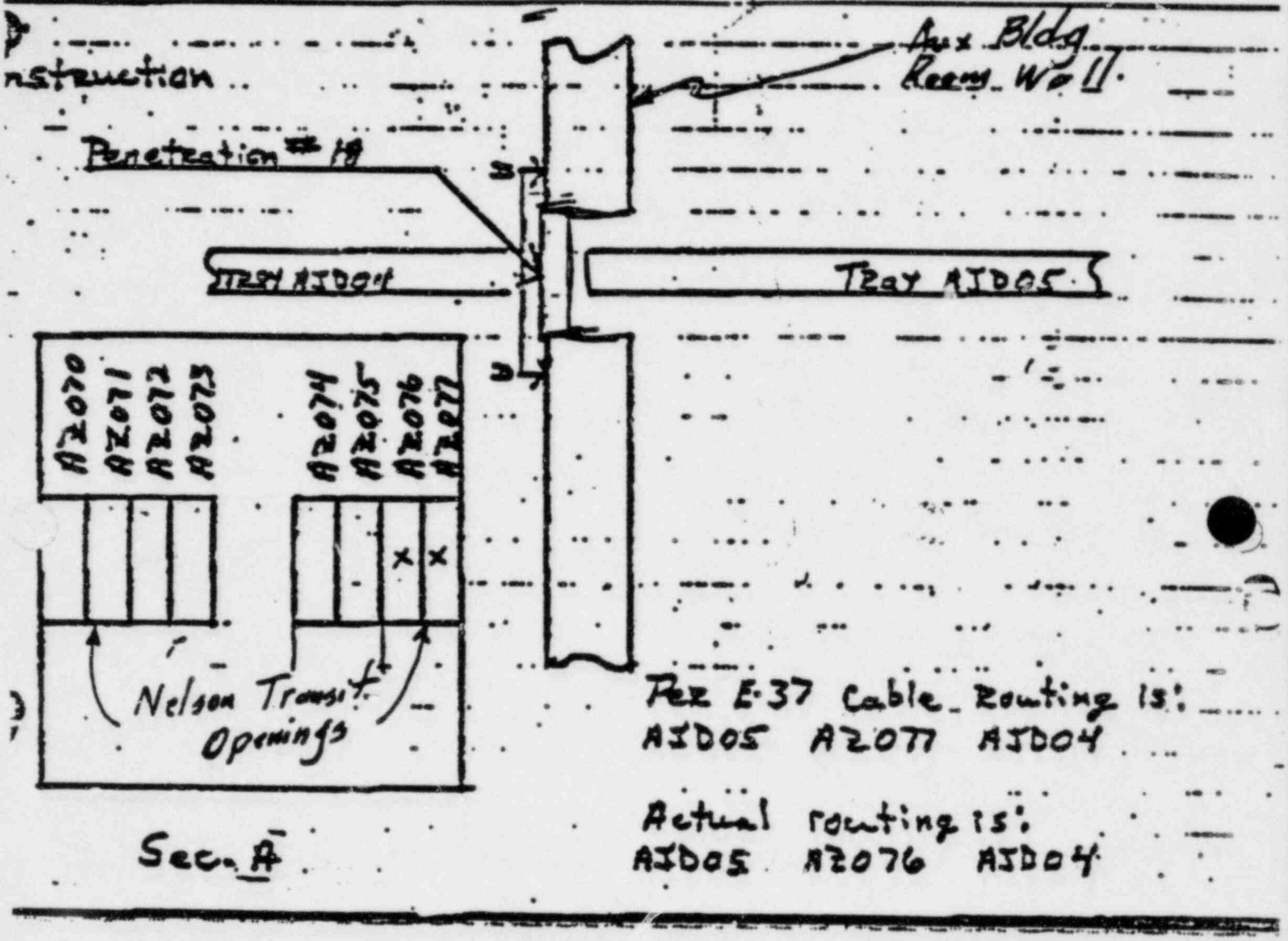
7. QC Area Walkdown

During final area turnover, QC shall verify, in accordance with PQCI 7220/E-3.0, that cables maintain the separation distances as shown in Drawing 7220-E-47, Paragraphs 5.1.3 and 5.1.4, and that all cable installations maintain the proper voltage separation.

8. Thermal Analysis

When a tray is wrapped or overfilled, heat generated from cables in that tray must be taken into consideration. If a cable is pulled into a tray without Project Engineering's knowledge, the thermal analysis will not include that cable, but conservative analytical techniques and inspections described in Sections III and IV resolve the concern.

CABLE # 1AB5514B SL # 1



SK-1

Description of Basic Concern

This cable was passed through the wrong Nelson transit (cable seal) window. Both the right and wrong window were for power cables. However, because of the closeness of power and instrument penetrations in the plant, our basic concern was a possible voltage violation if this problem were repeated with a power cable being passed through an instrument cable window.

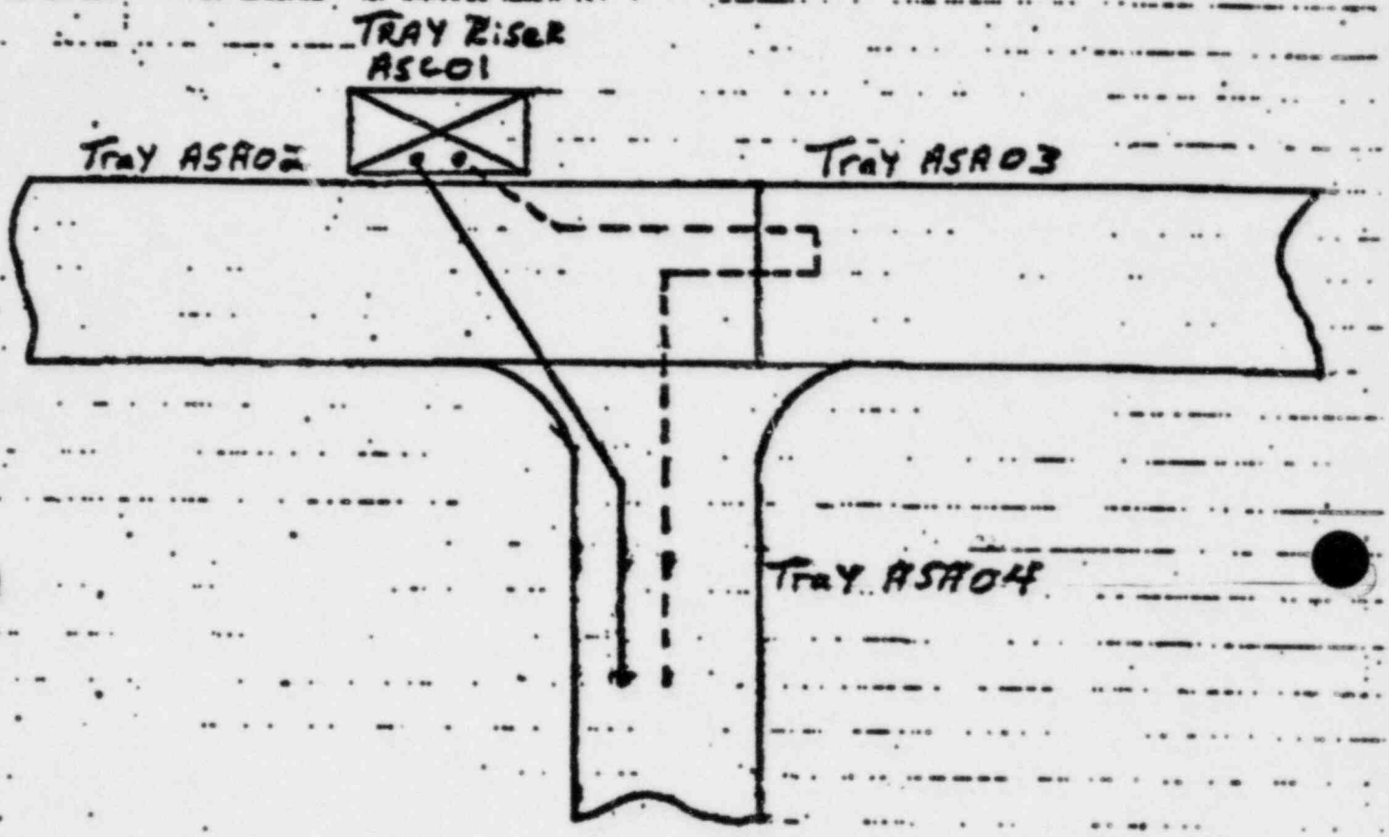
Reason for No Concern

Quality control will inspect all cable transitions from one raceway to another; this inspection will eliminate this concern.

Cable Code Design # B-2

CAB.6709A and CAB.6709B

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable ~~is~~ should be routed-by field

Cable should be - Per E-37

SK-2

Description of Basic Concern

Accountability; i.e., not knowing where a cable is pulled.

Reason for No Concern

The actual cable installation did not use all the designed raceway vias. Therefore, the absence of a cable would only make thermal analysis more conservative.

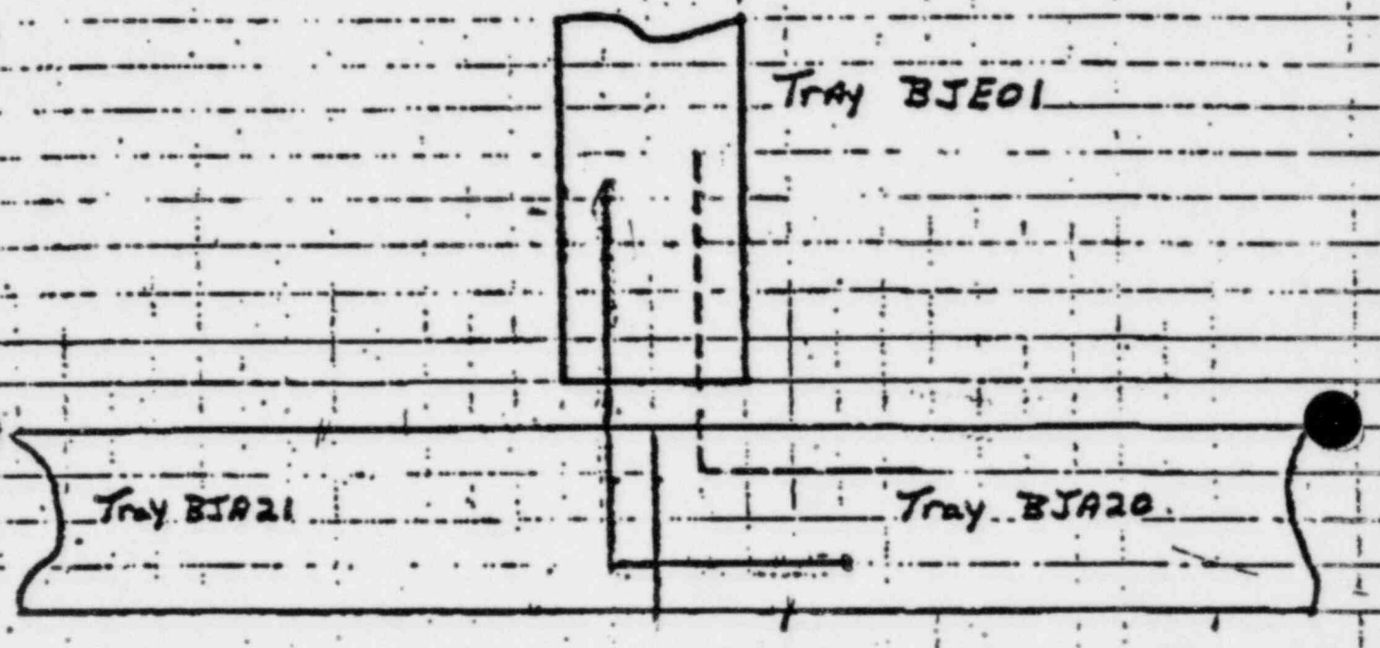
Cable No. 1BB2244H E

Code Tab C-1

Design

SK 3

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Trays are installed per E-36 and layout dwgs.

Cable as routed - By field

Cable Should be - Per E-37

SK-3

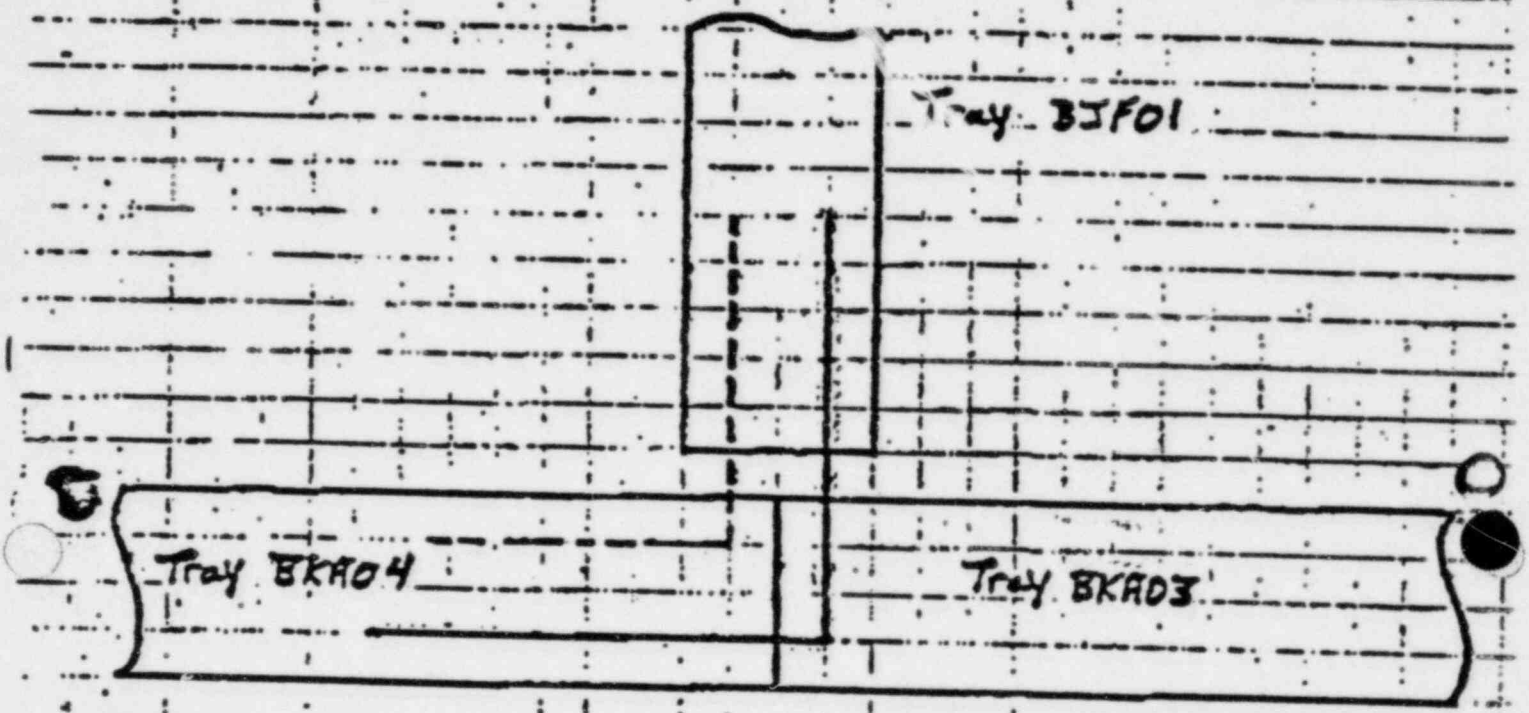
Description of Basic Concern

The subject cable enters the confines of an additional raceway. If the trays containing subject cable were required to be wrapped, how do we make sure that the cable portion in the unlisted via is protected.

Reason for No Concern

When a cable enters the confines of additional vias, the tray wrapping criteria would require wrapping approximately 12 more inches at each end for safety.

Code ** C-1
Design




Trays are installed per E-36 and lay out drwgs.

Cable is routed by field

Cable should be per E-37

SK-4

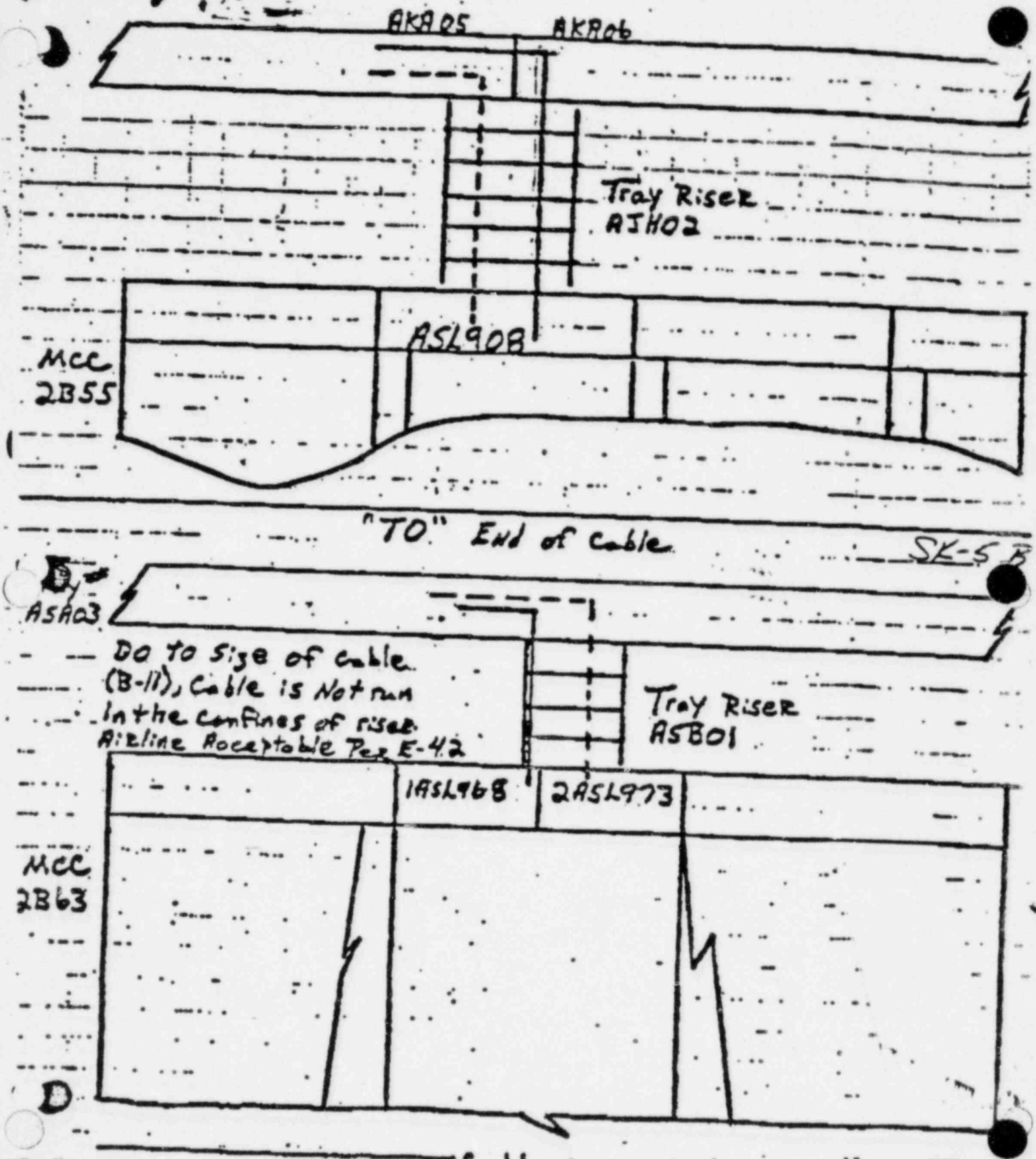
Description of Basic Concern

The subject cable enters the confines of an additional raceway. If the trays containing subject cable were required to be wrapped, how do we make sure that the cable is protected.

Reason for No Concern

When a cable enters the confines of additional vias, the tray wrapping criteria would require wrapping to the edge of the violation and approximately 12 more inches at each end for safety.

Cable # 1AB553A
Code # A-1
Design



SK-5A and 5B

Description of Basic Concern - SK-5A

The subject cable enters the confines of additional raceway. Also, if the subject cable was required to be wrapped, how do we make sure that the cable is protected.

Reason for No Concern

When a cable enters the confines of additional vias, the tray wrapping criteria would require wrapping to the edge of the violation and approximately 12 more inches at each end for safety.

Description of Basic Concern - SK-5B

Cable is airlined, and is not in the riser. It also enters the wrong slot number of the motor control center (MCC). The same slot has two numbers for ease of computer installation. Inspector might read the wrong number.

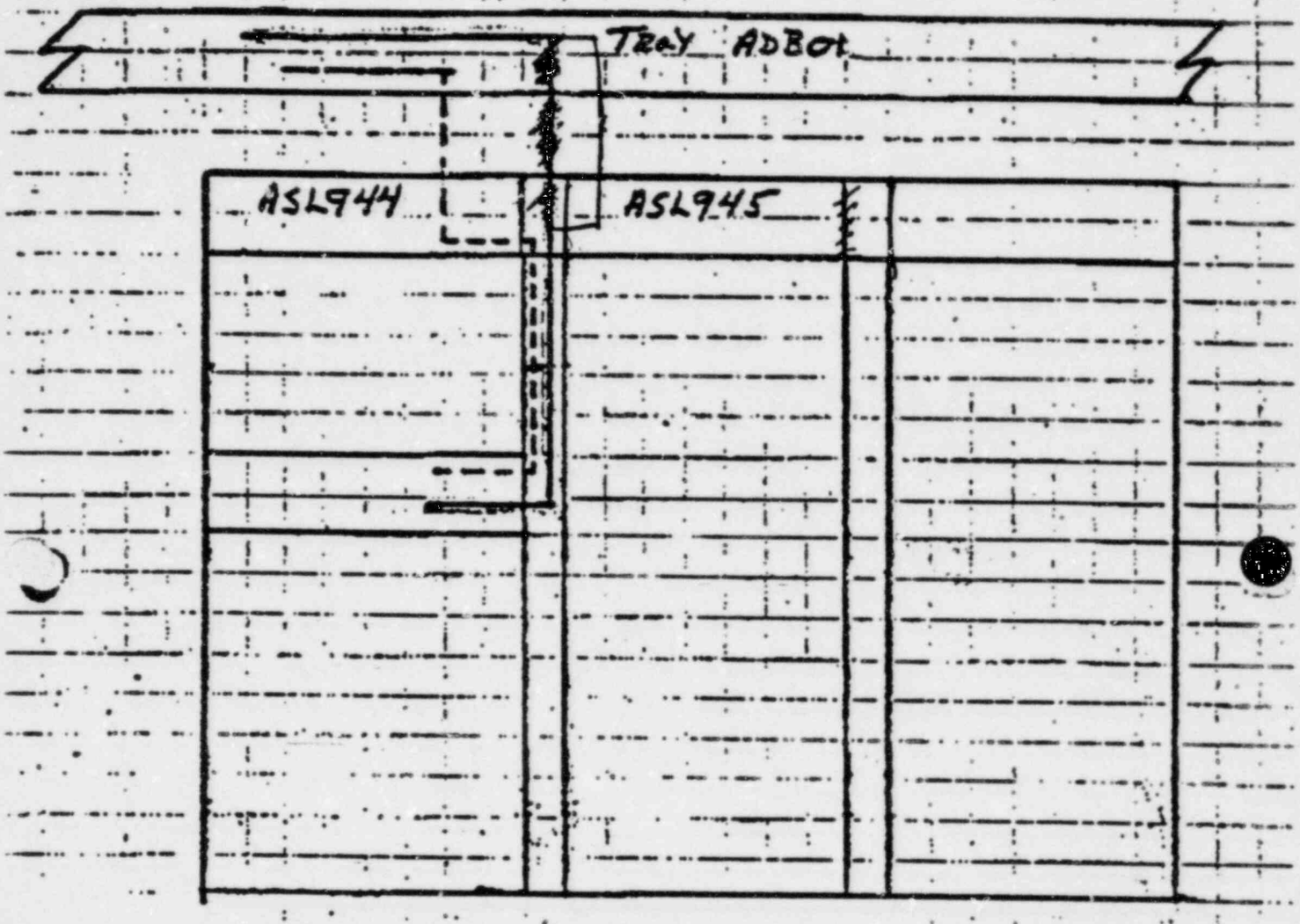
Reason for No Concern

A cable can be airlined 3 feet without engineering approval. The cable enters the correct stack (the subject stack of this MCC has two slot numbers; i.e., one opening, two numbers).

Cable # 1AB5301K
Code # A-1
Design

SK. 6

MidLand Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable is routed by field
Cable Should be routed-Per E-37

SK-6

Description of Basic Concern

Cable enters the wrong stack of the motor control center.

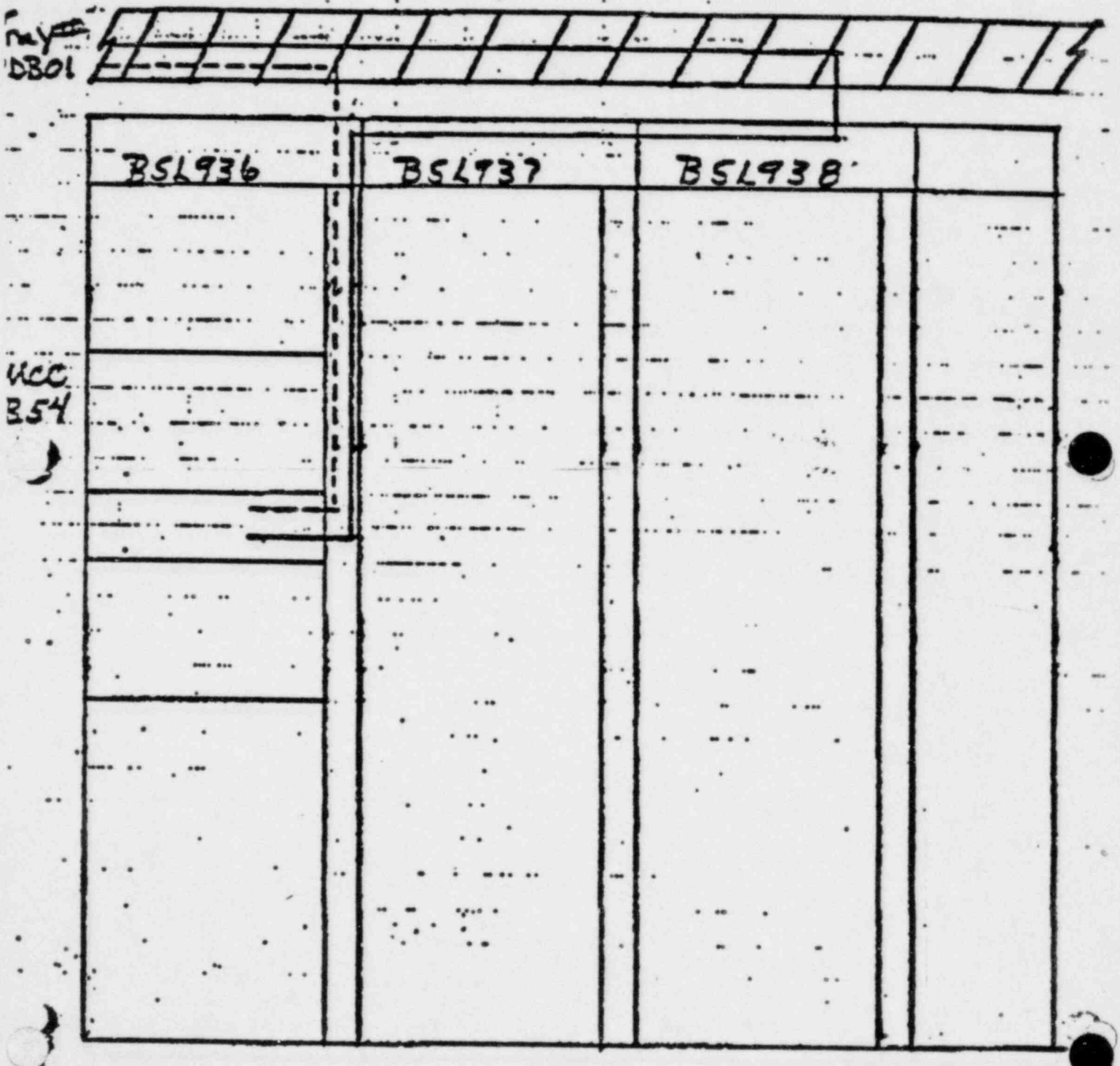
Reason for No Concern

A cable can enter any stack of a motor control center and be terminated because motor control centers are separated by channel.

SK. 7

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installati

Cable # OBY3614A
Code = A-1
Design




Cable is routed by field
Cable should be routed per E-37

SK-7

Description of Basic Concern

Cable enters the wrong stack of the motor control center.

Reason for No Concern

A cable can enter any stack of a motor control center and be terminated because motor control centers are separated by channel.

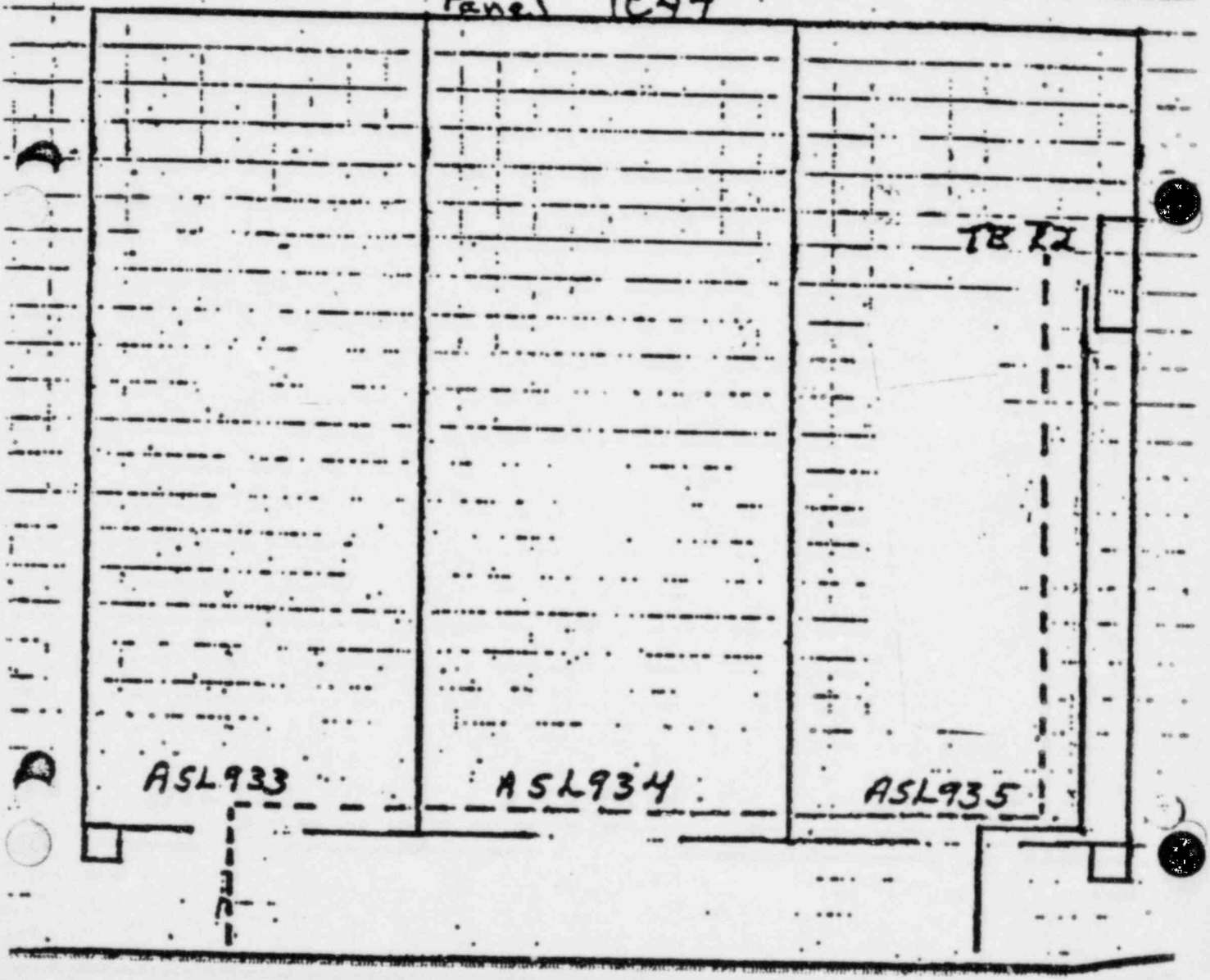
Cable # 1AG1113E

Code # A-L

Design

Is Routed-by field
Should be Routed-per E-37

Panel 1C44



SK-8

Description of Basic Concern

Cable was routed to the wrong compartment of the control panel. Field discovered E37 error then pulled and terminated cable at the correct compartment. E37 did not reflect as-built condition.

Reason for No Concern

When construction attempts to terminate a cable and discovers that the cable is in the wrong compartment, field engineering is notified of the problem.

Code Design A-2


Cable is Routed-by-field
Cable should be Routed-per E-37

SK-9

Description of Basic Concern

Accountability; i.e., not knowing where a cable is pulled.

Reason for No Concern

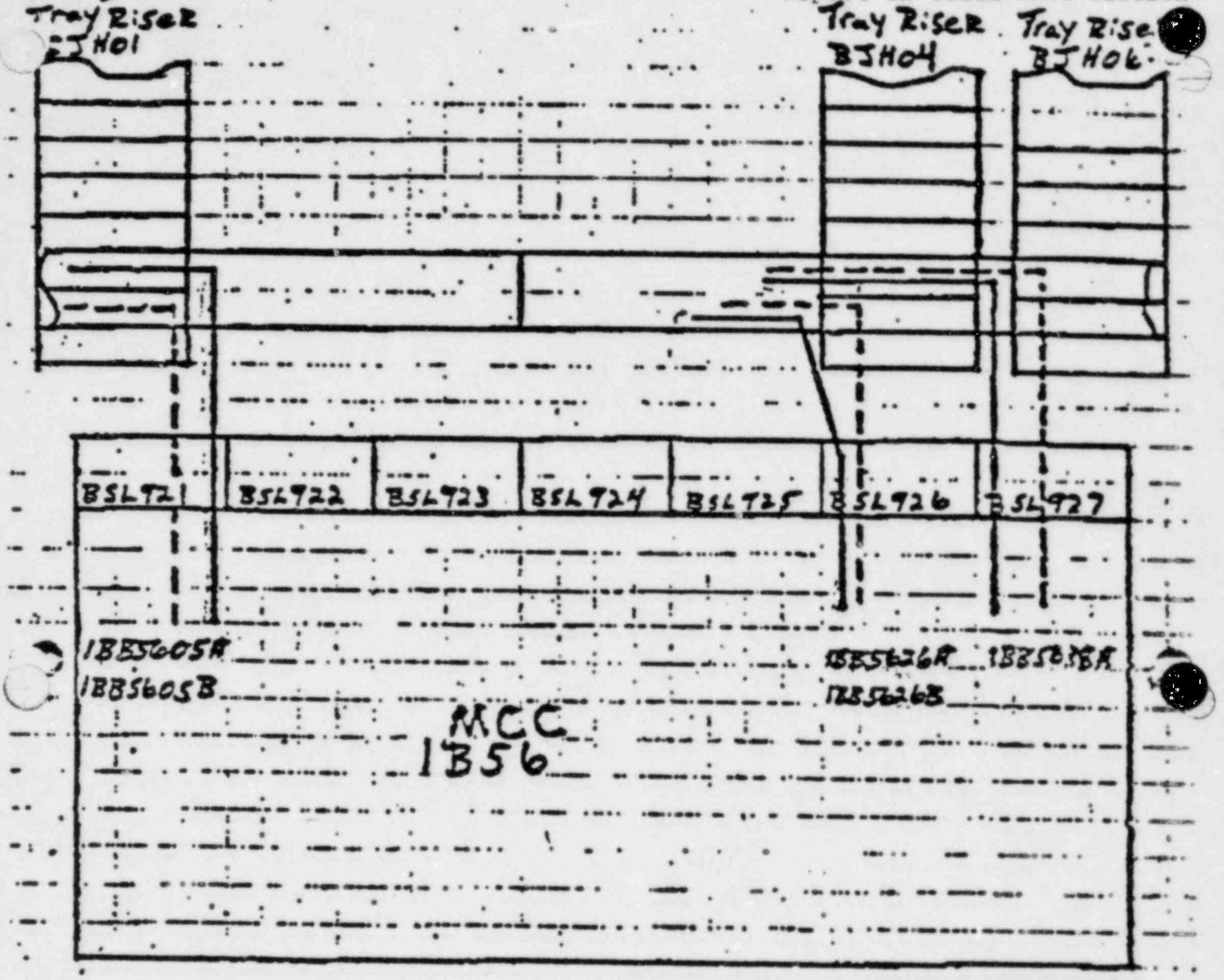
Engineering designed the cable to be airlined between E37 designated vias. The criteria, when in a case like this a Class 1E cable leaves the confines of a raceway, the subject cable will be visually inspected for possible separation violation. This inspection will discover this problem.

Cable — 1BB5605A FB [illegible] 1BB5626A FB SL-10

Code # D-1

Design

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable is Routed - By field

Cable should be - Per E-37

SK-10

Description of Basic Concern

Cables are airlined, and are not in the riser.

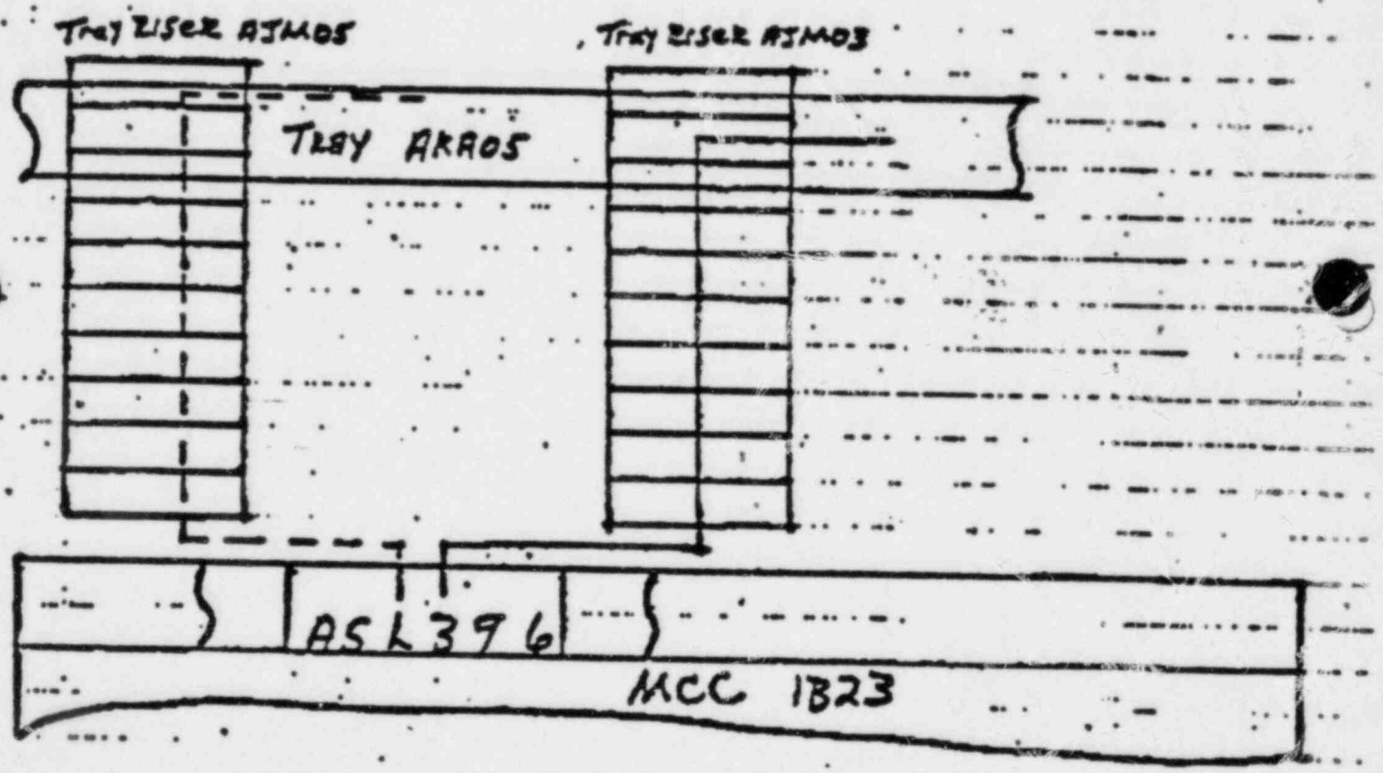
Reason for No Concern

A cable can be airlined 3 feet without engineering approval.

Cable # 1AB2327 A
Code # D-1
Design

SK-11






Cable is Routed- by field

Cable should be- Per E-37

SK-11

Description of Basic Concern

Cable was pulled into tray AJM03 without engineering's knowledge.

Reason for Concern

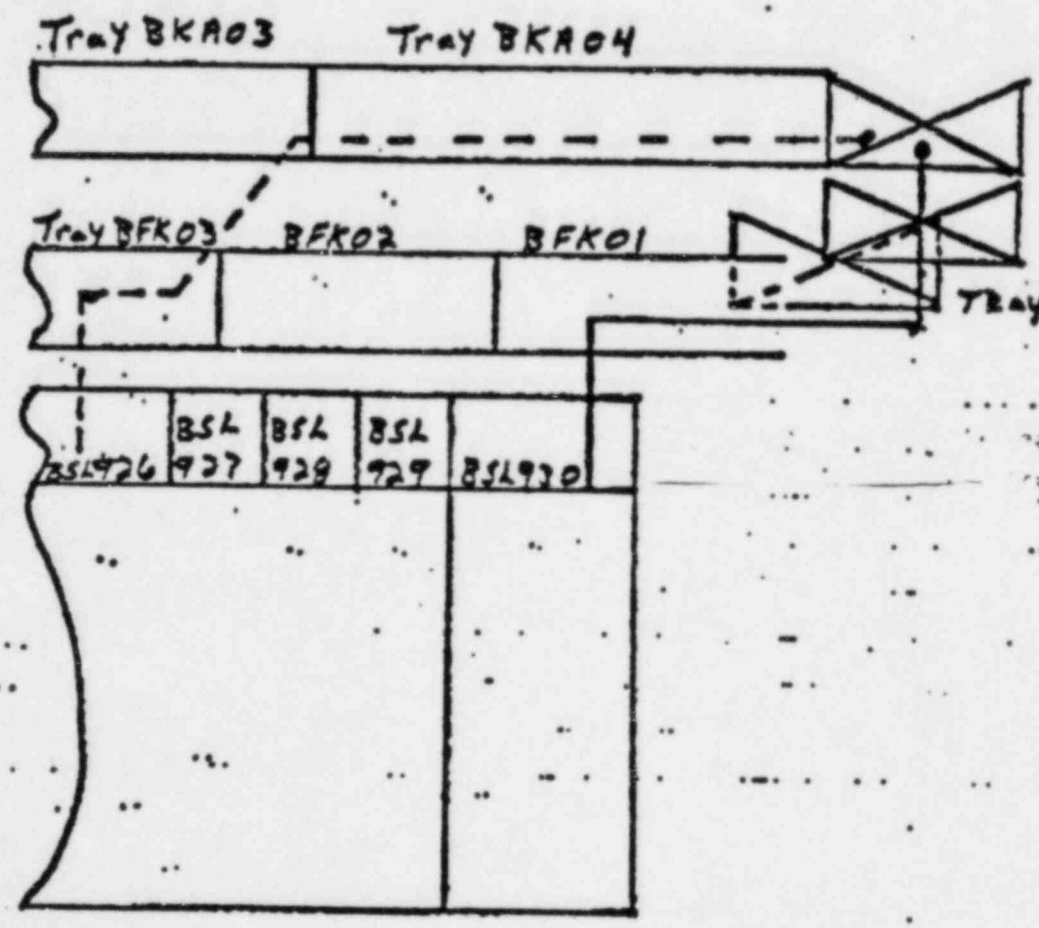
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

When a tray is wrapped, heat generated from cables in the tray must be taken into consideration. If a cable were pulled into that tray and engineering was not aware of it, the thermal analysis would not include that cable.

Cable # 2BB5626A
Code # D-1
Construction

SK. 12

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable is Routed - by field

Cable Should be - Per E-37

SK-12

Description of Basic Concern

Cable was not installed as routed in E37 and a voltage violation was created when a power cable was run in an instrumentation tray.

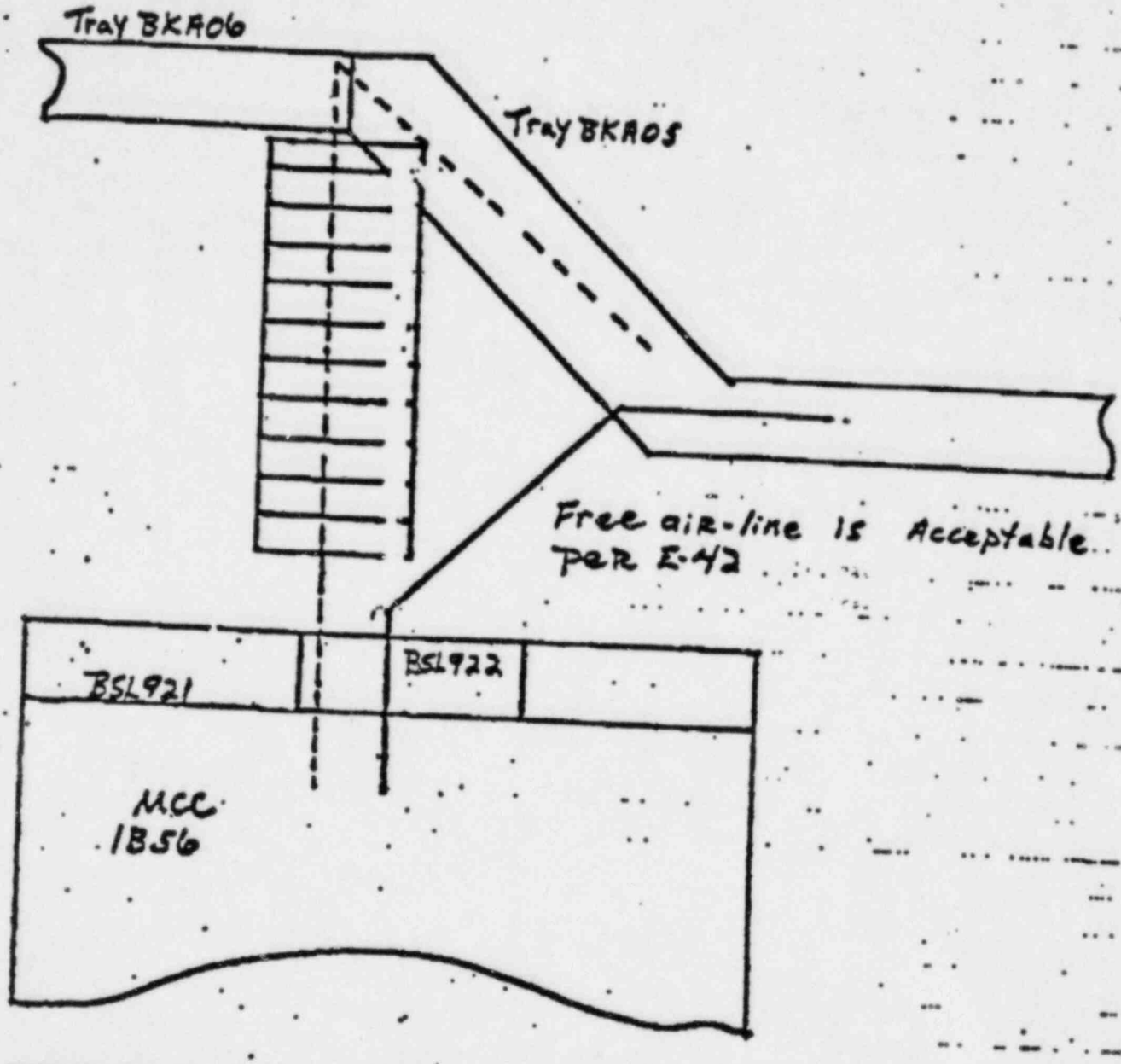
Reason for No Concern

Quality control will inspect all cable transitions from one raceway to another; this inspection will eliminate this concern.

Code = D-1
Design

SK.13

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable is routed - by field

Cable should be - per E-37

SK-13

Description of Basic Concern

Accountability; i.e., not knowing where a cable is pulled.

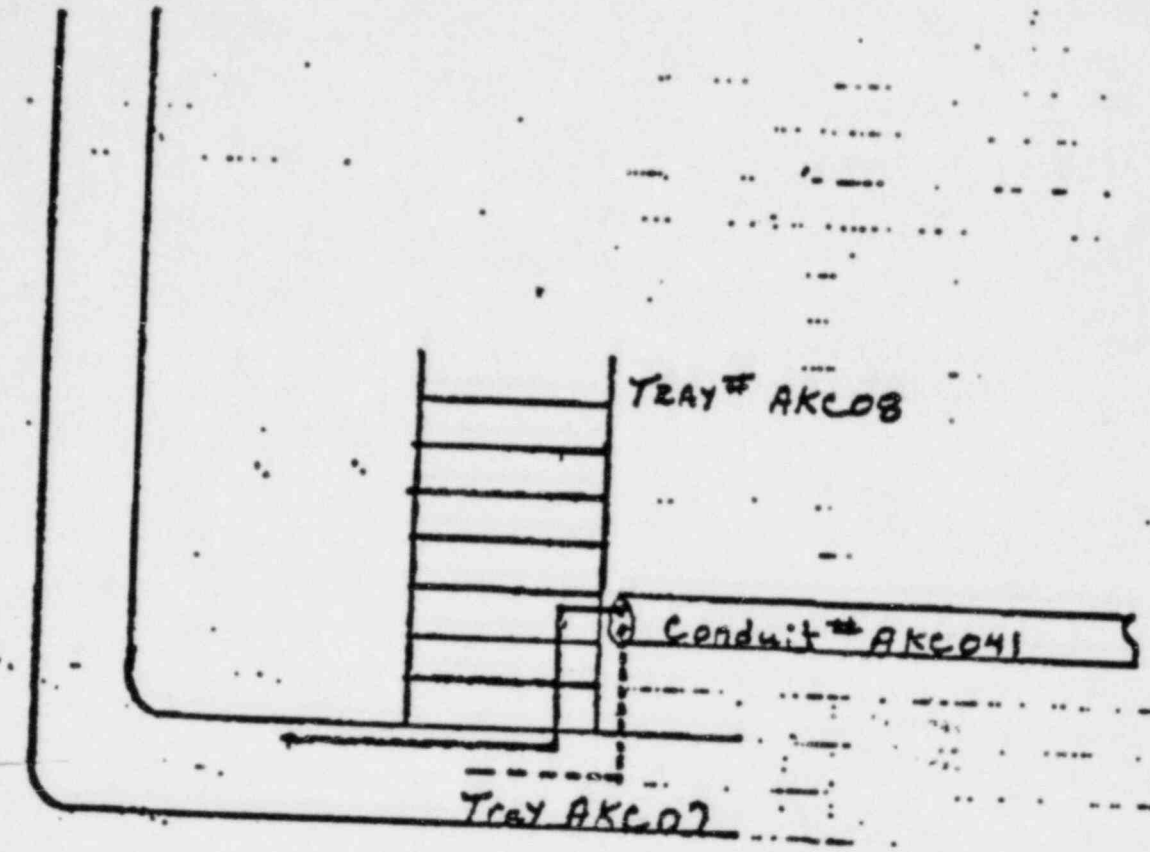
Reason for No Concern

The actual cable installation did not use all the designed raceway vias. Therefore, the absence of a cable would only make thermal analysis more conservative.

Cable # 1AB1704B
Code # B-1
Construction

SK.14






Cable is routed by field
Cable should be - PER E-37

SK-14

Description of Basic Concern

The subject cable enters the confines of additional raceway. If the trays containing the subject cable were required to be wrapped, how do we make sure that the cable portion in the unlisted via is protected.

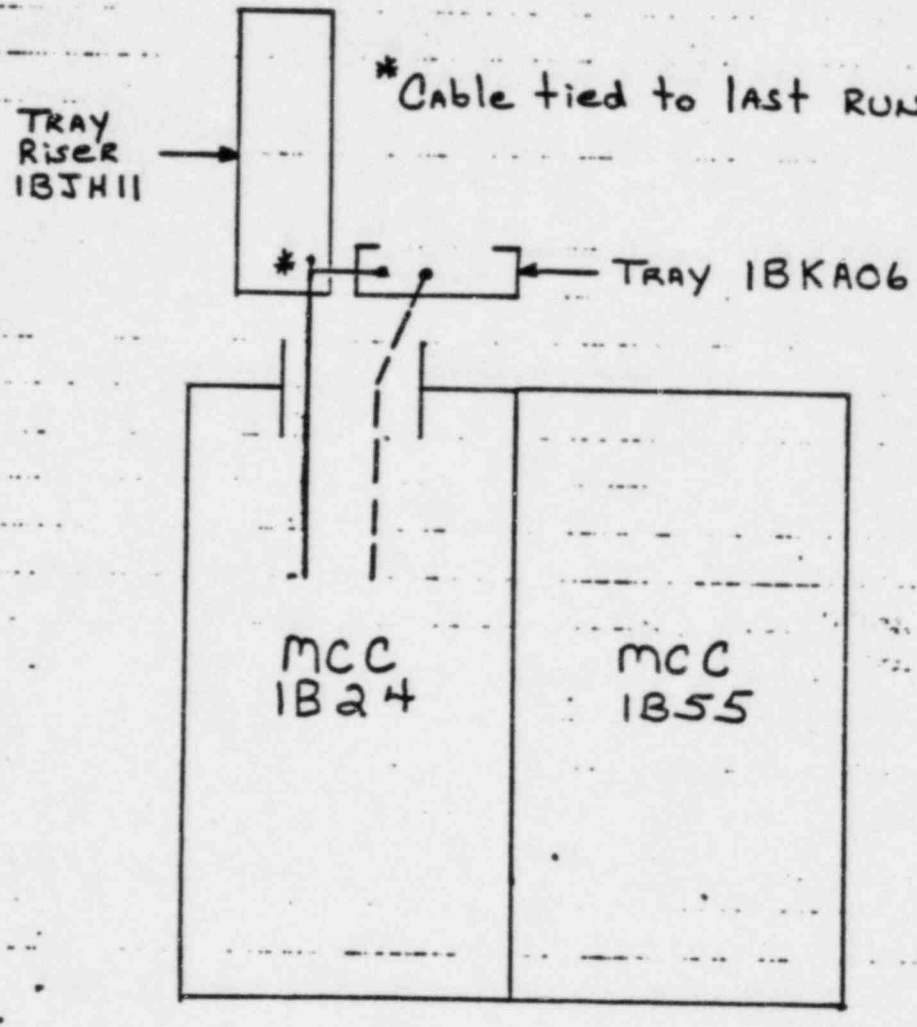
Reason for No Concern

When a cable enters the confines of additional vias, the tray wrapping criteria would require wrapping approximately 12 more inches at each end for safety.

Cable # 1BB2444 Q
Code # C-1
Construction

Sk #15.






——— Actual cable route in field

— — — — Cable route per E-37

SK-15

Description of Basic Concern

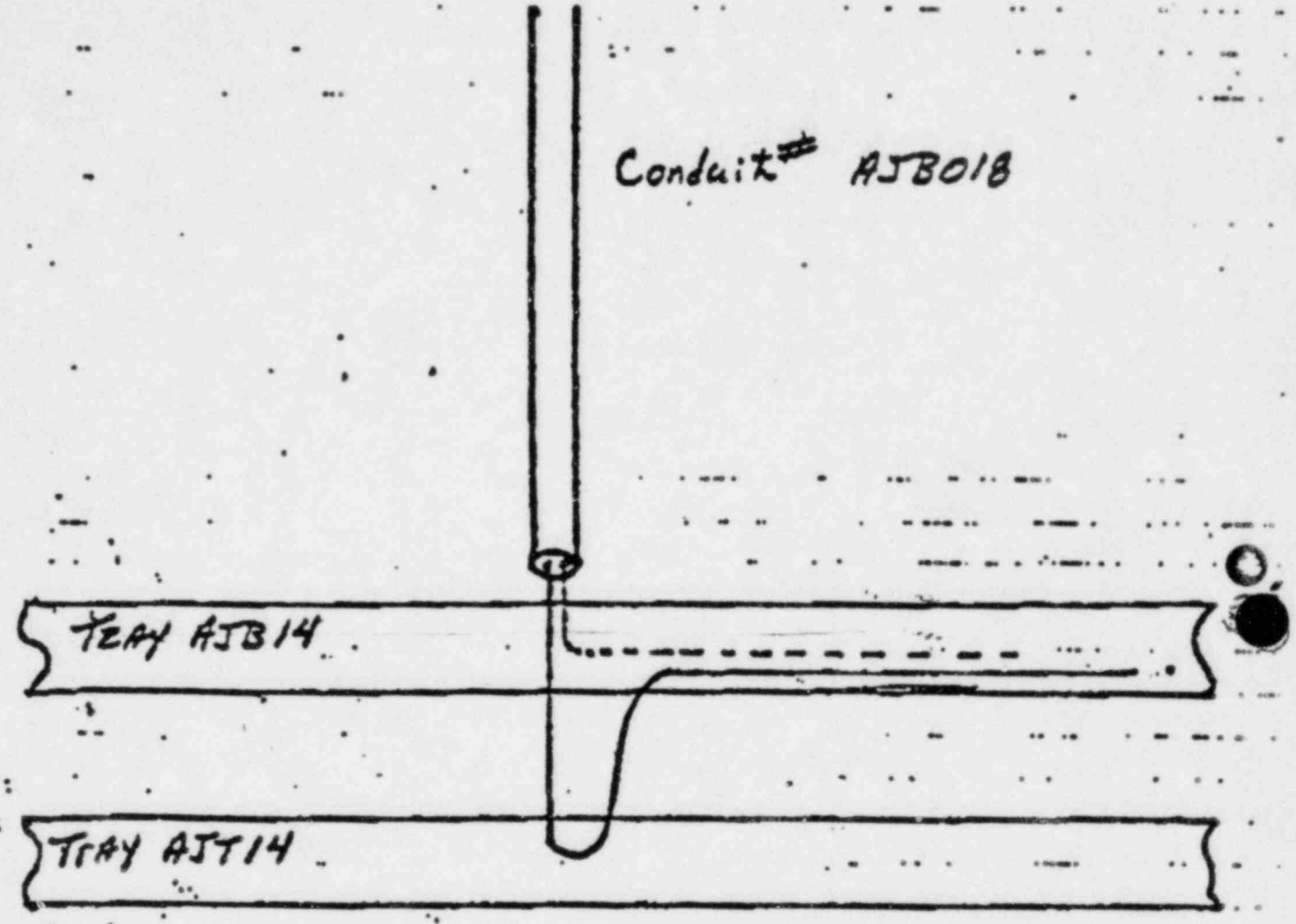
Cable is pulled into BJH11 which was not one of its assigned vias.

Reason for No Concern

The cable is only tied to the last rung of the riser, and will not contribute to thermal loading of the riser.

Cable #'s 1AFW021B and 1AFW082E  SK-16
Code # C-1
Construction






——— Cable is routed - by field.

- - - - - - - Cable should be - Per E-37

Cables were looped out of the bottom of tray AJB14 and into conduit AJB01B so that Min. bend Radii would not be violated and for ease of cable pulling.

Condition at interim training. Q.C. to inspect final training and bundling during area walkdown.

SK-16

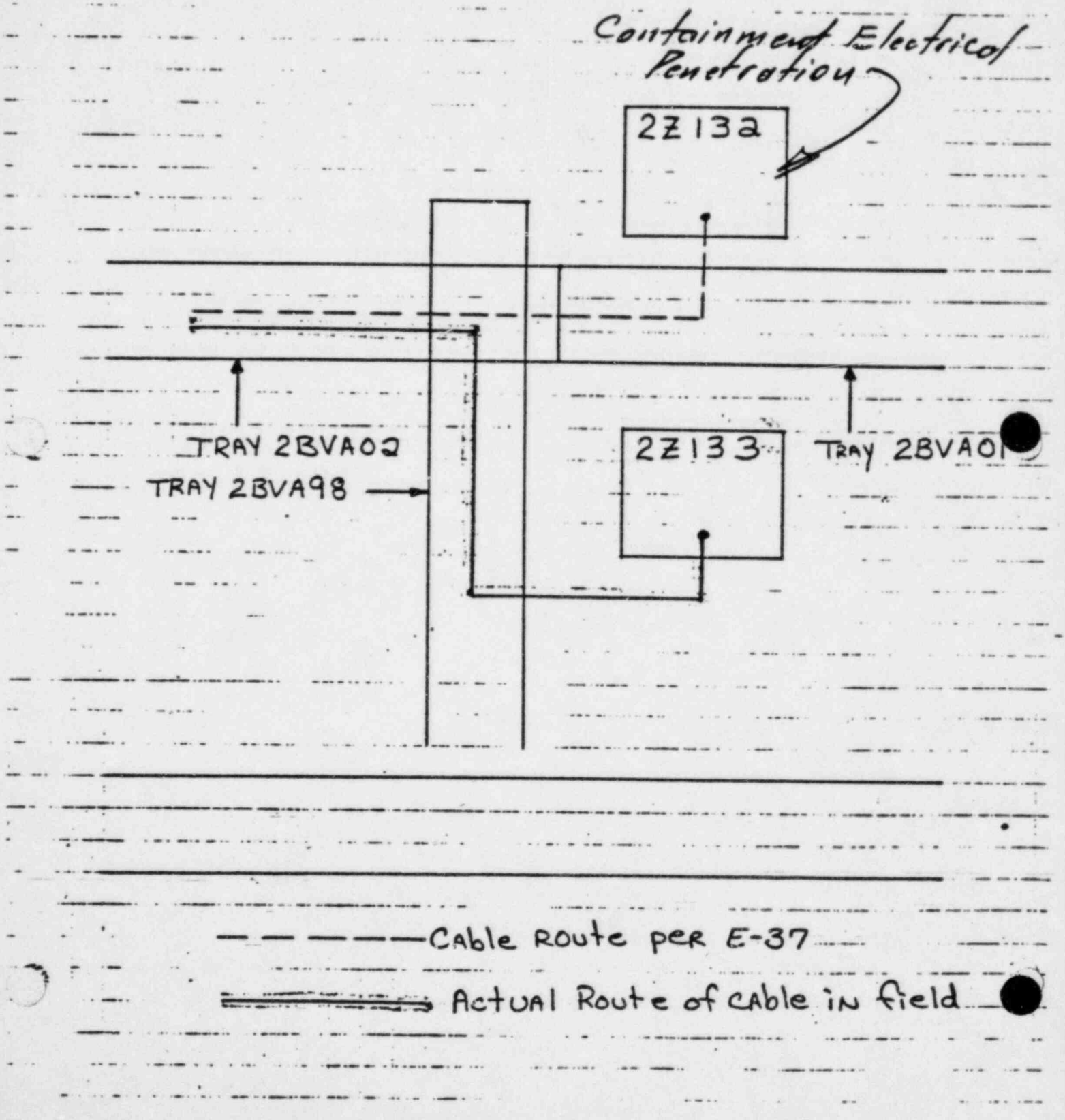
Description of Basic Concern

Cables looped out the bottom of tray AJB14 into tray AJT14.

Reason for No Concern

As a normal procedure, construction eliminates all slack from cables before tying them down. With this procedure accomplished, this concern will not be a problem.

Cable # 2BI067 A
Code # D-1
Construction



SK-17

Description of Basic Concern

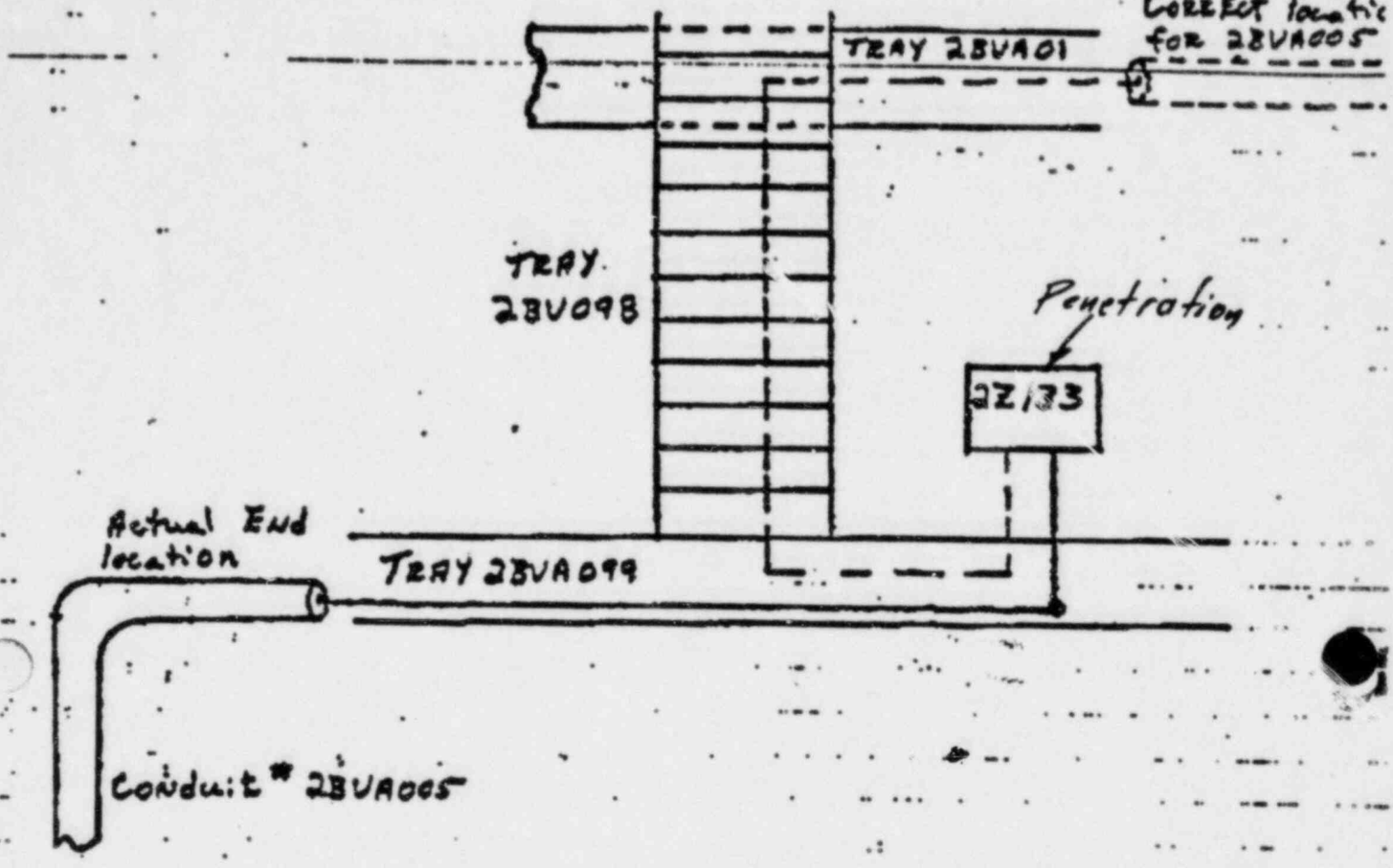
Cable is pulled to the wrong penetration.

Reason for No Concern

When construction attempts to terminate a cable at a penetration and discovers that the cable is not at the proper penetration, field engineering is notified of the problem.

Cable # 2BI004A and 2BI003A SK 18
Code # B-1
Construction #'s

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Conduit # 2BVA005 Installed at incorrect End location

Should run to 2BVA01 ± 18" into adjoining tray section

Cables Using per E-37 are: BVA005 BVA01 BVA98 BVA99

Due to incorrect End location: BVA005 — — BVA99

——— Cable is routed - By field

- - - - - - Cable Should be - Per E-37

SK-18

Description of Basic Concern

Because of incorrect conduit installation, the cable was pulled incorrectly.

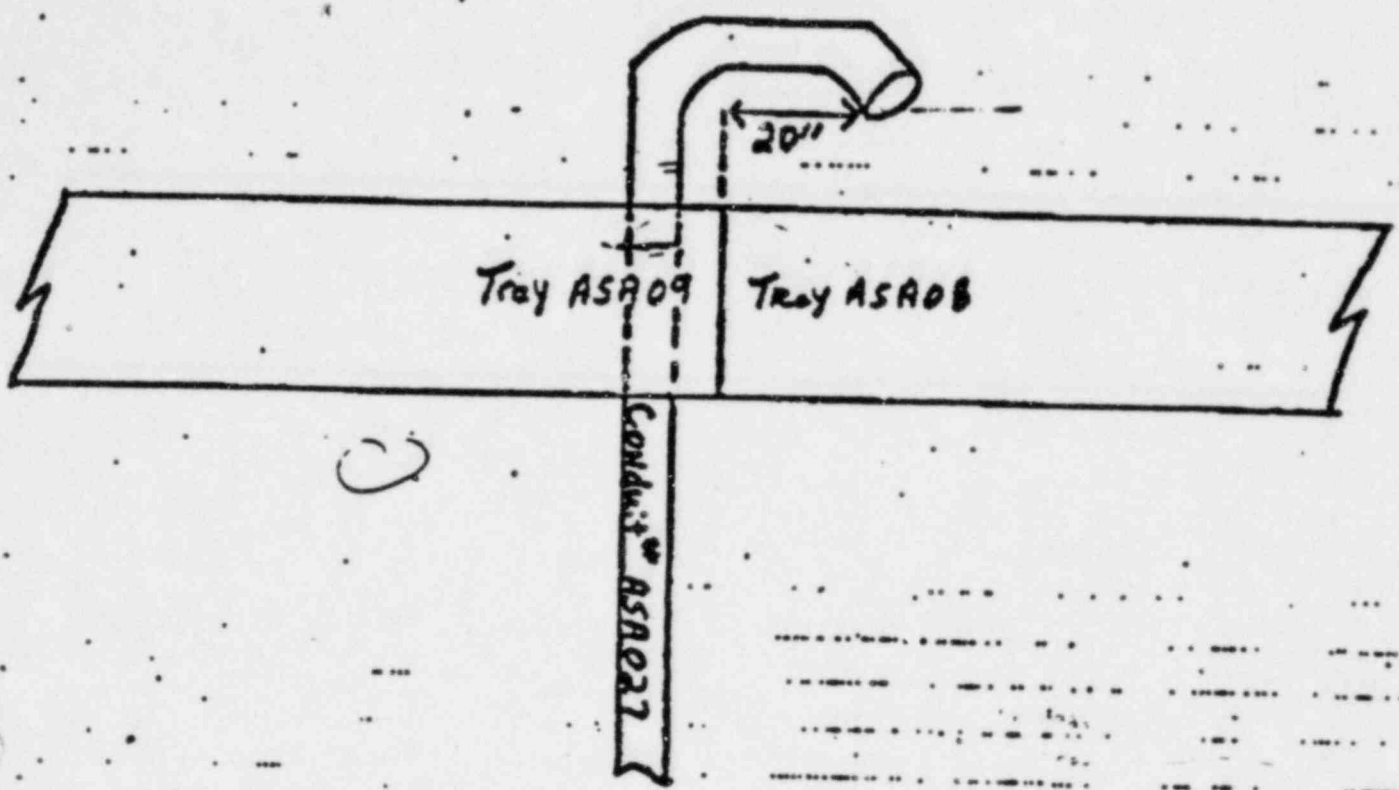
Reason for No Concern

The subject conduit installation had not been inspected by quality control. On discovering the incorrect conduit installation, cable misinstallation would have been corrected.

Cable # OAB6501N
Code # B-1
Construction

SK. 19

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Conduit # ASA027 Installed at incorrect END location.
Should run to ASA09 ± 18" into adjoining tray section.
Cable Vias per K-37 are: ASA027 ASA09 ASA08
Due to incorrect END location: ASA027 — ASA08

SK-19

Description of Basic Concern

Accountability; i.e., not knowing where a cable is pulled.

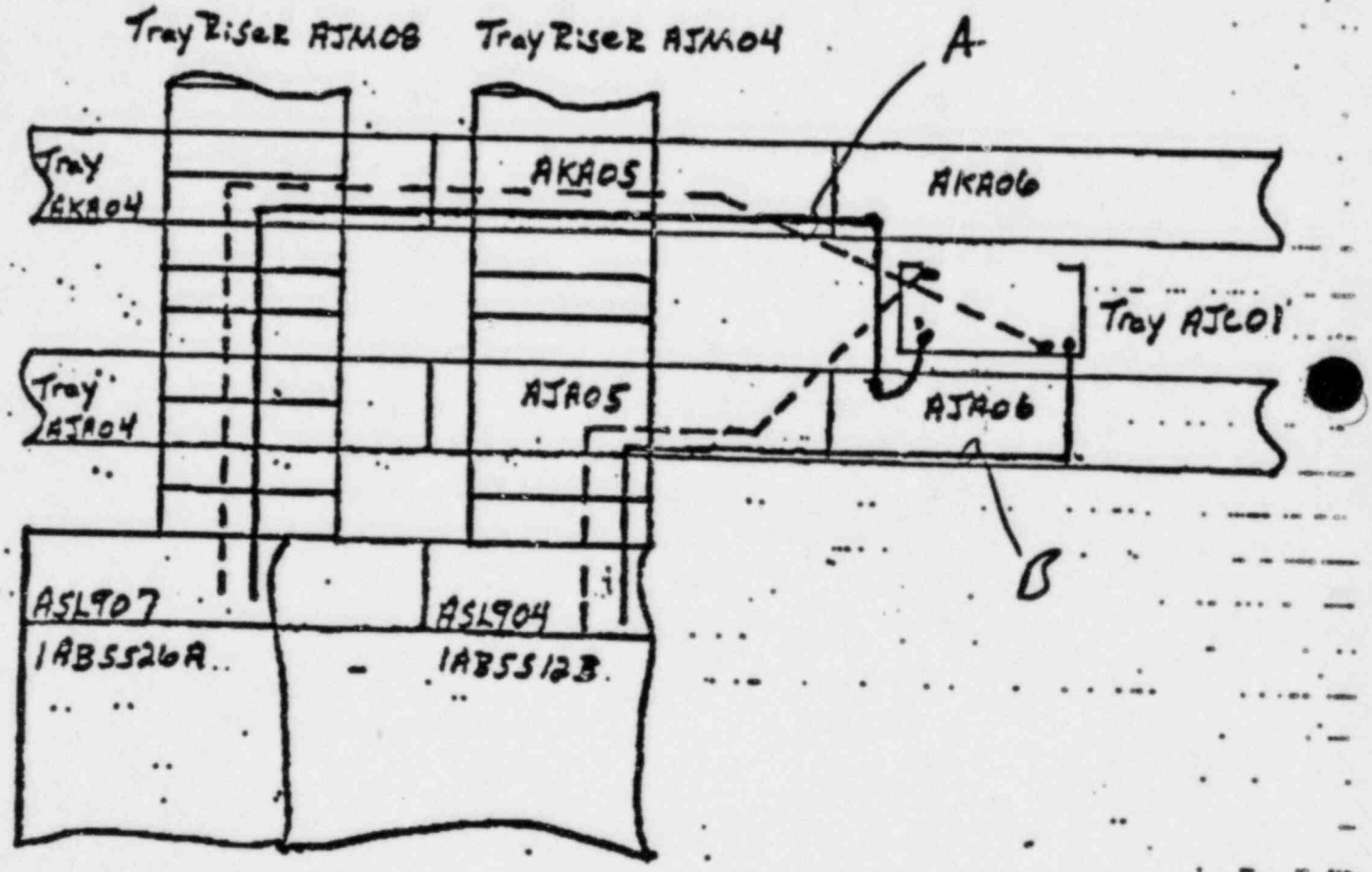
Reason for No Concern

The actual cable installation did not use all the designed raceway vias. Therefore, the absence of a cable would only make thermal analysis more conservative.

Cable # 1AB5526A and 1AB5512B
Code # D-1
Construction

SL 20





SK-20

Description of Basic Concern

Cables were pulled into trays AKA06 and AJA06, which were listed as vias in E37, without engineering's knowledge.

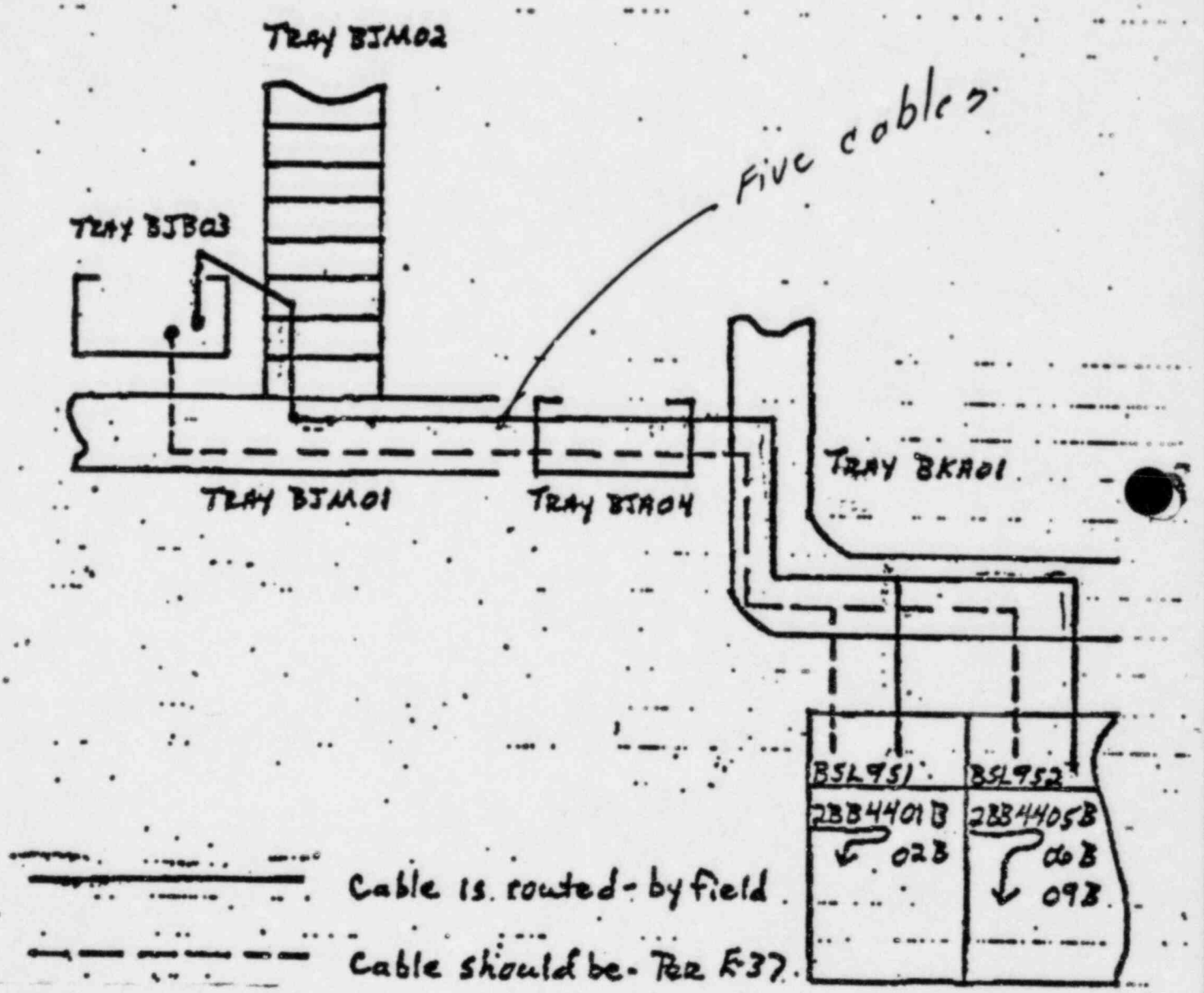
Reason for Concern

Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

When a tray is wrapped, heat generated from cables in the tray must be taken into consideration. If a cable were pulled into that tray and engineering was not aware of it, the thermal analysis would not include that cable.

Cable #'s 2BB4401B 02B 05B 06B 09B . SK.21
Code # D-1
Construction :

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation



SK-21

Description of Basic Concern

Cables were pulled into tray BJM02, not in E37 vias, without engineering's knowledge.

Reason for Concern

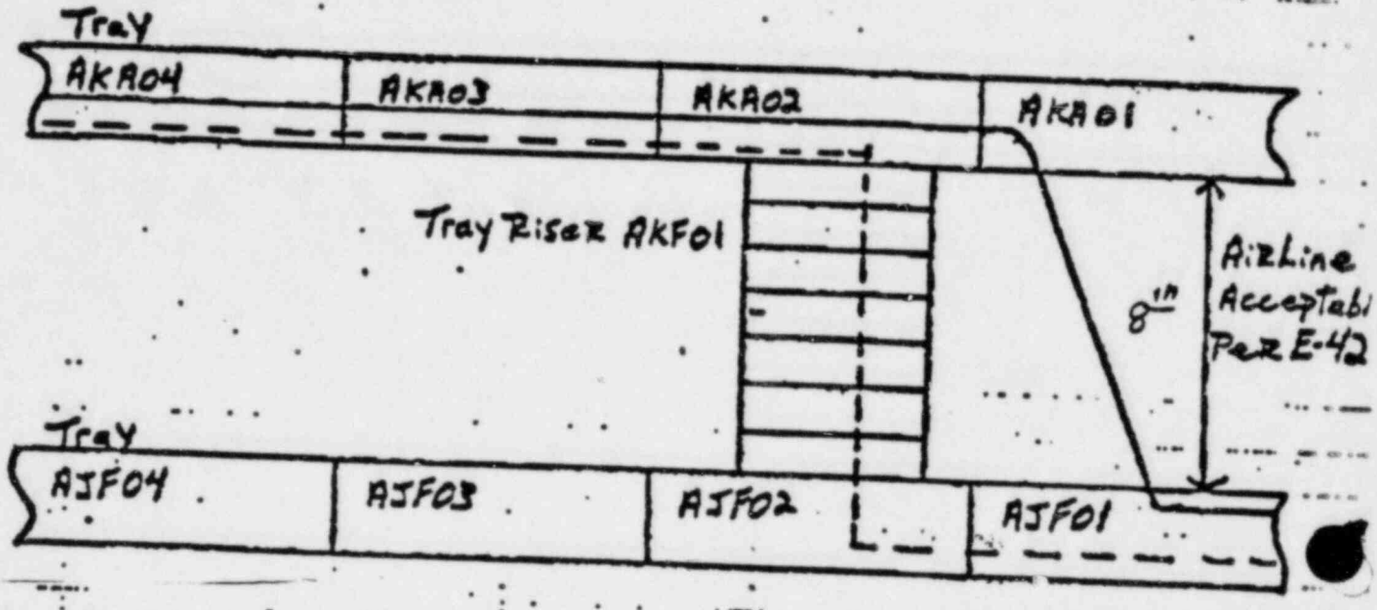
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

When a tray is wrapped, heat generated from cables in the tray must be taken into consideration. If a cable were pulled into that tray and engineering was not aware of it, the thermal analysis would not include that cable.

Code = D-1
Construction

SK. 22

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation




Cable is Routed - by field

Cable Should be - Per E-37

SK-22

Description of Basic Concern

Cables were pulled into tray AKA01, not in E37 vias, without engineering's knowledge.

Reason for Concern

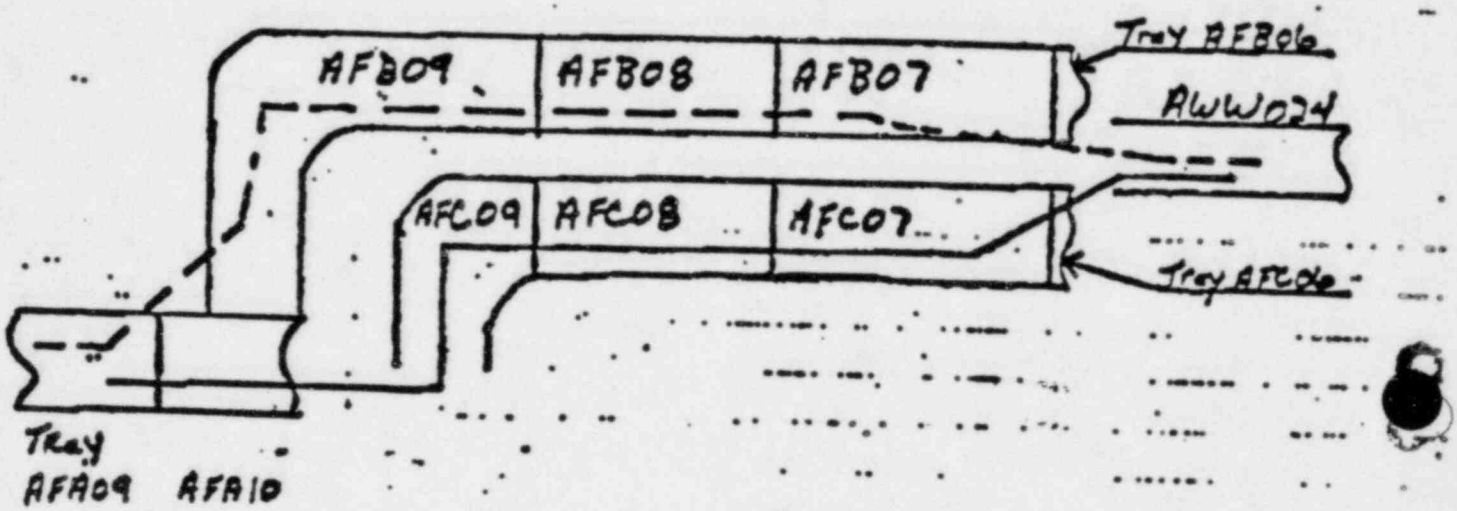
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

When a tray is wrapped, heat generated from cables in that tray must be taken into consideration. If a cable were pulled into that tray and engineering was not aware of it, the thermal analysis would not include that cable.

Cable = OAB4511.H
Code = D-1
Construction

SK. 23






Cable is routed - by field

Cable Should be - Per E-37

SK-23

Description of Basic Concern

Cable was pulled into tray AFC07-09, not listed in E37 vias, without engineering's knowledge.

Reason for Concern

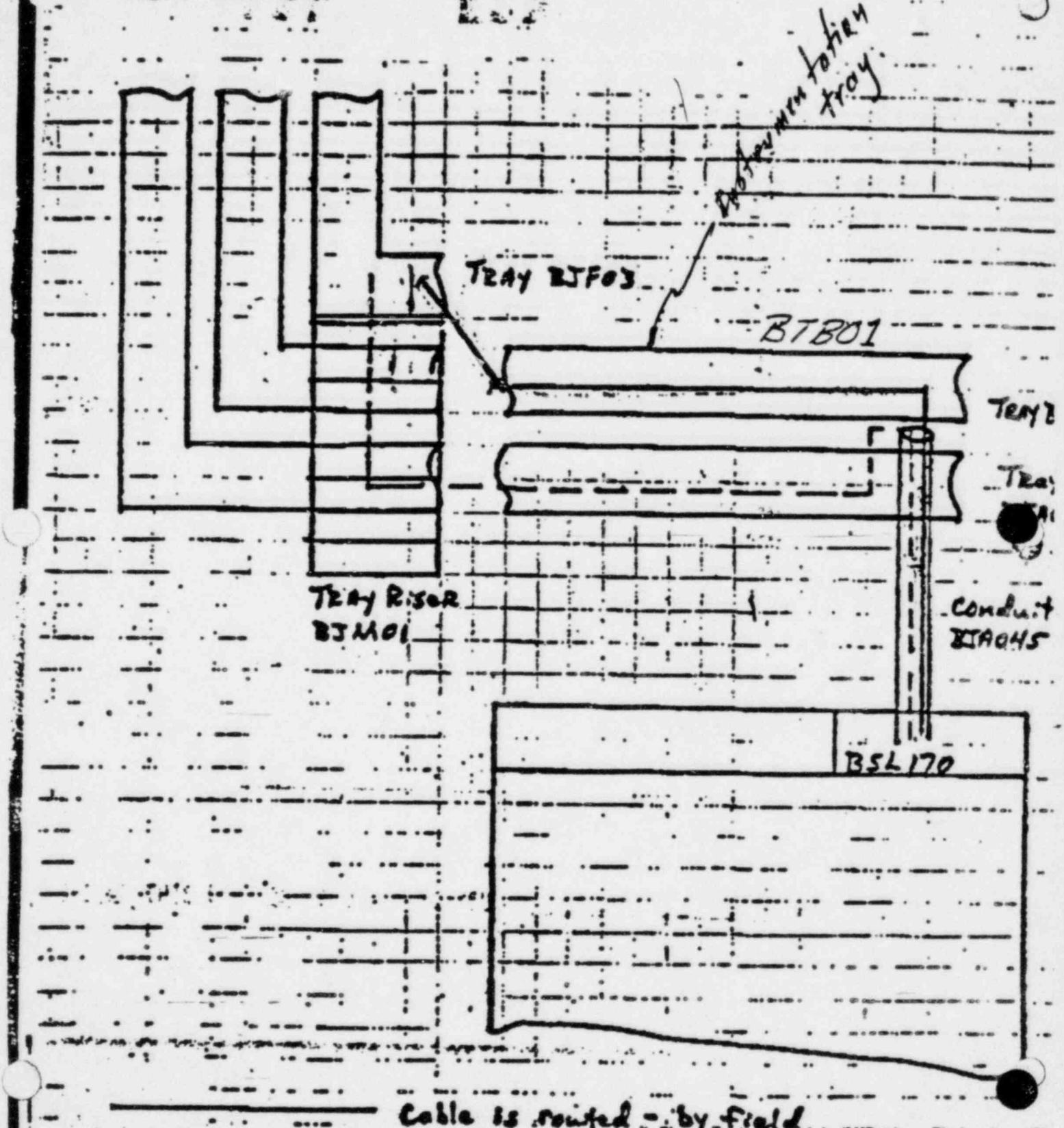
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

When a tray is wrapped, heat generated from cables in the tray must be taken into consideration. If a cable were pulled into that tray and engineering was not aware of it, the thermal analysis would not include that cable.

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation

SK-24

Cables 1BQH03 D I E
Code = D-1
Construction




Cable is routed - by field

Cable Should be - Per E-37

SK-24

Description of Basic Concern

Voltage violation - Control cables used instrumentation raceway.

Reason for No Concern

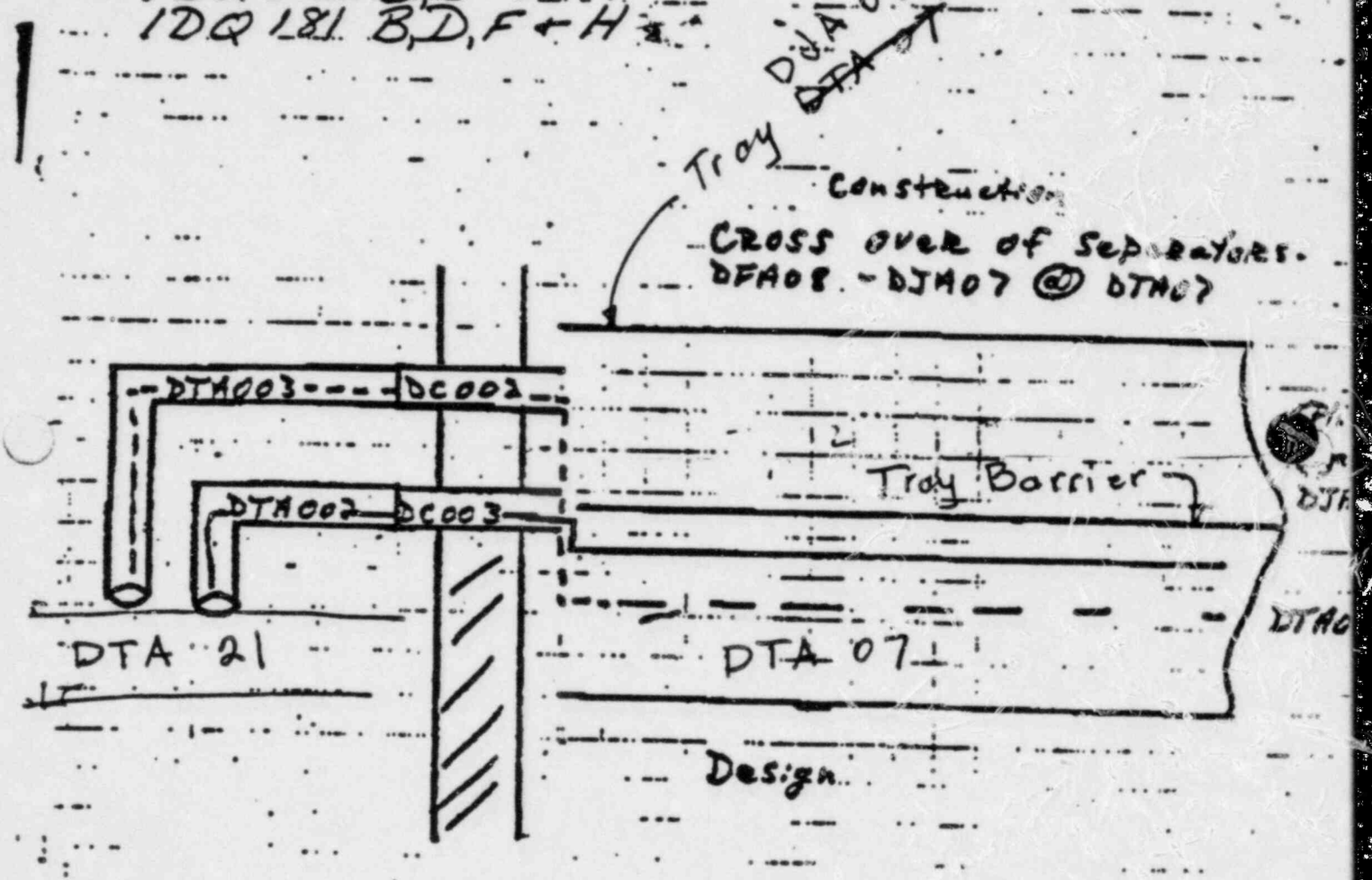
Quality control will inspect all cable transitions from one raceway to another; this inspection will eliminate this concern.

Code # D-1
Construction & Design

Midland Plant Units 1 and 2
Attachment 3 to
Report on Cable Installation

SK-25

1DQ157A
1DQ396 D,F,H,L,A,T
1DQ127 E,D+E
1DQ173 D,E+F
1DQ181 B,D,F+H




Design

Cable routed by Field

Cable Should be Per E-37

SK-25 Unique Case

Description of Basic Concern

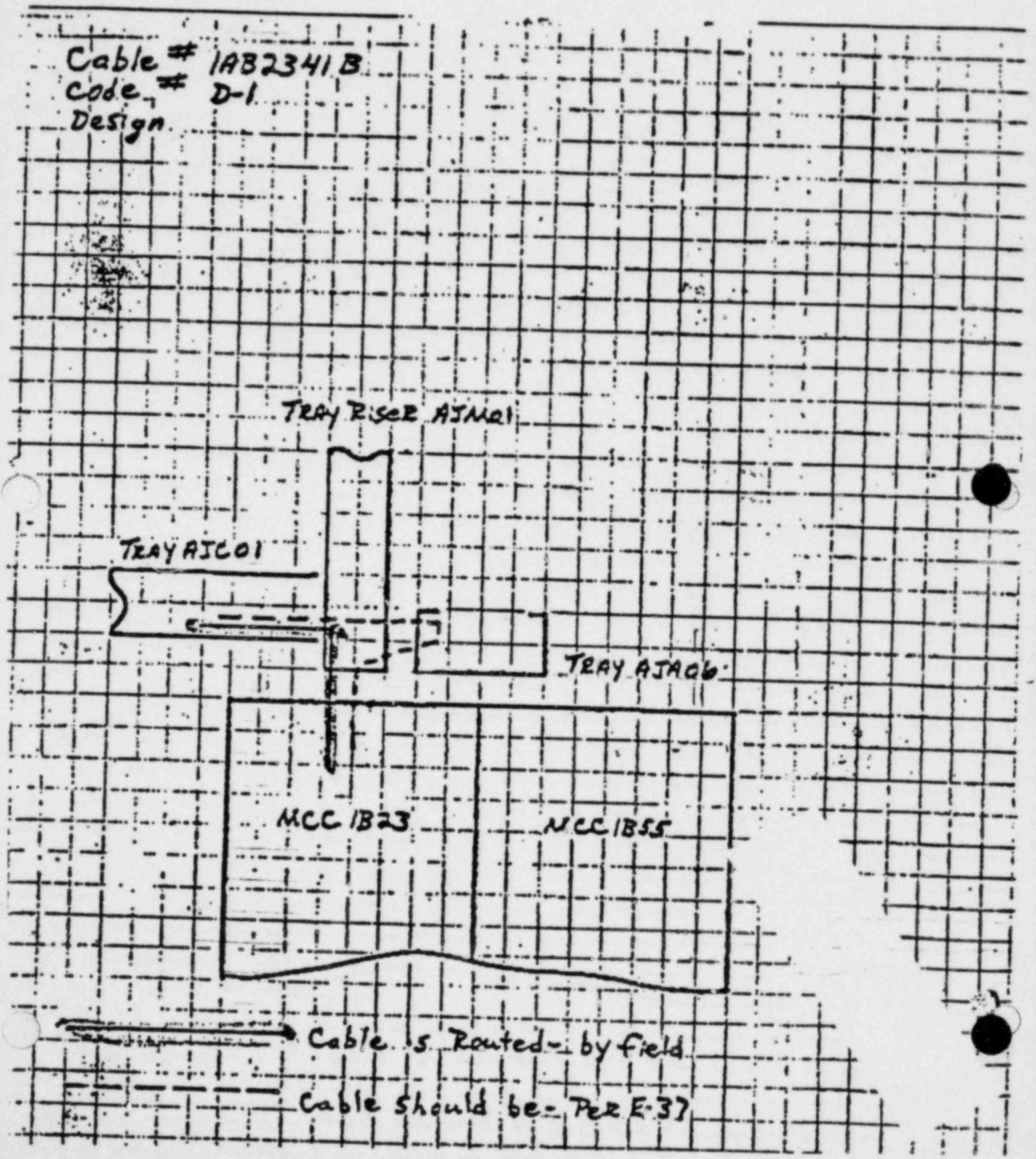
Sixteen small instrument cables were pulled into the wrong conduit.

Reason for No Concern

There is ample room in conduit DTA002/DC003 for the additional cable. There are no thermal concerns. This was a unique case because the subject conduits and cables had undergone successive renumbering and relocation after initial installation 1) to accommodate neutron detector cables and 2) because a steel beam blocked access to some of the conduit sleeves. The many changes may have caused confusion which led to the misinstallation of the cables. It is not credible that this situation would be repeated elsewhere; therefore, it constitutes a unique case.

SK-26




Cable # 1AB2341B
Code # D-1
Design
TRAY RISER AJM01
TRAY AJC01
TRAY AJA06
MCC 1B23
MCC 1B55
Cable is Routed - by field
Cable should be - Per E-37

SK-26

Description of Basic Concern

Accountability; i.e., not knowing where a cable is pulled.

Reason for No Concern

The actual cable installation did not use all the designed raceway vias. Therefore, the absence of a cable would only make thermal analysis more conservative.

| Name | Position - Organization |
|---|---|
| J.M. Anderson | Electrical/CS Engineering Coordination - Bechtel Power Corp. |
| K.D. Bailey | Division Engineering Manager - Bechtel Power Corp. |
| R. Cook | Resident Inspector - NRC |
| R.N. Gardner | Reactor Inspector - NRC |
| D.B. Kelly | Circuitry and Raceway Group Leader - Bechtel Power Corp. |
| R.B. Landsman | Reactor Inspector - NRC |
| B.W. Marguglio | Director of MPQAD - Consumers Power Co. |
| C.E. Norelius | Director of Division of Engineering and Technical Programs - NRC |
| J.A. Pastor | Design Production Electrical Section Head - Consumers Power Co. |
| G.W. Rowe | MPQAD SMO Lead Electrical Engineer - Consumers Power Co. |
| M.J. Schaeffer | MPQAD Electrical/I&C Section Head - Consumers Power Co. |
| A. West | Attorney - Isham, Lincoln & Beale |
| C.C. Williams | Section Chief - NRC |