UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 7, 1983

NOTE TO: W. Johnston
J. P. Knight
L. Rubenstein
W. Houston
F. Pagano

FROM: T. Novak

SUBJECT: NRR SALP III ASSESSMENT FOR MIDLAND PLANT, UNITS 1 & 2

Based upon inputs provided by selected technical reviewers who have had contact and interaction with Consumers Power Company during the period July 1, 1981, to March 31, 1983, a draft of the NRR SALP report for the Midland Plant was forwarded to appropriate Division Directors for comment by my memorandum of May 2, 1983. Enclosure 1 is the revised SALP report incorporating comments received.

Prior to adoption of this revised draft as the NRR assessment, we need to meet to discuss this report in view of several developments including recent hearing testimony by Region III and several third-party reviewers. The meeting will address the appropriateness of NRR input considering these developments. Enclosure 1 includes a table summarizing reviewer comments.

The meeting is scheduled for Friday, July 8 at 2:00 pm in T. Novak's office, 1108. Call Melanie Miller, X24259 or Elinor Adensam X27831, if you have need for additional information related to the meeting subject.

Thomas M. Novak, Assistant Director
for Licensing
Division of Licensing

cc: R. Mattson
R. Vollmer
E. Jordan
D. Eisenhut
D. Hood
E. Adensam

FACILITY NAME: Midland Nuclear Plant, Units 1 and 2

LICENSEE: Consumers Power Company

NRR PROJECT MANGER: Darl S. Hood

I. INTRODUCTION

This report presents the results of an evaluation of the applicant, Consumers Power Company, in the functional area of licensing activities. It is intended to provide NRR's input to the SALP review process as described in NRC Manual Chapter 0516. The review covers the period July 1, 1981 to March 31, 1983. A distinction of activities between Units 1 and 2 was not considered feasible or appropriate.

The basic approach used for this evaluation was to first select a number of licensing issues which involved a significant amount of staff manpower. Comments were then solicited from the staff. The staff applied the evaluation criteria for the performance attributes based on their experience with the applicant or his products. Finally, this information was assembled in a matrix which allowed an overall evaluation of the applicant's performance.

II. Summary of Results

NRC Manual Chapter 0516 specifies that each functional area evaluated will be assigned a performance category based on a composite of a number of attributes. The single final rating should be tempered with judgment with respect to the significance of the individual elements.

Based on this approach, the performance of Consumers Power Company in the functional area - Licensing Activities - is rated Category 2.

III. Criteria

Evaluation criteria, as given in NRC Manual Chapter Appendix 0516 Table 1, were used for this evaluation.

IV. Performance Analysis

The applicant's performance evaluation is based on a consideration of seven attributes as given in the NRC Manual Chapter. For the licensing actions

considered in this evaluation, only four of the attributes were of significance. Therefore, the composite rating is heavily based on the following attributes:

- Management involvement
- Approach to resolution of technical issues
- Responsiveness to NRC initiatives
- Staffing

There was no NRR evaluation basis for Enforcement History, Reportable Events and Training.

The evaluation was based on our evaluation of the following licensing activities:

- Soils and Structures
- Emergency Planning
- Equipment Qualification
- Quality Assurance Program
- Natural Gas Pipeline
- Auxiliary Feedwater System
- Instrumentation and Control Systems Review
- Seismic Spectra
- Fire Protection
- Implementation of NUREG-0737 Items

A. Management Involvement

The overall rating of this criterion is Category 2 with 2 activities receiving individual ratings of Category 1. For the licensing activities evaluated, there appeared to be appropriate management attention with decision making taking place at adequate levels. During numerous audits conducted by NRR, including audits relating to the soils issue, emergency planning, instrumentation and control systems, fire protection and equipment qualification, the records maintained by the licensee were generally complete, well maintained and available. In almost every area, the appropriate level of management participated in meetings with the NRC on safety, technical, and licensing issues and demonstrated knowledge on the meeting's subject matter.

In the soils remedial areas, a reorganization provided an executive manager fully dedicated to this area. While some difficulties occurred in the early phases of this reorganization, this continued involvement in the soils area throughout much of the assessment period results in the NRR staff rating performance in the soils area as Category 2.

Clear lines of responsibility were established in support of the staff's safety evaluation and subsequent issuance of the Safety Evaluation Report. Priorities established by licensee management were generally consistent with and supportive of those priorities established by the staff. Commitments made to incorporate resolutions into FSAR revisions were kept and were generally timely. The licensee also made an objective and extensive effort to track open issues related to the safety evaluation. One issue which involved implementation of a TMI Action Plan item (Item I.B.1.2) reached an apparent impasse between the staff and applicant. However, when the proper level of management attention was focused on the issue, both sides were able to reach an acceptable resolution. Licensee's management failed to recognize the safety signifance of constructing a high pressure gas facility in close proximity to safety structures until after construction completion.

B. Approach to Resolution of Technical Issues

The overall rating for this criterion is Category 2 with the performance rating for one individual licensing area falling into Category 1 and one area falling into Category 3. In general, licensee personnel involved in resolution of technical questions were knowledgeable and clearly understood the issues. During the appraisal period, technical submittals from the licensee to the NRC were usually complete and conservative. Resolution of two technical issues during the safety evaluation required elevation to the Division Director appeals level. In one of these issues, relief was given to the licensee. In the other, the licensee was required to commit to installation of a third auxiliary feedwater pump. In both cases, however, the licensee prepared reasonable technical justification for their position. In addition, the licensee's response once the appeals decision on the auxiliary feedwater pump had been made was excellent. The licensing area of soils and structures needs improvement insofar as the approach to technical issues. In the absence of NRC requirements, there was reluctance by the licensee to perform certain soils remedial work utilizing accepted quality assurance procedures. In regards to the buried piping issue, the licensee appeared to lack a thorough understanding of the safety issues involved. Improvement in the soils area over the appraisal period has been evidenced by more specific and clearer submittals to the NRC.

C. Responsiveness to NRC Initiatives

The overall rating for this area is Category 2 with the performance rating for individual licensing action falling in all 3 categories. In general, responses to the NRC were timely and thorough. The licensee was particularly responsive in the area of instrumentation and control systems. Additionally, in questions concerning the natural gas pipeline, the licensee demonstrated a willingness to address NRC concerns effectively and responsiveness increased accordingly. Responsiveness was rated poorly for those licensing issues which remained unresolved for a long period of time such as resolution of the buried piping problem.

D. Enforcement History

There is no basis for a NRR evaluation of this attribute.

E. Reportable Events

There is no basis for a NRR evaluation of this attribute at this time.

F. Staffing

Overall rating of this criterion is Category 2. Positions appear to be well-defined and responsibilities identified. Staffing is adequate and at levels consistent with the activity for the licensing activities evaluated. The licensee effected reorganizations and personnel replacements within a reasonable time insofar as key positions. In some cases, however, the staff considers that too much reliance was placed upon representation by consultants and by the architect/engineer.

G. Training

There is no basis for a NRR evaluation of this attribute at this time.

V. CONCLUSION

Based on the evaluation of Consumers Power Company's performance for a number of activities in the functional area of licensing, an overall performance rating of Category 2 has been assigned.

Generally, in licensing activities the licensee expressed a willingness to respond to NRC initiatives. Submittals were usually timely and thorough. Especially notable is the degree of management attention directed toward licensing activities as evidenced by meeting participation and the level at which decisions occur. Areas of above average performance in all criteria include instrumentation and control systems reviews. Conversely, although improvement in the soils areas has been seen during this appraisal period, the licensee should continue to focus a high level of management attention on this area in order to maintain an acceptable level of performance.

Midland Evaluation Matrix

Licensing Action	Management Involvement	Approach to Resolution-Tech	Responsiveness	Enforcement History	Reportable Events	Staffing	Training
Soils and Structures	2	3	2	N/A	N/A	2	N/A
Emergency Planning	2	2	2	N/A	N/A	2	N/A
Equipment Qualification	2	2	2	N/A	N/A	2	N/A
QA Program	2	2	2	N/A	N/A	2	N/A
Natural Gas Pipeline	2	2	1	N/A	N/A	2	N/A
Auxiliary Feedwater System	1	2	3	N/A	N/A	No Basis	N/A
Instrumentation and Control Systems Review	2	1	1	N/A	N/A	2	N/A
Seismic Spectra	2	2	1	N/A	N/A	2	N/A
Fire Protection	2	2	2	N/A	N/A	N/A	N/A
'REG-0737 Items	1	2	2	N/A	N/A	N/A	N/A
'ating	2	2	2	N/A	N/A	2	N/A

Approved by CA at SALP Board 6/14/83

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NRR PROJECT MANGER: Darl S. Hood

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Seismic Spectra	2	2	1	N/A	N/A	2	N/A
Fire Protection	2	2	2	N/A	N/A	N/A	N/A
NUREG-0737 Items	1	2	2	N/A	N/A	N/A	N/A
Overall Rating	2	2	2	N/A	N/A	2	N/A

1/32

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SEP 16 1980

Docket Nos.: 50-329/330

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF AUGUST 25, 1980 MEETING ON LICENSING STATUS OF THE MIDLAND PLANT, UNITS 1 AND 2

On August 25, 1980 management personnel from Consumers Power Company (the applicant) and the NRC staff met in Bethesda, Maryland to review briefly the potential timing and methods for resuming the NRC's formal docket review of the Midland Plant application. This was a followup meeting to that of June 13, 1980 during which the need of preparations for resumption of the review and the need for efficiencies in the review process were recognized. The Midland OL review has been suspended since the March 28, 1979 accident at Three Mile Island, Unit 2. Meeting attendees are listed in Enclosure 1. The meeting duration was two hours.

On the basis of its latest (forecast #6) completed construction schedules which reflect changes due to TMI-2 requirements, NRC open issues and other construction matters, the applicant noted that licensing could delay the scheduled fuel load unless the NRC resumes full review of the OL application immediately. This is illustrated by the applicants enclosed proposed licensing schedule. The applicant's schedule for Unit 2 calls for a July 1983 fuel load and December 1983 commercial operation. For Unit 1, the corresponding dates are December 1983 and July 1984 (electrical and steam). The staff noted that the July 29, 1980 visit by the NRC's Caseload Forecast Panel and a followup meeting on August 22, 1980 resulted in a finding of reasonable agreement with the applicant's projected construction completion estimates; the Panel's projected dates are about three months later. The staff intends to prepare and process a licensing schedule change request on the basis of the Panel's revised estimates; however, such processing will recognize the staff's overall workload priorities and resources and the processed result may not necessarily coincide with the construction completion dates.

The applicant described a review plan emphasizing the full use of previously completed review efforts and the use of proposed guidelines to determine whether repeated or reopened staff reviews of particular questions and other potential new requirements would provide substantial additional protection to public health and safety. The staff rejected these proposed guidelines and noted that any procedures for the conduct of staff review must be left entirely to the NRC as a matter of NRC administrative policy.

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The NRC Director of NRR, Mr. H. Denton, reviewed previous trial approaches which have provided for efficient use of staff resources in the review process. This included the approach used on Palo Verde in which the Utility utilized outside consultants to supplement its internal reviews of its systems to meet the Commission's regulations, and in which the NRC staff participated in the applicant's internal meetings. The approach used on Susquehanna for the seismic qualification review by the NRC was also cited as an example of review efficiency. Mr. Denton stated that the Palo Verde results, in particular, were most encouraging, and that the NRC would be willing to participate in a similar approach for Midland. Mr. Selby of Consumers Power Company replied that this approach would be examined further, but noted that the success of this or any other approach would be doubtful unless a sustained core of staff reviewers can be assigned to the project through review completion, particularily in the reactor systems and electrical systems branches.

Mr. Denton also noted that current FSARs and PSARs are deficient in their explicit display of conformance to each of the Commission's rules and regulations of significance to safety. The staff will require explicit documentation in the Midland FSAR upon which to base its conclusions pursuant to 10 CFR 50.57(a)(1) and (2).

Darl Hood

D. S. Hood, Project Manager
Licensing Branch No. 3
Division of Licensing

Enclosures:
As stated

cc: See next page

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Department of Public Health
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Ms. Barbara Stamiris
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Freeland, Michigan 48623

Ms. Sharon K. Warren
636 Hillcrest
Midland, Michigan 48640

ENCLOSURE 1

MEETING ATTENDEES

August 25, 1980

CPCo

J. Selby
S. Howell
J. Cook
J. Sullivan

NRC

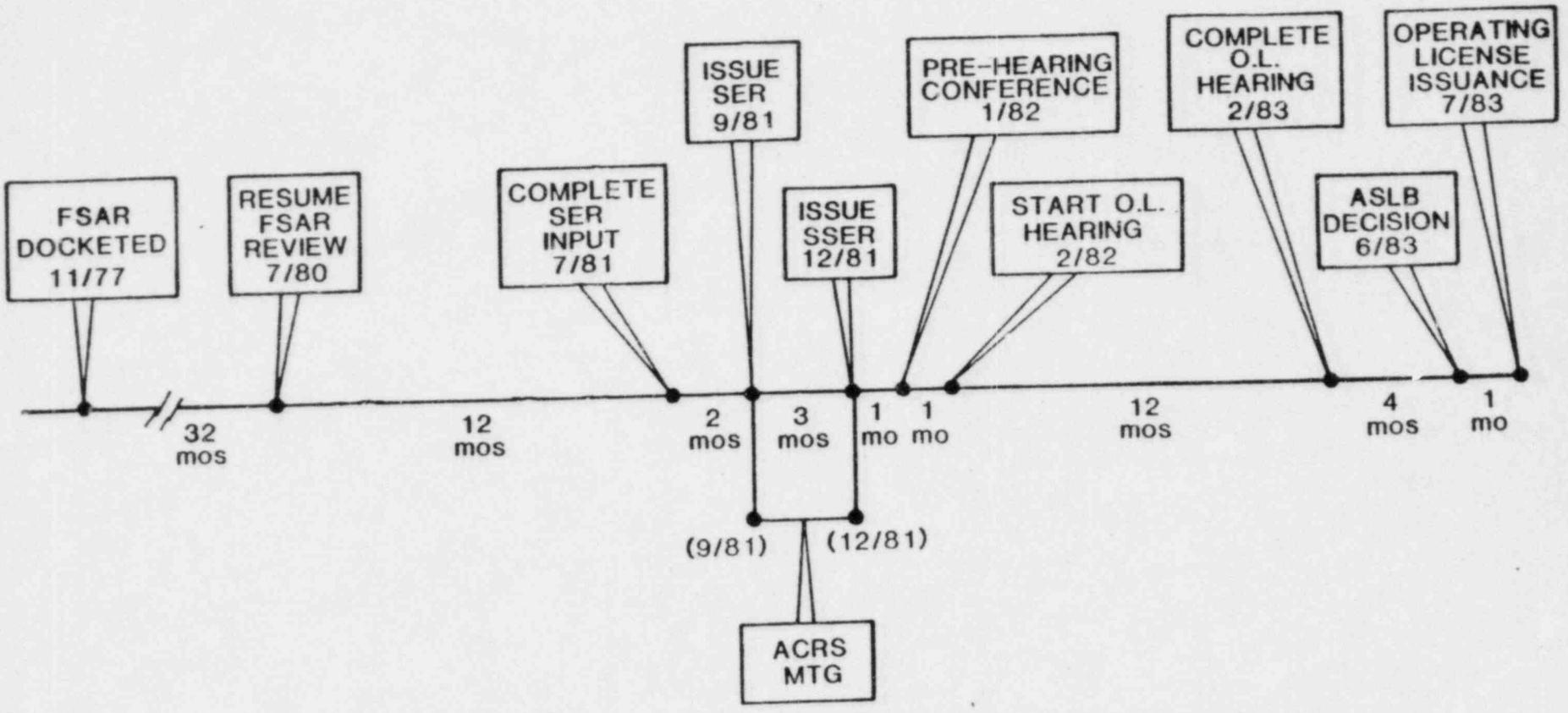
H. Denton
D. Eisenhut
R. Tedesco
A. Schwencer
D. Hood
W. Olmstead
B. Jones
W. Lovelace

ENCLOSURE 2

FIGURE 1.3-1

LICENSING SCHEDULE FOR THE MIDLAND NUCLEAR PLANT

(Proposed by Consumers Power Company)



RJL 8/15/80

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MEETING NOTICE DISTRIBUTION

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H. Denton
E. Case
D. Eisenhut
R. Purple
T. Novak
S. Varga
T. Ippolito
R. A. Clark
R. Reid
R. Tedesco
J. Youngblood
A. Schwencer
Chief, Licensing Branch #3
J. R. Miller
G. Lainas
D. Crutchfield
Chief, Systemic Evaluation Program Branch
Chief, Operating Reactors Assessment Branch
R. Vollmer
R. Bosnak
F. Schauer
R. E. Jackson
G. Lear
V. Noonan
S. Pawlicki
V. Benaroya
Z Rosztoczy
W. Haass
D. Muller
R. Ballard
W. Regan
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D. Ross
P. Check
R. Satterfield
O. Parr
W. Butler
W. Kreger
R. W. Houston
T. Murphy
W. Gammill
L. Rubenstein
T. Speis
Chief, Core Performance Branch
J. Stolz
S. Hanauer
P. Collins
D. Vassallo
D. Ziemann
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R. Schroeder
K. Kniel
D. Skovholt
G. Knighton
M. Ernst
R. Baer
C. Berlinger
S. Israel
ACRS (16)
Attorney, OELD
OIE (3)
OSD (7)
Project Manager - D. Hood
Licensing Assistant - J. Lee
Receptionist
TERA
J. LeDoux, I&E

I&E Headquarters
I&E Region I
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NRC Participants:
R. Vollmer
J. Knight
G. Lear
W. Paton
J. Kane
A. Schwencer
D. Hood

bcc: Applicant & Service List

AUG 12 1980

Docket Nos: 50-329
50-330

MEMORANDUM FOR: A. Schwencer, Acting Chief, Licensing Branch 3, Division of Licensing

FROM: Darl Hood, Project Manager, Licensing Branch 3, Division of Licensing

SUBJECT: NOTICE OF MEETING TO APPEAL STAFF POSITION REQUIRING ADDITIONAL EXPLORATIONS AND TESTING OF MIDLAND PLANT FILL

Date & Time: August 29, 1980
1:00 - 4:00 PM

Location: Midland Service Center
1100 S. Washington Street
Midland, Michigan

Purpose: To provide Consumer Power Company the opportunity to appeal to the NRC Division Director of Engineering a Staff position of June 30, 1980 requiring additional exploration and testing of soils at Midland Plant site.

Participants: 1/

NRC

2/R. Vollmer, Director, Division of Engineering
J. Knight, Asst. Director for Components & Structures Eng.
2/G. Lear, Chief, Hydrologic & Geotechnical Eng. Branch
W. Paton, OELD
J. Kane, Hydrologic & Geotechnical Engineering Branch
2/D. Hood, LB-3, Division of Licensing
2/A. Schwencer, Chief, Licensing Branch 3, Div. of Licensing
U.S. Army Corps of Engineers (NRC Consultant)

1/ The meeting is open to interested members of the public, petitioners, or other parties to attend as observers pursuant to enclosed NRC staff policy on open meetings.

2/ These individuals will also tour the plant site August 28, 1980, 1:00 - 4:00 P.M. Permission to enter construction site must be obtained in advance from Consumers Power Company

OFFICE ▶					
SURNAME ▶					
DATE ▶					

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Consumer Power Company

G. Keeley, J. Cook, et al

Bechtel

L. Curtis, et al

Darl Hood, Project Manager
Licensing Branch 3
Division of Licensing

Enclosures:
(1) Agenda
(2) Open Meeting Policy

cc: See next page

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OFFICE	LB-3:DL	LB-3:DL				
SURNAME	DHood/mcf	ASchwencer				
DATE	8/11/80	8/12/80				

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WASHINGTON, D. C. 20555

AUG 12 1980

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Consumer Power Company

G. Keeley, J. Cook, et al

Bechtel

L. Curtis, et al

Darl Hood

Darl Hood, Project Manager
Licensing Branch 3
Division of Licensing

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Agenda

I. Background

On December 6, 1969, the NRC issued an order modifying the construction permits held by Consumer Power Company (the applicant) for the Midland Plant. The Order prohibited certain soil construction activities pending the submission of an amendment to Consumer's application and the issuance of an amendment to the construction permits. In addition to other matters, the Order notes that several of the Staff's requests for information were directed to the determination and justification of acceptance criteria to be applied to various remedial measures taken and proposed by the applicant. The Order further notes that such criteria, coupled with the details of the remedial action, are necessary for the Staff to evaluate the technical adequacy and proper implementation of the proposed action. The applicant has requested a hearing as provided by the Order and the Board has scheduled a Special Prehearing Conference for September 10, 1980.

The issue of the appeal meeting, in general, is whether certain information which the Staff has requested is really necessary for the staff to evaluate the technical adequacy or proper implementation of the proposed action. The applicant estimates the cost of compliance with the staff request to be about an additional one million dollars.

II. Issues

1. Diesel Generator Building

In its review of the steps that the applicant proposed to take in order to determine the adequacy of the surcharge program which was proposed to consolidate the soils beneath and around the Diesel Generator Building, the staff asked on March 21, 1979 (Request 5) that the applicant describe to what extent additional borings and measurements would be taken after completion of the surcharge program to ascertain that the supporting material had been compacted to the original requirements in the PSAR. The applicant replied on April 2[illegible], 1979 that the preload is, in effect, a full scale load test and will yield load settlement relationships that are more reliable and representative of the foundation conditions than evaluations based on sampling and soil testing, and that additional explorations were unnecessary (see attached response).

On November 19, 1979, we advised the applicant (Request 35) that the reply to Question 5 was unacceptable and that we require that exploration, sampling and testing of soils samples be performed to determine the actual soils properties resulting from the preload program, including a determination of the relative compaction of the fill. The applicants reply (attached) reiterated with increased detail the reasons why the response to Question 5 is considered to be satisfactory.

A staff letter of June 30, 1980 provided several observations as to why the responses to Requests 5 and 35 were unacceptable and forwarded staff position 37 defining the minimum acceptable exploration and testing program. This was further amplified by our letter of August 4, 1980 forwarding a report by our consultant, the U.S. Army Corps of Engineers, and the Corps request for additional information (see renumbered request 40 therein regarding the Diesel Generator Building support).

This matter was discussed with the applicant, the Corps and the Geotechnical Branch during a meeting on July 31, 1980. No change in position resulted.

2. Other Structures, Components and Features

The Staff letters of June 30 and August 4, 1980 also called for additional exploration and testing of the soils for other structures, components and site features. The applicant's position during the July 31, 1980 meeting was that these data are not needed for structures proposed to be supported by piles or caissons because these would extend into the glacial till. The applicant also expressed a reluctance to conduct borings into the cooling pond dike based upon a concern that this might lead to hydraulic fracture or damage the dike slopes.

III. Future Actions

Subject to the findings of this appeal to the NRC Division Director of Engineering, the applicant has expressed a desire for further appeal to the Director of the Office of Nuclear Reactor Regulation.

Question 5

To what extent will additional borings and measurements be taken after completion of preloading programs to ascertain that the material has been compacted to the original requirements set forth in the PSAR?

Response

As mentioned in the response to Question 4, preloading to loads comparable to the weight of the structure supported by the fill will consolidate soft clay areas and improve and make more uniform the engineering properties of the fill. Furthermore, the preload is, in effect, a full scale load test and will yield load settlement relationships that are more reliable and representative of the foundation conditions than evaluations based on sampling and soil testing.

Because the preload will improve the engineering properties of clay fill and provide reliable, positive information on performance that applies to all of the preloaded fill, the data obtained can be used to predict residual settlements with confidence. The indirect procedure of evaluating the percent compaction at sample locations in borings and relating them to the whole body of fill under investigation is not as positive as the direct measurement of performance during preloading.

For the stated reasons, it is unnecessary to make additional explorations for the purpose of making comparison with the PSAR density criteria. It is planned to monitor the settlement of the structures during the life of the plant to provide a record of performance.

QUESTION 35

We infer from your response to Question 5 that additional exploration will not be performed after completion of the preloading program. This is unacceptable. We require that exploration, sampling and testing of soil samples be performed to determine the actual soil properties resulting from the preload program, including a determination of the relative compaction of the fill.

RESPONSE

General

We believe the response to Question 5 along with the supporting information referred to in Question 4 is satisfactory for the reasons discussed below.

The soil engineering properties pertinent to the design of fill-supported structures are those controlling the settlement behavior of the structures, the dynamic response of the structure during earthquake loading, and the ultimate bearing capacity of the supporting medium. The instrumentation during the preloading period permits a reliable prediction of the upper limit of settlement that can occur, and the shear wave velocity measurements made following preload permit the determination of dynamic response. Bearing capacity was evaluated based on laboratory shear strength tests. With the presence of a permanent dewatering system, liquefaction is not a consideration. The magnitude of seismic shakedown is treated in the response to Question 27. 5

Settlement

The preload and the dead load of the diesel generator building produced stresses in the fill that exceeded those stresses that will prevail when the structure is operational. Settlement estimates for the borated water storage tanks and the diesel oil tanks are discussed in the responses to Questions 31 and 33. A summary of these settlements, including seismic, dewatering and diesel engine vibration, is given in the response to Question 27.

The diesel generator building remained under preload conditions until the rate of residual settlement had become small and could be predicted conservatively for the lifetime of the plant by extrapolation. Therefore, it can be predicted with assurance that the actual rate of settlement will be less than the rate which would occur assuming the preload is in place. This provides a direct means for estimating an upper-bound settlement value for the structure. Because settlement

measurements are taken at different places in and around the structure, the preload also allows estimates of differential settlements to be made reliably. These procedures are direct and far more reliable than the extraction of samples to determine percent compaction or the performance of laboratory consolidation tests to compute settlement. Another benefit of preloading is that most of the settlements and differential settlements occur before the building is put into service. Therefore, connections to the building will be made after most of the differential settlement has already taken place.

Dynamic Response

The dynamic response of a structure is evaluated using analytical procedures normally requiring an estimate of the dynamic shear modulus of the supporting medium. The shear modulus can be calculated from in-situ shear wave velocity tests using the cross-hole procedure. Rebound measurements obtained during preload removal will also provide additional evaluation of the dynamic stiffness values. This is possible because of the short duration involved in preload removal and the limited strain associated with unloading. Both of these procedures were implemented for the diesel generator building. The rebound data showed the building short-term rebound was in the range of 0.16 to 0.24 inch. These data were used to calculate the values of Young's modulus, shear modulus, and the corresponding shear wave velocity as given in Table 35-1. Cross-hole shear wave velocity measurements were also made at the diesel generator building and other locations in the plant area fill as shown in Figure 35-1. Figure 35-2 is a combined plot showing results of the shear wave velocity measurements conducted at different locations in the plant area fill along with the estimated shear wave velocity values based on the diesel generator building rebound measurements. This figure also shows that the shear wave velocity data based on cross-hole tests are generally higher than those calculated based on rebound, as might be expected, because a portion of the building rebound is attributed to rebound of the natural soil below the fill. Such a rebound below the fill would result in an increase in the calculated moduli and velocities for the fill.

Bearing Capacity

The engineering property pertinent to bearing capacity calculations is the shear strength of the soil. Consolidated undrained triaxial shear strength tests were conducted on samples of plant area clay fill (transformer, condensate tanks, borated water tanks) taken during the 1978 exploration program.

Figure 35-3 is a plot of undrained shear strength versus confining pressure from these tests. Based on undrained shear strength from the normally consolidated envelope, the ultimate bearing capacity was calculated to be approximately 13.6 ksf. This gives a factor of safety of 3 for dead and live loads and greater than 2 for dead, live, plus seismic loads.

Summary

As stated in the response to Question 4, the compaction requirements set forth in the PSAR were based on the premise that the significant engineering properties are related to the degree of compaction. Where the engineering properties can be established by other more direct means, the degree of compaction no longer becomes the controlling criteria. 5

The significant engineering properties associated with the plant area fill at Midland are determined from the results of full-scale tests for settlement predictions, in-situ measurements for dynamic response evaluations, and laboratory shear strength tests for bearing capacity calculations. Because the procedures adopted provide a reliable means of predicting the required engineering design parameters, additional drilling, sampling, and testing would not provide better data to refine predictions.

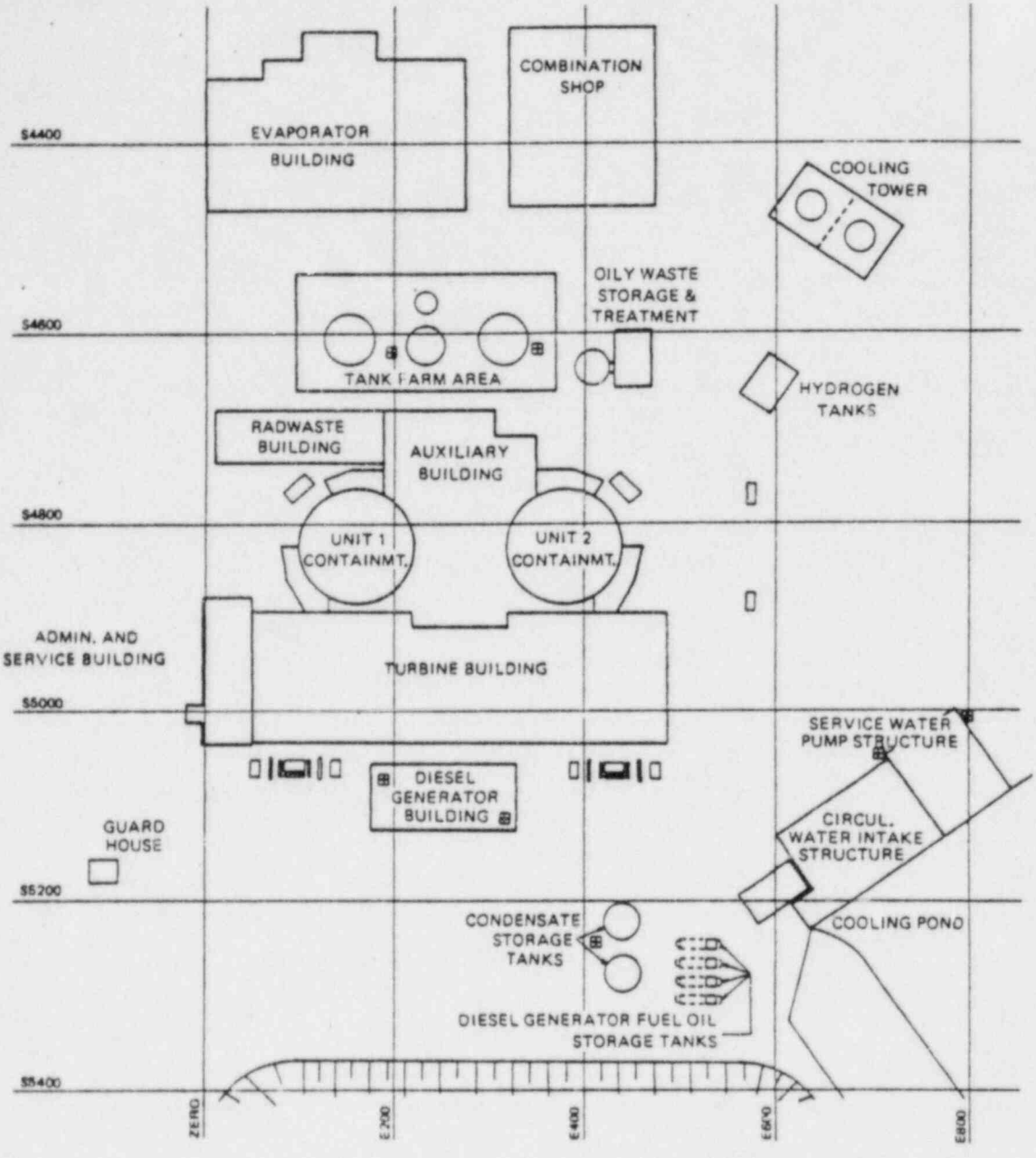
TABLE 35-1

YOUNG'S MODULUS, SHEAR MODULUS, AND SHEAR WAVE VELOCITIES BASED ON OBSERVED REBOUND DATA OF THE DEISEL GENERATOR BUILDING

Borros Anchors	Building Rebound (inch)	Strain*	Young's Modulus E (ksf)	Shear Modulus** G (ksf)	Shear Wave Velocity** V (ft/s)
BA-61	0.24	0.00071	3,080	1,060-1,140	530-550
BA-62	0.16	0.00048	4,620	1,590-1,710	650-680
BA-63	0.24	0.00071	3,080	1,060-1,140	530-550
BA-64	0.18	0.00054	4,107	1,420-1,520	620-640

5

*Assumes that all strains took place in the fill from elevation 628' to 600'.
**Computed ranges are based on Poisson's ratio between 0.35 and 0.45.



LEGEND:

⊞ CROSS HOLE SHEAR WAVE VELOCITY TESTS

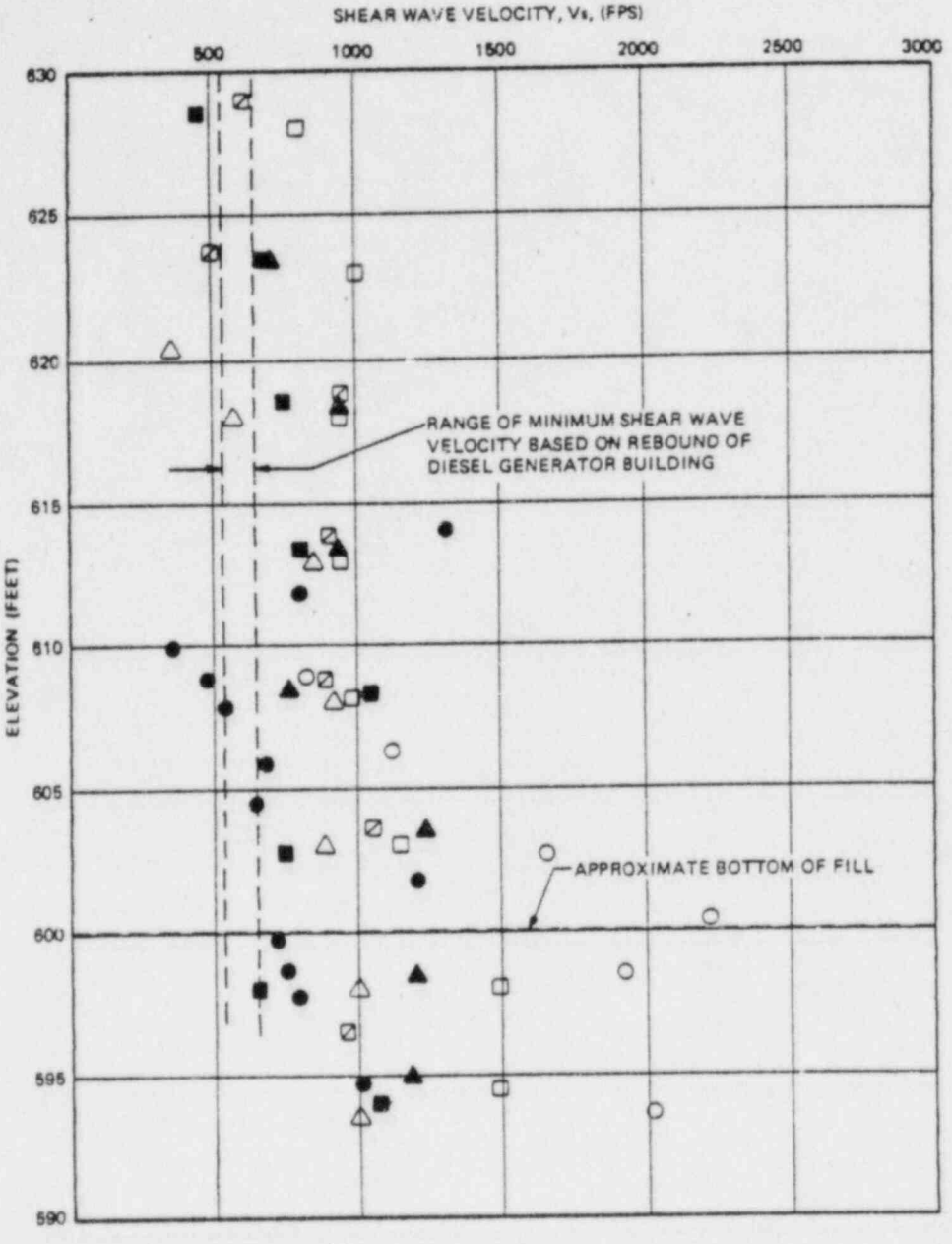
0 50 100 150 200
SCALE IN FEET

CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2

Cross Hole Test Locations

Figure 35-1

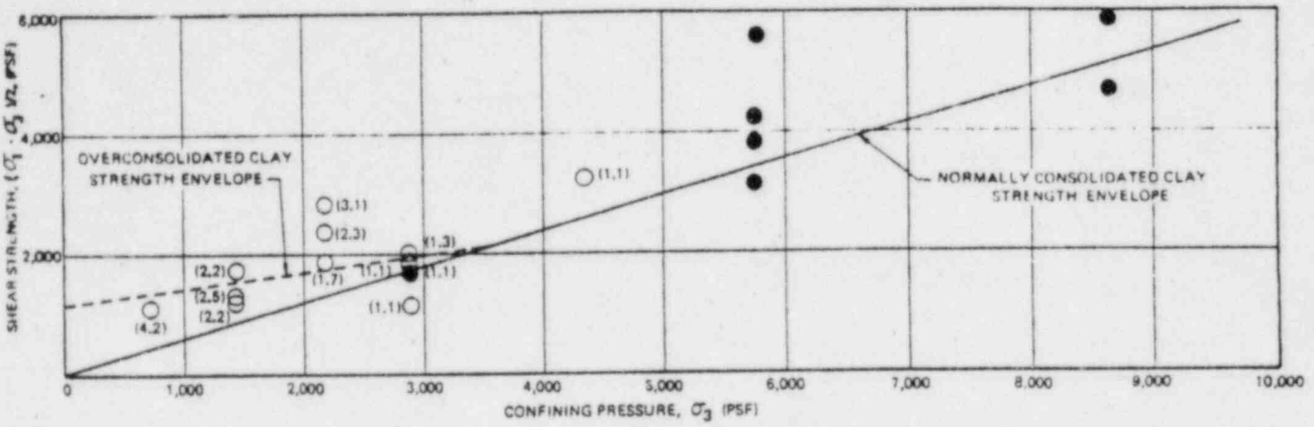
2/80 Revision 5



CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2

Shear Wave Velocity Profile
Plant Area Fill

Figure 35-2



LEGEND

● NORMALLY CONSOLIDATED SOIL SAMPLES

(2.5)○ OVERCONSOLIDATED SOIL SAMPLES
↑ OVER CONSOLIDATION RATIO (OCR)

NOTE:

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS ON PLANT AREA FILL

CONSUMERS POWER COMPANY MIDLAND PLANT UNITS 1 & 2
Confining Pressure vs Shear Strength
Figure 35-3

43 FR 28058
Published 6/28/78

DOMESTIC LICENSE APPLICATIONS

Open Meetings and Statement of NRC Staff Policy

The Nuclear Regulatory Commission's (NRC's) regulations in 10 CFR 2.102 permit applicants to confer informally with the NRC technical staff during reviews of domestic license or permit applications. These meetings have served as an essential means for the exchange of technical information and views necessary for the technical review of applications. For several years other parties or potential parties to domestic licensing proceedings, as well as members of the general public, have, upon request, been permitted to attend applicant-NRC technical staff meetings as observers. However, the Commission's regulations do not require that others be permitted to attend such informal meetings between applicant and staff, and the general practice being followed in this regard has never been formally articulated. This statement is intended to provide such articulation. It is also noted that this matter is related to the provision for increased public participation which was approved by the Commission during its consideration of NUREG 0292 (Denton Report).

As a general matter, the Commission and staff try to involve concerned citizens in any Commission activity in which they have expressed an interest. All meetings conducted by the NRC technical staff as part of its review of a particular domestic license or permit application (including an application for an amendment to a license or permit) will be open to attendance by all parties or petitioners for leave to intervene in the case. These meetings are intended by the NRC technical staff to facilitate an exchange of information between the applicant and the staff. It is expected that the NRC technical staff and the applicant will actively participate in the meeting. Others may attend as observers. Likewise, when meetings are scheduled between the staff and other parties or petitioners, applicants would be permitted to attend only as observers.

The general policy of open meetings described above will admit of only a few exceptions, which must be approved by the Director of the relevant division. For example, some persons may not be permitted to attend meetings where classified or proprietary information (including sensitive safeguards information) is to be discussed. The NRC staff will prepare a written summary of the unclassified and non-proprietary portions of such meetings and forward the summary to interested persons unable to attend so that they will be informed of what transpired at the meeting. However, attendance will not be limited solely because preliminary opinions, recommendations, or advice will be offered on the merits of the applications during the meeting.

When a party or petitioner for leave to intervene requests, reasonable efforts will be made by the NRC staff to inform the party or petitioner of forthcoming meetings conducted by the NRC technical staff so that appropriate arrangements for attendance can be made. It is recognized that in some cases the need for a prompt meeting may make it impossible or impracticable to notify all parties and petitioners. The policy described above also cannot practicably be applied to chance encounters between NRC technical staff personnel and other parties or petitioners but such chance encounters will not be permitted to serve as a source of information for the conduct of licensing reviews.

43 FR 38954
Published 8/31/78

STATEMENT ON STANDARDIZATION OF NUCLEAR POWER PLANTS

The initial statement of the Atomic Energy Commission (AEC) on standardization of nuclear power plants was issued in April 1972. In March 1973 the AEC announced the staff's readiness to implement the standardization policy utilizing three distinct concepts; namely, the manufacturing license concept, the duplicate plant concept, and the reference system concept. In August 1974, the AEC announced that the replicate plant concept would be acceptable as a transitional step toward standardization. The AEC was abolished and its regulatory responsibilities assigned to the newly formed Nuclear Regulatory Commission (the Commission) on January 19, 1975. On June 29, 1977, the Commission issued a statement that reaffirmed its support of standardization and requested comments and suggestions on proposed new guidance developed by the staff and on other steps that the Commission might undertake to further encourage standardization. The statement, which was published in the FEDERAL REGISTER on July 5, 1977, also noted staff plans to use such comments and suggestions in its continuing study of standardization.

On the basis of its study, the staff has concluded that certain changes to the Commission's standardization program should be implemented, and that these changes can be implemented within existing regulations. The staff has further concluded that the program, as changed, will continue to allow applicants to utilize a variety of design options in ways that can avoid the development of significant adverse antitrust consequences. The Commission continues to recognize its responsibility to provide a standardization program that can be used effectively without contributing to such concerns. The standardization program has been guided by this principle from its inception and it is our intent that it should continue. The staff discussed the revised standardization program with the Department of Justice. While the Department of Justice did not conduct an independent evaluation, which in its opinion would be unnecessarily duplicative, it did review the results of the staff's efforts. That review did not identify any antitrust concerns inherent in the revised standardization program beyond those perceived by the staff. However, the potential exists that improper utilization of the standardization program by applicants might lead to these antitrust concerns. Accordingly, the staff will monitor the standardization program to assure that each applicant properly considers antitrust matters in developing and using standard designs. The staff will take appropriate action if it determines the development of a situation that appears to have the potential for creating problems of an antitrust nature.

The staff has prepared a report on its study; the report provides a summary of the information used in the study, presents the public comments received in response to the Commission's prior statement, and presents the staff's assessment of this information in support of its conclusions and recommendations. The Commission has reviewed these recommendations with the staff. The specific actions to be taken by the staff are described in the following discussion.

REFERENCE SYSTEM CONCEPT

The reference system concept involves the approval of a standard design for most of a nuclear plant or a major fraction of a nuclear plant outside of the context of an application for a construction permit or operating license. Approval by the staff is granted to a designer in the form of a preliminary design approval (PDA) or a final design approval (FDA). Two preliminary design approvals have been issued to date and 5 of the approved designs have been referenced in 11 construction permit applications. Staff approvals of such designs do not constitute Commission approval. Each utility application referencing a PDA must be subjected to a public hearing process prior to the award of a construction permit. No application for an FDA has yet been received. The Commission's policy statement of June 29, 1977, described two types of final design approvals then being considered by the staff; one was an FDA which could be referenced only in operating license applications for plants whose construction permit applications referenced the corresponding PDA, and the other was an FDA which could be referenced in applications for construction permits or combined construction permits and final design approvals for purposes of issuance of operating licenses.

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AUG 4 1980

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Docket Nos.: 50-329/330

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. Cook:

SUBJECT: CORP OF ENGINEERS REPORT AND REQUEST FOR ADDITIONAL INFORMATION ON PLANT FILL

My letter of June 30, 1980 requested the results of additional explorations and laboratory testing needed to support certain geotechnical engineering studies on the Midland plant fill and associated remedial actions. That letter noted that details on the extent of these studies would be provided be separate correspondence. Enclosure 1 is a letter report of July 7, 1980 by our consultant, the U.S. Army Corps of Engineers, and is forwarded to this end.

Paragraph 4 of the Corps report identifies additional information needed to resolve specific problems identified in paragraph 3. For purposes of control, we have re-numbered the subparagraphs of paragraph 4 to be sequential with our prior requests on this matter. They have also been marked to reflect the results of NRR review. Your reply should reference the revised numbering system and should address the requests as marked to reflect our changes.

Subparagraph 4j of the Corps report entitled Liquefaction Potential, is not included in our re-numbering since it represents an evaluation rather than a request. We consider this evaluation to be tentative at this time since it is subject to the determination of suitable seismic design input for the site. We will address this matter shortly by separate correspondence.

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OFFICE ▶
SURNAME ▶
DATE ▶

NRC FORM 318 (9-76) NRCM 0240 ☆U.S. GOVERNMENT PRINTING OFFICE: 1979-289-369

We would appreciate your reply at your earliest opportunity. Should you need clarification of these requests for additional information, please contact us.

Sincerely,

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
COE Letter Report
dated 7/7/80

cc: See next page

OFFICE ▶	DL:LB #3	DL:LB #3
SURNAME ▶	DSHood:mec DSH	ASchwencer
DATE ▶	8/ 4 /80	8/ 4 /80

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 4 1980

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Mr. J. W. Cook
Vice President
Consumers Power Company
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Sincerely,

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
COE Letter Report
dated 7/7/80

cc: See next page

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DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

ENCLOSURE 1

REPLY TO ATTENTION OF
NCEED-T

7 JUL 1980

SUBJECT: Interagency Agreement No. NRC-03-79-167, Task No. 1 - Midland Plant Units 1 and 2, Subtask No. 1 - Letter Report

THRU: Division Engineer, North Central
ATTN: NCDED-G (James Simpson)

TO: U.S. Nuclear Regulatory Commission
ATTN: Dr. Robert E. Jackson
Division of Systems Safety
Mail Stop P-314
Washington, D. C. 20555

1. The Detroit District hereby submits this letter report with regard to completion of subtask No. 1 of the subject Interagency Agreement concerning the Midland Nuclear Plant, Units 1 and 2. The purpose of this report is to identify unresolved issues and make recommendations on a course of action and/or cite additional information necessary to settle these matters prior to preparation of the Safety Evaluation Report.

2. The Detroit District's team providing geotechnical engineering support to the NRC to date has made a review of furnished documents concerning foundations for structures, has jointly participated in briefing meetings with the NRC staff, Consumer Power Company (the applicant) and personnel from North Central Division of the Corps of Engineers and has made detailed site inspections. The data reviewed includes all documents received through Amendment 78 to the operating license request, Revision 28 of the FSAR, Revision 7 to the 10 CFR 50.54(f) requests and MCAR No. 24 through Interim Report No. 8. Generally, each structure within the complex was studied as a separate entity.

3. A listing of specific problems in review of Midland Units 1 and 2 follows for Category I structures. The issues are unresolved in many instances, because of inadequate or missing information. The structures to be addressed follow the description of the problem.

a. Inadequate presentation of subsurface information from completed borings on meaningful profiles and sectional views. All structures.

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b. Discrepancies between soil descriptions and classifications on boring logs with submitted laboratory test results summaries. Examples of such discrepancies are found in boring T-14 (Borated water tank) which shows stiff to very stiff clay where laboratory tests indicate soft clay with shear strength of only 500 p.s.f. The log of boring T-15 shows stiff, silty clay, while the lab tests show soft, clayey sand with shear strength of 120 p.s.f. All structures.

c. Lack of discussion about the criteria used to select soil samples for lab testing. Also, identification of the basis for selecting specific values for the various parameters used in foundation design from the lab test results. All structures.

d. The inability to completely identify the soil behavior from lab testing (prior to design and construction) of individual samples, because in general, only final test values in summary form have been provided. All structures.

(1) Lack of site specific information in estimating allowable bearing pressures. Only textbook type information has been provided. If necessary, bearing capacity should be revised based on latest soils data. All structures on, or partially on, fill.

(2) Additional information is needed to indicate the design methods used, design assumptions and computations in estimating settlement for safety related structures and systems. All structures except Diesel Generator Building where surcharging was performed.

e. A complete detailed presentation of foundation design regarding remedial measures for structures undergoing distress is required. Areas of remedial measures except Diesel Generator Building.

f. There are inconsistencies in presentation of seismic design information as affected by changes due to poor compaction of plant fill. Response to NRC question 35 (10 CFR 50.54f) indicates that the lower bound of shear wave velocity is 500 feet per second. We understand that the same velocity will be used to analyze the dynamic response of structures built on fill. However, from information provided by the applicant at the site meeting on 27 and 28 February 1980, it was stated that, except for the Diesel Generator Building, higher shear wave velocities are being used to re-evaluate the dynamic response of the structures on fill material. Structures on fill or partially on fill except Diesel Generator Building.

4. A listing of specific issues and information necessary to resolve them.

39. a. Reactor Building Foundation

(1) Settlement/Consolidation. Basis for settlement/consolidation of the reactor foundation as discussed in the FSAR assumes the plant site would

not be dewatered. Discuss and furnish computation for settlement of the Reactor Buildings in respect to the changed water table level as the result of site dewatering. Include the effects of bouyancy, which were used in previous calculations, and fluctuations in water table which could happen if the dewatering system became inoperable.

(2) Bearing Capacity. Bearing capacity compucations should be provided and should include method used, foundation design, design assumptions, adopted soil properties, and basis for selecting ultimate bearing capacity and resulting factor of safety.

40.f. Diesel Generator Building.

(1) Settlement/Consolidation. In the response to NRC Question 4 and 27, (10 CFR 50.54f), the applicant has furnished the results of his computed settlements due to various kinds of loading conditions. From his explanation of the results, it appears that compressibility parameters obtained by the preload tests have been used to compute the static settlements. Information pertaining to dynamic response including the amplitude of vibration of generator pedestals have also been furnished. The observed settlement pattern of the Diesel Generator Building indicates a direct correlation with soil types and properties within the backfill material. To verify the preload test settlement predictions, compute settlements based on test results on samples from new borings which we have requested in a separate memo and present the results. Reduced ground water levels resulting from dewatering and diesel plus seismic vibration should be considered in settlement and seismic analysis. Furnish the computation details for evaluating amplitude of vibration for diesel generator pedestals including magnitude of exciting forces, whether they are constant or frequency dependent.

(2) Bearing Capacity. Applicant's response to NRC Question 35 (10 CFR 50.54f) relative to bearing capacity of soil is not satisfactory. Figure 35-3, which has been the basis of selection of shear strength for computing bearing capacity does not reflect the characteristics of the soils under the Diesel Generator Building. A bearing capacity computation should be submitted based on the test results of samples from new borings which we have requested in a separate memo. This information should include method used, foundation design assumptions, adopted soil properties and basis for selection, ultimate bearing capacity and resulting factor of safety.

(3) Preload Effectiveness. The effectiveness of the preload should be studied with regard to the moisture content of the fill at the time of preloading. The height of the water table, its time duration at this level, and whether the plant fill was placed wet or dry of optimum would be all important considerations.

NCEED-T
SUBJECT: Interagency Agreement No. NRC-03-79-167, Task No. 1 - Midland Plant Units 1 and 2, Subtask No. 1 - Letter Report

(a) Granular Soils.

When sufficient load is applied to granular soils it usually causes a reorientation of grains and movement of particles into more stable positions plus (at high stresses) fracturing of particles at their points of contact. Reorientation and breakage creates a chain reaction among these and adjacent particles resulting in settlement. Reorientation is resisted by friction between particles. Capillary tension would tend to increase this friction. A moisture increase causing saturation, such as a rise in the water table as occurred here, would decrease capillary tension resulting in more compaction. Present a discussion on the water table and capillary water effect on the granular portion of the plant fill both above and below the water table during and after the preload.

(b) Impervious and/or Clay Soils.

Clay fill placed dry of optimum would not compact and voids could exist between particles and/or chunks. In this situation SPT blow counts would give misleading information as to strength. Discuss the raising of the water table and determine if the time of saturation was long enough to saturate possible clay lumps so that the consolidation could take place that would preclude further settlement.

Discuss the preload effect on clay soils lying above the water table (7 feet ±) that were possibly compacted dry of optimum. It would appear only limited consolidation from the preload could take place in this situation and the potential for further settlement would exist.

Discuss the effect of the preload on clays placed wet of optimum. It would appear consolidation along with a gain in strength would take place. Determine if the new soil strength is adequate for bearing capacity.

Conclusion: Since the reliability of existing fill and compaction information is uncertain, additional borings and tests to determine void ratio (granular soils) relative density, moisture content, density, consolidation properties and strength (triaxial tests) would appear to be desirable in order to satisfactorily answer the above questions. Borings should be continuous push with undisturbed cohesive soil samples taken.

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(4) Miscellaneous. A contour map, showing the settlement configuration of the Diesel Generator Building, furnished by the applicant at the meeting of 27 and 28 February 1980 indicates that the base of the building has warped due to differential settlements. Additional stresses will be induced in the various components of the structure. The applicant should evaluate these stresses due to the differential settlement and furnish the computations and results for review.

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41. f. Service Water Building Foundation.

(1) Bearing Capacity. A detailed pile design based upon pertinent soil data should be developed in order to more effectively evaluate the proposed pile support system prior to load testing of test piles. Provide adopted soil properties, reference to test data on which they are based, and method and assumptions used to estimate pile design capacity including computations. Provide estimated maximum static and dynamic loads to be imposed and individual contribution (DL, LL, OBE, SSE) on the maximum loaded pile. Provide factor of safety against soil failure due to maximum pile load.

(2) Settlements.

(a) Discuss and provide analysis evaluating possible differential settlement that could occur between the pile supported end and the portion placed on fill and glacial till. Describe the impact of failure on safety related features (e.g., diesel fuel oil storage tanks) behind or near the wall.

(b) ~~Present~~ Discuss and why the retaining wall adjacent to the intake structure is not required to be a Seismic Category I structure. Evaluate the observed settlement of both the service water pumphouse retaining walls and the intake structure retaining wall and the significance of the settlement including future settlement prediction on the safe operation of the Midland Nuclear Plant. This evaluation should address actual stresses induced by the settlement against allowable stresses permitted by approved codes.

(3) Seismic Analysis. Provided the proposed 100 ton ultimate pile load capacities are achieved and reasonable margin of safety is available, the vertical pile support proposed for the overhang section of the Service Water Pump Structure will provide the support necessary for the structure under combined static and seismic inertial loadings even if the soil under the overhang portion of the structure should liquefy. There is no reason to think this won't be achieved at this time, and the applicant has committed to a load test to demonstrate the pile capacity. The dynamic response of the structure, including the inertial loads for which the structure itself is designed and the mechanical equipment contained therein, would change as a result of the introduction of the piles. Therefore:

(a) Please summarize or provide copies of reports on the dynamic analysis of the structure in its old and proposed configuration. For the latter, provide detailed information on the stiffness assigned to the piles and the way in which the stiffnesses were obtained and show the largest change in interior floor vertical response spectra resulting from the proposed modification. If the proposed configuration has not yet been analyzed, describe the analyses that are to be performed giving particular attention to the basis for calculation or selection, of and the range of numerical stiffness values assigned to the vertical piles.

(b) Provide after completion of the new pile foundation, in accordance with commitment No. 6, item 125, Consumers Power Company memorandum

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dated 13 March 1980, the results of measurements of vertical applied load and absolute pile head vertical deformation which will be made when the structural load is jacked on the piles so that the pile stiffness can be determined and compared to that used in the dynamic analysis.

42. k. Auxiliary Building Electrical Penetration Areas and Feedwater Isolation Valve Pits.

(1) Settlement. Provide the assumptions, method, computation and estimate of expected allowable lateral and vertical deflections under static and seismic loadings.

(2) Provide the construction plans, and specifications for underpinning operations beneath the Electrical Penetration Area and Feedwater Valve Pit. The requested information to be submitted should cover the following in sufficient details for evaluation:

(a) Details of the temporary dewatering system (locations, depth, size and capacity of wells) including the monitoring program to be required, (for example, measuring drawdown, flow, frequency of observations, etc.) to evaluate the performance and adequacy of the installed system.

(b) Location, sectional views and dimensions of access shaft and drift to and below auxiliary building wings.

(c) Details of temporary surface support system for the valve pits.

~~(d)~~ Dewatering before underpinning is recommended in order to preclude differential settlement between pile and soil supported elements and negative drag forces.

(d) Provide adopted soil properties, method and assumptions used to estimate caisson and/or pile design capacities, and computational results. Provide estimated maximum static and dynamic load (compression, uplift and lateral) to be imposed and the individual contribution (DL, LL, OBE, SSE) on maximum loaded caisson and/or pile. Provide factor of safety against soil failure due to maximum pile load.

(e) Discuss and furnish computations for settlement of the portion of the Auxiliary Building (valve pits, and electrical penetration area) in respect to changed water level as a result of the site dewatering. Include the effect of bouyancy, which was used in previous calculations, and fluctuations in water table which could happen, if dewatering system becomes inoperable.

(f) Discuss protection measures to be required against corrosion, if piling is selected.

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(g) Identify specific information, data and method of presentation to be submitted for regulatory review at completion of underpinning operation. This report should summarize construction activities, field inspection records, results of field load tests on caissons and piles and an evaluation of the completed fix for assuring the stable foundation.

43. Borated Water Tanks.

(1) Settlement. The settlement estimate for the Borated Water Storage Tanks furnished by the applicant in response to NRC Question 31 (10 CFR 50.54f) is based upon the results of two plate load tests conducted at the foundation elevation (EL 627.00±) of the tanks. Since a plate load test is not effective in providing information regarding the soil beyond a depth more than twice the diameter of the bearing plate used in the test, the estimate of the settlement furnished by the applicant does not include the contribution of the soft clay layers located at depth more than 5' below the bottom of the tanks (see Boring No. T-14 and T-15, and T-22 thru T-26).

(a) Compute settlements which include contribution of all the soil layers influenced by the total load on the tanks. Discuss and provide for review the analysis evaluating differential settlement that could occur between the ring (foundations) and the center of the tanks.

(b) The bottom of the borated tanks being flexible could warp under differential settlement. Evaluate what additional stresses could be induced in the ring beams, tank walls, and tank bottoms, because of the settlement, and compare with allowable stresses. Furnish the computations on stresses including method, assumptions and adopted soil properties in the analysis.

(2) Bearing Capacity. Laboratory test results on samples from boring T-15 show a soft stratum of soil below the tank bottom. Consideration has not been given to using these test results to evaluate bearing capacity information furnished by the applicant in response to NRC Question 35 (10 CFR 50.54f). Provide bearing capacity computations based on the test results of the samples from relevant borings. This information should include method used, foundation design assumptions, adopted soil properties, ultimate bearing capacity and resulting factor of safety for the static and the seismic loads.

44. Underground Diesel Fuel Tank Foundation Design

(1) Bearing capacity. Provide bearing capacity computation based on the test results of samples from relevant borings, including method used, foundation design assumptions, adopted soil properties, ultimate bearing capacity and the resulting factor of safety.

(2) Provide tank settlement analysis due to static and dynamic loads including methods, assumptions made, etc.

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(3) What will be effects of uplift pressure on the stability of the tanks and the associated piping system if the dewatering system becomes inoperable?

45. Underground Utilities:

(1) Settlement

(a) Inspect the interior of water circulation piping with video cameras and sensing devices to show pipe cross section, possible areas of crackings and openings, and slopes of piping following consolidation of the plant fill beneath the imposed surcharge loading.

(b) The applicant has stated in his response to NRC Question 7 (10 CFR 50.54f) that if the duct banks remain intact after the preload program has been completed, they will be able to withstand all future operating loads. Provide the results of the observations made, during the preload test, to determine the stability of the duct banks, with your discussion regarding their reliability to perform their design functions.

(c) The response to Question 17 of "Responses to NRC Requests Regarding Plant Fill" states that "there is no reason to believe that the stresses in Seismic Category I piping systems will ever approach the Code allowable." We question the above statement based on the following:

Profile 26" - OHBC-54 on Fig. 19-1 shows a sudden drop of approx. 0.2 feet within a distance of only 20 feet. Using the procedure on p. 17-2,

$$\sigma_b = E(e) = E\left(\frac{D}{2R}\right) = E\,\frac{D}{2}\,\frac{8\delta}{L^2}$$

$$\sigma_b = 30000\ \frac{26}{2}\left[\frac{8(0.2)(12)}{(20\times12)^2}\right] = 130.0\ \text{KSI}$$

as allowable

~~Furthermore, the Eq. 19(a) of Article NC-3652.3, Sec. III, Division 1, of the ASME Code requires that some stress intensification factor "i" be assigned to all computed settlement stresses.~~ Yet, Table 17-2 lists only 52.5 KSI stress for this pipe. This matter requires further review. Please respond to this apparent discrepancy and also specify the location of each computed settlement stress at the pipeline stationing shown on the profiles. More than one critical stress location is possible along the same pipeline.

(d) During the site visit on 19 February 1980, we observed three instances of what appeared to be degradation of rattlespace at penetrations of Category I piping through concrete walls as follows:

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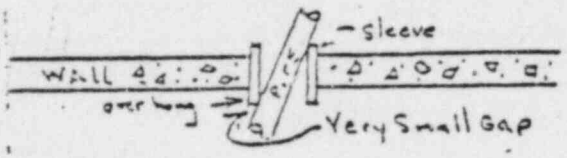
West Borated Water Tank - in the valve pit attached to the base of the structure, a large diameter steel pipe extended through a steel sleeve placed in the wall. Because the sleeve was not cut flush with the wall, clearance between the sleeve and the pipe was very small.



Service Water Structure - Two of the service water pipes penetrating the northwest wall of the service water structure had settled differentially with respect to the structure and were resting on slightly squashed short pieces of 2 x 4 placed in the bottom of the penetration. From the inclination of the pipe, there is a suggestion that the portions of the pipe further back in the wall opening (which was not visible) were actually bearing on the invert of the opening. The bottom surface of one of the steel pipes had small surface irregularities around the edges of the area in contact with the 2 x 4. Whether these irregularities are normal manufacturing irregularities or the result of concentration of load on this temporary support caused by the settlement of the fill, was not known.

These instances are sufficient to warrant an examination of those penetrations where Category I pipe derives support from plant fill on one or both sides of a penetration. In view of the above facts, the following information is required.

(1) What is the minimum seismic rattlespace required between a Category I pipe and the sleeve through which it penetrates a wall?

(2) Identify all those locations where a Category I pipe deriving support from plant fill penetrates an exterior concrete wall. Determine and report the vertical and horizontal rattlespace presently available and the minimum required at each location and describe remedial actions planned as a result of conditions uncovered in the inspection. It is anticipated that the answer to Question (1) can be obtained without any significant additional excavation. If this is not the case, the decision regarding the necessity to obtain information at those locations requiring major excavation should be deferred until the data from the other locations have been examined.

(e) Provide details (thickness, type of material etc.) of bedding or cradle placed beneath safety related piping. conduits, and supporting structures. Provide profiles along piping, and conduits alignments showing the properties of all supporting materials to be adopted in the analysis of pipe stresses caused by settlement.

(f) The two reinforced concrete return pipes which exit the Service Water Pump Structure, run along either side of the emergency cooling water reservoir, and ultimately enter into the reservoir, are necessary for safe shutdown. These pipes are buried within or near the crest of Category I slopes that form the sides of the emergency cooling water reservoir. There is no report on, or analysis of, the seismic stability of post earthquake residual displacement for these slopes. While the limited data from this area do not raise the specter of any problem, for an important element of the plant such as this, the earthquake stability should be examined by state-of-the-art methods. Therefore, provide results of the seismic analysis of the slopes leading to an estimate of the permanent deformation of the pipes. Please provide the following: (1) a plan showing the pipe location with respect to other nearby structures, slopes of the reservoir and the coordinate system; (2) cross-sections showing the pipes, normal pool levels, slopes, subsurface conditions as interpreted from borings and/or logs of excavations at (a) a location parallel to and about 50 ft from the southeast outside wall of the service water pipe structure and (b) a location where the cross section will include both discharge structures. Actual boring logs should be shown on the profiles; their offset from the profile noted, and soils should be described using the Unified Soil Classification System; (3) discussion of available shear strength data and choice of strengths used in stability analysis; (4) determination of static factor or safety, critical earthquake acceleration, and location of critical circle; (5) calculation of residual movement by the method presented by Newmark (1965) or Makdisi and Seed (1978); and (6) a determination of whether or not the pipes can function properly after such movements.

46.X. Cooling Pond.

(1) Emergency Cooling Pond. In recognition that the type of embankment fill and the compaction control used to construct the retention dikes for the cooling pond were the same as for the problem plant fill, we request reasonable assurance that the slopes of the Category I Emergency Cooling Pond (baffle dike and main dike) are stable under both static and dynamic loadings. We request a revised stability analysis for review, which will include identification of locations analyzed, adopted foundation and embankment conditions (stratification, seepage, etc.) and basis for selection, adopted soil properties, method of stability analysis used and resulting factor of safety with identification of sliding surfaces analyzed. Please address any potential impact on Category I pipes near the slopes, based on the results of this stability study. Recommendations for location of new exploration and testing have been provided in a separate letter.

(2) Operating Cooling Pond. A high level of safety should be required for the remaining slopes of the Operating Cooling Pond unless it can be assured that a failure will not: (a) endanger public health and properties, (b) result in an assault on environment, (c) impair needed emergency access. Recommendations for locations of new borings and laboratory tests have been submitted in a separate letter. These recommendations were made on the assumptions that the stability of the operating cooling pond dikes should be demonstrated.

47. Site Dewatering Adequacy.

(1) In order to provide the necessary assurance of safety against liquefaction, it is necessary to demonstrate that the water will not rise above elevation 610 during normal operations or during a shutdown process. The applicant has decided to accomplish this by pumping from wells at the site. In the event of a failure, partial failure, or degradation of the dewatering system (and its backup system) caused by the earthquake or any other event such as equipment breakdown, the water levels will begin to rise. Depending on the answer to Question (a) below concerning the normal operating water levels in the immediate vicinity of Category I structures and pipelines founded on plant fill, different amounts of time are available to accomplish repair or shutdown. In response to Question 24 (10 CFR 50.54f) the applicant states "the operating groundwater level will be approximately el 595 ft" (page 24-1). On page 24-1 the applicant also states "Therefore el 610' is to be used in the designs of the dewatering system as the maximum permissible groundwater level elevation under SSE conditions." On page 24-15 it is stated that "The wells will fully penetrate the backfill sands and underlying natural sands in this area." The bottom of the natural sands is indicated to vary from elevation 605 to 580 within the plant fill area according to Figure 24-12. The applicant should discuss and furnish response to the following questions:

(a) Is the normal operating dewatering plan to (1) pump such that the water level in the wells being pumped is held at or below elevation 595 or (2) to pump as necessary to hold the water levels in all observation wells near Category I Structures and Category I Pipelines supported on plant fill at or below elevation 595, (3) to pump as necessary to hold water levels in the wells mentioned in (2) above at or below elevation 610, or (4) something else? If it is something else, what is it?

(b) In the event the water levels in observation wells near Category I Structures or Pipelines supported on plant fill exceed those for normal operating conditions as defined by your answeer to Question (a) what action will be taken? In the event that the water level in any of these observation wells exceeds elevation 610, what action will be taken?

(c) Where will the observation wells in the plant fill area be located that will be monitored during the plant lifetime? At what depths will the screened intervals be? Will the combination of (1) screened interval in cohesionless soil and (2) demonstration of timely response to changes in cooling pond level prior to drawdown be made a condition for selecting the observation wells? Under what conditions will the alarm mentioned on page 24-20 be triggered? What will be the response to the alarm? A worst case test of the completed permanent dewatering and groundwater level monitoring systems could be conducted to determine whether or not the time required to accomplish shutdown and cooling is available. This could be done by shutting off the entire dewatering system when the cooling pond is at elevation 627 and determining the water level versus time curve for each observation well. The test should be continued until the water level under Category I structure. whose foundations are potentially liquefiable, reaches elevation 610 (the normal water level) or the sum of the time intervals allotted for repair and the time interval needed to accomplish shutdown (should the repair prove unsuccessful) has been exceeded, whichever occurs first. In view of the heterogeneity of the fill, the likely variation of its permeability and the necessity of making several assumptions in the analysis which was presented in the applicant's response to Question 24a, a full-scale test should give more reliable information on the available time. In view of the above the applicant should furnish his response to the following:

If a dewatering system failure or degradation occurs, in order to assure that the plant is shutdown by the time water level reaches elevation 610, it is necessary to initiate shutdown earlier. In the event of a failure of the dewatering system, what is the water level or condition at which shutdown will be initiated? How is that condition determined? An acceptable method would be a full-scale worst-case test performed by shutting off the entire dewatering system with the cooling pond at elevation 627 to determine, at each Category I Structure deriving support from plant fill, the water level at which a sufficient time window still remains to accomplish shutdown before the water rises to elevation 610. In establishing the groundwater level or condition that will trigger shutdown, it is necessary to account for normal surface water inflow as well as groundwater recharge and to assume that any additional action taken to repair the dewatering system, beyond the point in time when the trigger condition is first reached, is unsuccessful.

(2) As per applicant response to NRC Question 24 (10 CFR 50.54f) the design of the permanent dewatering system is based upon two major findings: (1) the granular backfill materials are in hydraulic connection with an underlying discontinuous body of natural sand, and (2) seepage from the cooling pond is restricted to the intake and pump structure area, since the plant fill south of Diesel Generator Building is an effective barrier to the inflow of the cooling pond water. However, soil profiles (Figure 24-2 in the "Response to NRC Requests Regarding Plant Fill"), pumping test time-drawdown graphs (Figure 24-14), and plotted cones of influence (Figure 24-15) indicate that south of Diesel Generator Building, the plant fill material adjacent to

the cooling pond is not an effective barrier to inflow of cooling pond water. The estimated permeability for the fill material as reported by the applicant is 8 feet/day and the transmissivities range from 29 to 102 square feet/day. Evaluate and furnish for review the recharge rate of seepage through the fill materials from the south side of the Diesel Generator Building on the permanent dewatering system. This evaluation should especially consider the recovery data from PD-3 and complete data from PD-5.

(3) The interceptor wells have been positioned along the northern side of the Water Intake Structure and service water pump structures. The calculations estimating the total groundwater inflow indicate the structures serve as a positive cutoff. However, the isopachs of the sand (Figures 24-9 and 24-10) indicate 5 to 10 feet of remaining natural sands below these structures. The soil profile (Figure 24-2) neither agrees nor disagrees with the isopachs The calculations for total flow, which assumed positive cutoff, reduced the length of the line source of inflow by 2/3. The calculations for the spacing and positioning of wells assumed this reduced total flow is applied along the entire length of the structures. Clarify the existence of seepage below the structures, present supporting data and calculations, and reposition wells accordingly. Include the supporting data such as drawdown at the interceptor wells, at midway location between any two consecutive wells, and the increase in the water elevations downstream of the interceptor wells. The presence of structures near the cooling pond appears to have created a situation of artesian flow through the sand layer. Discuss why artesian flow was not considered in the design of the dewatering system.

(4) Provide construction plans and specification of permanent dewatering system (location, depths, size and capacity of wells, filterpack design) including required monitoring program. The information furnished in response of NRC Question 24 (10 CFR 50.54f) is not adequate to evaluate the adequacy of the system.

(5) Discuss the ramifications of plugging or leaving open the weep holes in the retaining wall at the Service Water Building.

(6) Discuss in detail the maintenance plan for the dewatering system.

(7) What are your plans for monitoring water table in the control tower area of the Auxiliary Building?

(8) What measures will be required to prevent incrustation of the pipings of the dewatering system. Identify the controls to be required during plant operation (measure of dissolved solids, chemical controls). Provide basis for established criteria in view of the results shown on Table 1, page 23 of tab 147.

(9) Upon reaching a steady state in dewatering, a groundwater survey should be made to confirm the position of the water table and to insure that no perched water tables exist.

Dewatering of the site should be scheduled with a sufficient lead time before plant start up so that the additional settlement and its effects (especially on piping) can be studied. Settlement should be closely monitored during this period.

Provide your plans for conducting this groundwater survey.

N/A

j. Liquefaction Potential.

An independent Seed-Idriss Simplified Analysis was performed for the fill area under the assumption that the groundwater table was at or below elevation 610. For 0.19 g peak ground surface acccelerated, it was found that blow counts as follows were required for a factor of safety of 1.5:

Elevation ft	Minimum SPT Blow Count*[1] For F.S. = 1.5
610	14
605	16
600	17
595	19

The analysis was considered conservative for the following reasons (a) no account was taken of the weight of any structure, (b) liquefaction criteria for a magnitude 6 earthquake were used whereas an NRC memorandum of 17 Mar 80 considered nothing larger than 5.5 for an earthquake with the peak acceleration level of 0.19 g's, (c) unit weights were varied over a range broad enough to cover any uncertainty and the tabulation above is based on the most conservative set of assumptions. Out of over 250 standard penetration tests on cohesionless plant fill or natural foundation material below elevation 610, the criteria given above are not satisfied in four tests in natural materials located below the plant fill and in 23 tests located in the plant fill. These tests involve the following borings:

SW3, SW2, DG-18, AX 13, AX 4, AX 15, AX 7, AX 5, AX 11, DG 19, DG 13, DG 7, DG 5, D 21, GT 1, 2.

Some of the tests on natural material were conducted at depths of at less than 10 ft before approximately 35 ft of fill was placed over the location. Prior to comparison with the criteria these tests should be multiplied by a factor of about 2.3 to account for the increase in effective overburden pressure that results from the placement and future dewatering of the fill.

1*For M = 7.5, blow counts would increase by 30%.

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Of the 23 tests on plant fill which fail to satisfy the criteria, most are near or under structures where remedial measures alleviating necessity for support from the fill are planned. Only 4 of the tests are under the Diesel Generator Building (which will still derive its support from the fill) and 3 others are near it. Because these locations where low blow counts were recorded are well separated from one another and are not one continuous stratum but are localized pockets of loose material, no failure mechanism is present.

In view of the large number of borings in the plant fill area and the conservatism adopted in analysis, these few isolated pockets are no threat to plant safety. The fill area is safe against liquefaction in a Magnitude 6.0 earthquake or smaller which produces a peak ground surface acceleration of 0.19 g or less provided the groundwater elevation in the fill is kept at or below elevation 610.

48. X. Seismic analysis of structures on plant fill material.

(1) Category I Structures. From Section 3.7.2.4 of the FSAR it can be calculated that an average V_s of about 1350 ft/sec was used in the original dynamic soil structure interaction analysis of the Category I structures. This is confirmed by one of the viewgraphs used in the 28 February Bechtel presentation. Plant fill V_s is clearly much lower than this value. It is understood from the response to Question 13 (10 CFR 50.54f) concerning plant fill that the analysis of several Category I structures are underway using a lower bound average V_s = 500 ft/sec for sections supported on plant fill and that floor-response spectra and design forces will be taken as the most severe of those from the new and old analysis. The questions which follow are intended to make certain if this is the case and gain an understanding of the impact of this parametric variation in foundation conditions.

(a) Discuss which Category I structures have been and/or will be reanalyzed for changes in seismic soil structure interaction due to the change in plant fill stiffness from that envisioned in the original design. Have any Category I structures deriving support from plant fill been excluded from reanalysis? On what basis?

(b) Tabulate for each old analysis and each reanalysis, the foundation parameters (v_s, ν and ρ) used and the equivalent spring and damping constants derived therefrom so the reviewer can gain an appreciation of the extent of parametric variation performed.

(c) Is it the intent to analyze the adequacy of the structures and their contents based upon the envelope of the results of the old and new analyses? For each structure analyzed, please show on the same plot the old, new, and revised enveloping floor response spectra so the effect of the

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changed backfill on interior response spectra predicted by the various models can be readily seen.

(2) Category I retaining wall near the southeast corner of the Service Water Structure. This wall is experiencing some differential settlement. Boring information in Figure 24-2 (Question 24, Volume 1 Responses to NRC Requests Regarding Plant Fill) suggests the wall is founded on natural soils and backfilled with plant fill on the land side. Please furnish details clarifying the following:

(a) Is there any plant fill underneath the wall? What additional data beyond that shown in Figure 24-2 support your answer?

(b) Have or should the design seismic loads (FSAR Figure 2.5-45) be changed as a result of the changed backfill conditions?

(c) Have or should dynamic water loadings in the reservoir be considered in the seismic design of this wall? Please explain the basis of your answer.

5. In your response for the comments and questions in paragraph 4 above, if you feel that sufficiently detailed information already exists on the Midland docket that may have been overlooked, please make reference to that information. Resolution of issues and concerns will depend on the expeditious receipt of data mentioned above. Contact Mr. Neal Gehring at FTS 226-6793 regarding questions.

FOR THE DISTRICT ENGINEER:

P. McCALLISTER
Chief, Engineering Division

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Docket Nos. 50-329/330

MEMORANDUM FOR: A. Schwencer, Acting Chief, Licensing Branch No. 3, Division of Licensing

FROM: D. S. Hood, Project Manager, Licensing Branch No. 3, Division of Licensing

SUBJECT: FORTHCOMING MEETING WITH MIDLAND, UNITS 1 AND 2 - REGARDING ADDITIONAL INFORMATION ON PLANT FILL

DATE & TIME: July 31, 1980
9:30 A. M.

LOCATION: Room P-110
Phillips Building
Bethesda, Maryland

PURPOSE: To clarify June 30, 1980 requests for additional information on plant fill.

PARTICIPANTS:

Consumers Power Company
G. Keeley
J. R. Thiruvengadam

Bechtel
L. H. Curtis, et al

NRC
J. Knight
G. Lear
L. Heller, et al
D. Hood

U. S. Army Corps of Engineers

Darl S. Hood, Project Manager
Licensing Branch No. 3
Division of Licensing

Enclosure:
Letter of 6/30/80

cc: See next page

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OFFICE	DL:LB #3	DL:LB #3				
SURNAME	DSHood:mec	ASchwencer				
DATE	7/16/80	7/ /80				

NRC FORM 318 (9-76) NRCM 0240 ☆U.S. GOVERNMENT PRINTING OFFICE: 1979-289-369

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUL 21 1980

Docket Nos. 50-329/330

MEMORANDUM FOR: A. Schwencer, Acting Chief, Licensing Branch No. 3, Division of Licensing

FROM: D. S. Hood, Project Manager, Licensing Branch No. 3, Division of Licensing

SUBJECT: FORTHCOMING MEETING WITH MIDLAND, UNITS 1 AND 2 - REGARDING ADDITIONAL INFORMATION ON PLANT FILL

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U. S. Army Corps of Engineers

Darl Hood

Darl S. Hood, Project Manager
Licensing Branch No. 3
Division of Licensing

Enclosure:
Letter of 6/30/80

cc: See next page

8007310104 PP

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Enclosure

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 3 0 1980

Docket Nos.: 50-329/330

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. Cook:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING PLANT FILL

We have reviewed your responses to our requests of November 19, 1979 regarding the quality of plant fill, effects and remedial actions resulting therefrom. Our review is being performed with the assistance of the U. S. Army Corps of Engineers. We and they find that the results of additional explorations and laboratory testing identified in Enclosure 1 (Request 37) are needed to support required geotechnical engineering studies. Details on the extent of these studies will be provided shortly by separate correspondence. Enclosure 1 is provided in order that you may initiate planning of the required explorations in a timely manner. However we suggest you await receipt of these further details prior to physically beginning the explorations. Enclosure 1 (Footnote 4 of Table 37-1) also includes requests for advanced notification of the availability of certain samples.

As noted in our Request 37 of Enclosure 1, your position in previous responses to Requests 5 and 35 not to complete additional explorations, sampling and laboratory testing after preloading continues to be unacceptable to us. So that you might better understand our position, we offer the following observations:

(1) The preload program as completed on the heterogeneous materials which were placed for the purpose of structural fill is not necessarily an improvement, nor does it necessarily produce foundation soils of more uniform engineering properties, compared to the soil performance which would have resulted if the material had been properly compacted to the original requirements established in the Midland PSAR.

(2) To develop reasonable assurance of plant safety, the required studies are needed to serve as an independent verification of the predictions of future settlements and the conclusions of the preload program.

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(3) The required studies will permit an estimate of total and differential settlement for involved structures and systems following drawdown with the proposed permanent dewatering system.

(4) Certain aspects of the preload program, such as the complication introduced by the simultaneous raising of the cooling pond reservoir, present difficulties in our full acceptance of your conclusion of the preload program.

Enclosure 1 also includes other requests for information which we and the U. S. Army Corps of Engineers need to continue our review.

We would appreciate your response to Enclosure 1 at your earliest opportunity. A partial reply based upon data already available should be submitted rather than to await the results of new borings and tests contained in parts of Enclosure 1. Should you require clarifications of these requests and positions, please contact us.

Sincerely,

A. Schwencer, Acting Chief
Licensing Branch No. 3
Division of Licensing

Enclosure:
As stated

cc: See next page

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Mr. William Lawhead
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7th Floor
477 Michigan Avenue
Detroit, Michigan 48226

ADDITIONAL REQUESTS REGARDING PLANT FILL

36. We have reviewed your response to Request 24 and find that information from additional boring logs is needed.

Provide the boring logs for the following explorations:

a. Pull down holes PD-1 thru PD-27 (35 holes that include 8A, 20A, 20B, 20C, 15A, 15B, 15C and 27A)
b. LOW-1 thru LOW-14 (14 holes)
c. TW-1 thru TW-5 and PZ-1 thru PZ-48 (55 holes)
d. OW-1 thru OW-5 (5 holes)
e. TEW-1 thru TEW-8 (8 holes)

The logs should include date and method of drilling, the type and location of samples attempted. Also provide the locations, boring logs and available test data of any exploration completed in 1979 and 1980 which has not yet been submitted.

37. (RSP) Your position in previous responses to Requests 5 and 35 not to complete additional explorations, sampling and laboratory testing following the preload program continues to be unacceptable. We require that you complete as a minimum, the exploration and testing program indicated by Table 37-1.

38. Discuss the foundation design for any seismic safety-related piping and conduit connected to or located under the Radwaste Building and Turbine Building where piping and conduit have been placed on plant fill.

Table 37-1

Request for Additional Explorations, Sampling and Testing

Location [1]	Depth [2]	Sampling [3]	Lab Testing [4]	Anticipated Geotechnical [6] Engineering Studies to be Required
Diesel Generator Building (6 holes along perimeter)	Thru fill and a minimum of 5' into natural glacial till soils	Classify samples according to Unified Soils Classification System	For cohesive soils C-D (Consolidated-Drained) C-U (Consolidated-Undrained) Consolidation [5] For sands Drained Direct Shear on both loose & dense specimens Relative Density	Bearing Capacity Settlement Piping Distortion
Auxiliary Building (2 holes)	Same as above	Same as above	Same as above except add U-U (Unconsolidated-Undrained for cohesive soils	Caisson Foundation Design (Vertical and Lateral Load Support)
Service Water Pump (1 hole) Structure and Retaining Walls (2 holes)	Same as above	Same as above	Same as above except consolidation testing would be limited to samples in retaining wall foundations.	Pile Foundation Design (Vertical and Lateral Load Support) Retaining Wall Stability & Settlement.
Cooling Pond Embankments (7 holes along perimeter)	Extend thru fill and a minimum of 5' into natural residual soils except hole no. 5 which should extend to bottom elevation of cooling pond.	Same as above	For cohesive soils C-D (Consolidated-Drained) C-U (Consolidated-Undrained) U-U (Unconsolidated-Undrained)	Slope Stability Fill compaction adequacy

NOTES: See page 2

Table 37-1 (continued)

NOTES:

1/ See attached Figs. 37-1 and 37-2 for approximate boring location. Holes to be accurately located in the field to avoid obstructions, underground piping and conduits and slurry trench area.

2/ No boring is to be terminated in loose or soft soils.

3/ Continuous split spoon sampling using SPT is required. Holes are to be held open using either casing or hollow stem auger. Additional borings to obtain representative undisturbed samples for detailed laboratory testing should be located at the completion and elevation of the split spoon sampling program. The groundwater level should be recorded at the completion of drilling in all borings once the level has stabilized.

4/ Normal classification (e.g., gradation, Atterberg Limits) unit weight and moisture content testing to be performed on representative samples from each significant foundation layer. This column pertains to lab testing in addition to the above mentioned tests. It is requested that at least one week notice be provided to the NRC before opening undisturbed samples to permit on site visual observation by Corps of Engineer representative.

5/ The maximum load should be great enough to establish the straight-line portion of the void ratio-pressure curve.

6/ Details on the extent of geotechnical engineering studies to be completed using the results of field and lab testing work will be provided in a separate letter.

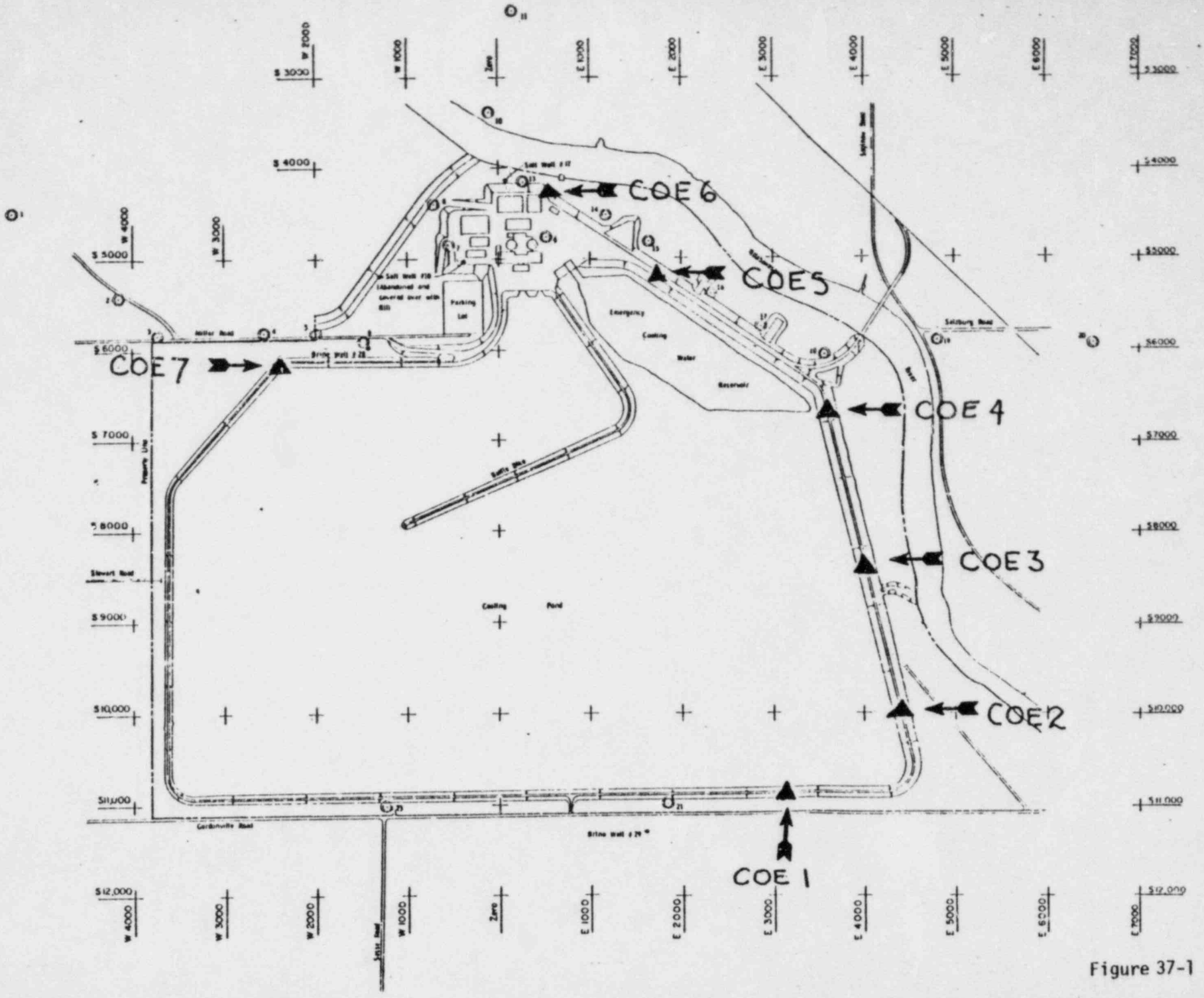

Figure 37-1

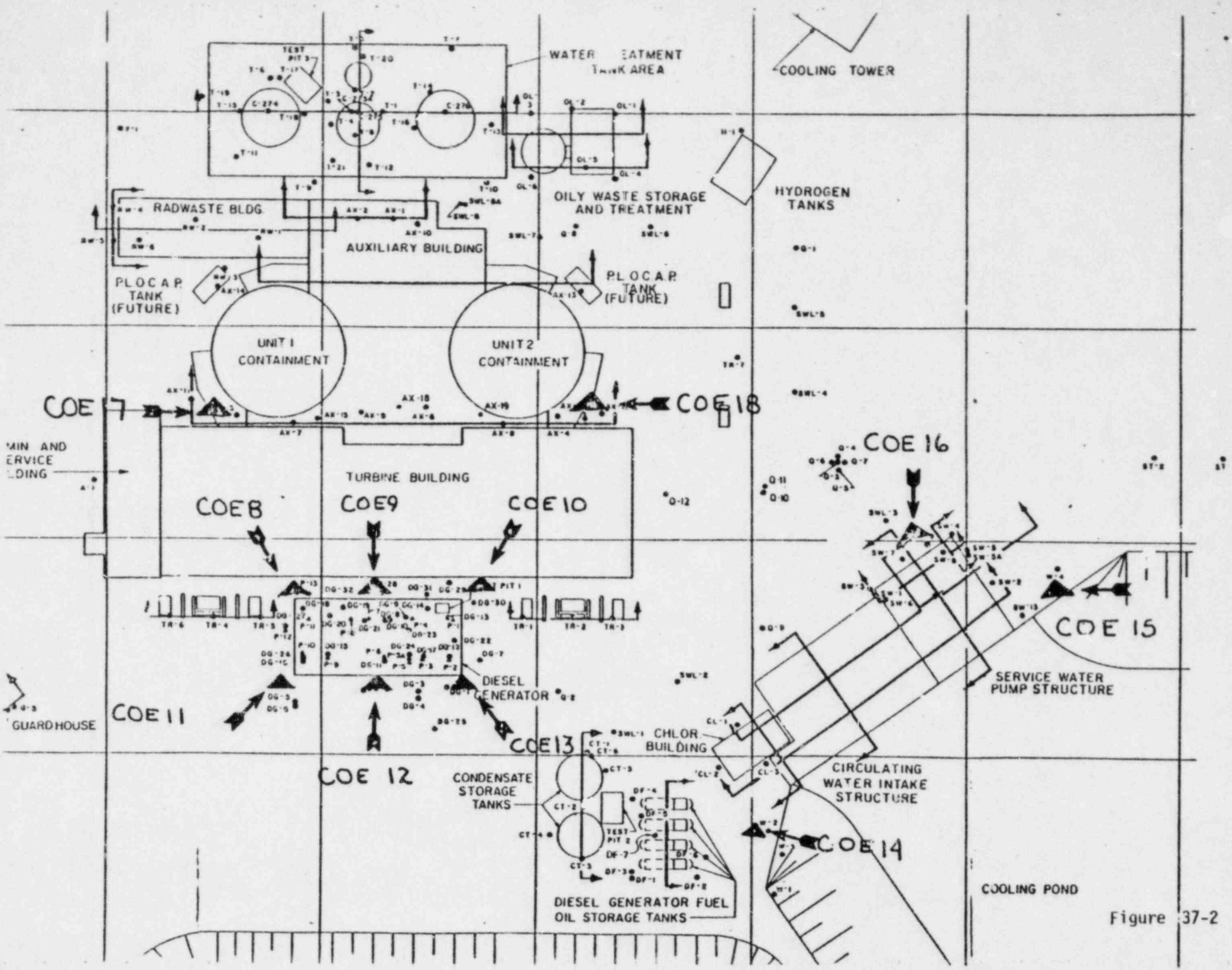
WATER TREATMENT TANK AREA
COOLING TOWER
OILY WASTE STORAGE AND TREATMENT
HYDROGEN TANKS
RADWASTE BLDG.
AUXILIARY BUILDING
PLOCAP TANK (FUTURE)
PLOCAP TANK (FUTURE)
UNIT 1 CONTAINMENT
UNIT 2 CONTAINMENT
COE 7
COE 18
COE 16
TURBINE BUILDING
COE 8
COE 9
COE 10
COE 15
SERVICE WATER PUMP STRUCTURE
DIESEL GENERATOR
COE 11
GUARDHOUSE
COE 13
CHLOR BUILDING
COE 12
CONDENSATE STORAGE TANKS
CIRCULATING WATER INTAKE STRUCTURE
COE 14
COOLING POND
DIESEL GENERATOR FUEL OIL STORAGE TANKS

Figure 37-2

5/B2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 13 1981

Docket Nos.: 50-329/330

MEMORANDUM FOR: File

FROM: D. Hood

SUBJECT: FEBRUARY 27, 1981 TELECON REGARDING CHANGES IN REMEDIAL ACTIONS FOR MIDLAND SOIL SETTLEMENT

At 11:15 a.m. on February 27, 1981, Messrs. J. Cook, G. Keeley, and others of Consumers Power Company called Messrs. R. Vollmer, F. Miraglia (Acting for R. Tedesco), H. Levin, and D. Hood of NRC to report certain decisions and changes intended to expedite resolution of the soil matter on Midland Plant, Units 1 and 2.

(1) Mr. Cook has today authorized all borings, exploration and testing requested by the Staff's letter of June 30, 1980, Request 37, as subsequently amended by R. Tedesco letter. The Staff and the Corps of Engineers will be invited to participate as requested in the staff letter. Samples will be sent to an independent laboratory and results of analyses will be provided to the Staff.

(2) For the Diesel Generator Building, the program will measure the pre-consolidation pressure of the boring sample and this will be correlated by analysis to what the surcharge program should have done. An error analysis of the uncertainty of this empirical data associated with borings will also be provided. Consumers would appreciate an opportunity to discuss these results with the staff prior to conclusion of the staff review.

(3) The proposed remedial action for the Service Water Building has been changed. The use of piles has been dropped and a Bin Wall concept (essentially an extension of the entire North wall down to till) will be adopted. Underpinning was found to provide little seismic margin. A conceptual design package, including seismic discussions, will be presented for the new fix the first week in April.

(4) The fix for the Aux. Bldg. remains the same, however more caissons might possibly be added if found to be needed. Other possibilities for lateral loads are being reviewed in the event such should be needed. A potential 50.55(e) report on the Aux. Bldg. seismic analysis was issued February 20, 1981.

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MAR 13 1981

(5) The drilling of wells for the permanent dewatering system may prove to be a pacing schedule item if a lengthy hearing results. Mr. Cook would like to explore with the Staff the possibility that the drilling of these wells might be acceptable to the staff prior to completion of the hearing. Mr. Cook noted that wells can always be plugged if necessary at some later date.

(6) Two reports by Weston Geophysical, one for the seismic response spectra at the original ground surface and another on the probabilistic seismic hazards study will be forwarded March 2, 1981. A third report, covering the response spectra at the top of the fill will be forwarded later. A meeting on the first two reports is requested.

(7) A 50.55(e) report on the BWST cracks was issued February 20, 1981. Five options are being considered at this time.

Darl Hood, Project Manager
Licensing Branch No. 3
Division of Licensing

cc: J. Kane
L. Heller
W. Paton
G. Lear
J. Knight
F. Schauer
F. Rinaldi
R. Bosnak
A. Cappucci
R. Gonzale
R. Jackson
J. Kimball
J. Gilray
R. Shewmaker
E. Gallagher
R. Knop
F. Miraglia
R. Vollmer
H. Levin
R. Tedesco

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MAR 24 1981

Docket Nos.: 50-329/330

MEMORANDUM FOR: File

FROM: D. Hood

SUBJECT: TELECON ON MIDLAND SOILS BORING SCHEDULE

Participants

Consumers	NRC	Corps of Engineers (COE)
G. Keeley	J. Kane	R. Erickson
D. Budzik	L. Heller	R. Gehring
J. Brunner, Esq.	D. Hood	H. Singh

Mr. Keeley, et.al., called at 11:00 on March 20, 1981. Following up on an earlier call in which Vice President J. Cook advised us of Consumers decision to authorize the soils borings and testing requested by the NRC and COE (see telecon summary of 3/13/81), Mr. Keeley indicated the following schedule:

- Start soil borings - March 25, 1981
  (beginning with the pond dike)
- Start of Laboratory testing - April 1, 1981
- Completion of borings - About April 25 1981
- Completion of Laboratory testing - June 8, 1981

Mr. Keeley identified Woodward and Clyde Associates, Inc. as the subcontractor for both the borings and lab testing. The contract was signed 3/18/81. Consumers is contracting directly, rather than using Bechtel. Mr. M. "Rom" Ramanujam, (517) 788-5816, a new geotechnical engineer with Consumers, will be the principal technical contact for the project. Rom is meeting today with Dr. Peck and with Woodward and Clyde regarding the technical details of the contract and will determine a more detailed break out of the schedule. Rom will make a follow-up call with J. Kane and H. Singh 3/23/81 with these further details.

Mr. Keeley stated that the compressed schedule was geared to the hearing (presently set to start in mid-June 1981). Three separate boring rigs will be used. Testing will be conducted at the Woodward and Clyde laboratory.

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MAR 24 1981

Mr. Keeley also advised that a letter to the NRC on Consumers recent decision to change the support concept for part of the Service Water Intake Structure over fill will be mailed today. The possibility that the revised concept might alter the need for borings in this vicinity will be discussed during the 3/23/81 call.

NRC requested a copy of the contract specification for the boring and testing program to better understand the scope of the program.

DARL HOOD

Darl Hood, Project Manager
Licensing Branch No. 3
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cc: J. Kane (2)
L. Heller
G. Lear
J. Knight
R. Vollmer
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R. Gonzales
J. Kimball
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E. Gallagher
R. Cook (RIII)
R. Knop
W. Paton

6/B2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 27 1981

FEB 10 1981

Docket Nos. 50-329/330 OM, OL

APPLICANT: Consumers Power Company

FACILITY: Midland Plant, Units 1 and 2

SUBJECT: SUMMARY OF APPEALS MEETING OF AUGUST 29, 1980 REGARDING ADDITIONAL EXPLORATIONS AND TESTING OF MIDLAND PLANT FILL

On August 29, 1980, NRC staff management met in Midland, Michigan with Consumers Power Company (the applicant) to hear a request for relief from an NRC staff position requiring additional borings and tests of the plant fill. The meeting followed a site tour on August 28, 1980 during which staff management observed structures and features affected by inadequately compacted backfill used at the site. Attendees at the appeals meeting are listed in Enclosure 1. Participants in the site tour are listed in Enclosure 2.

The issue of appeal to the Director of Engineering, Mr. R. Vollmer, and the Assistant Director for Components and Structures Engineering, Mr. J. Knight, is whether additional borings and testing of fill soils at the Midland Plant site requested by the NRC staff in a letter of June 30, 1980 are necessary. The staff, supported by its consultant, the U.S. Army Corps of Engineers, contends that the additional borings, testing and resultant geotechnical engineering studies are needed for findings regarding the extent of the soils deficiency and regarding technical adequacy and proper implementation of proposed or completed remedial actions directed to deficiencies in the plant fill. The applicant, supported by several consultants, takes the position that additional borings to justify the adequacy of the remedial action program are unnecessary in that borings, laboratory tests, data collected in connection with the surcharge program for the Diesel Generator Building, and load testing for piles and caissons for other structures provide sufficient information. The applicant also believes that borings should not be taken in the cooling pond dike since this might lead to hydraulic fracturing and slope damage. The applicant also contends that the dike has performed satisfactorily since construction and the borings are unnecessary.

The appeal follows a meeting of July 31, 1980 between the applicant, the NRC Geotechnical Branch, and the U.S. Army Corps of Engineers. No resolution of the differences in view regarding the need for the additional information resulted at this earlier meeting. A letter of August 4, 1980 had also been issued by the staff since the earlier meeting to further describe the staff request of June 30, 1980.

The agenda and sequence of the appeal meeting consisted of (1) introductions by the staff (10 min.), (2) presentations of the applicant's position (1 1/2 hours), (3) summary of the staff position (10 min.), (4) questions by the Director and Assistant Director (15 min.), and (5) the decision (5 min.).

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Applicant's Position and Presentation

Viewgraph slides used during the applicant's presentations are shown in Enclosure 3.

Mr. G. Keeley reviewed a chronological sequence for supplying of soils information to the NRC. Mr. Keeley stated that the response to requests 36 and 38 from the staff's letter of June 30, 1980 would be submitted September 15, 1980 and the response to request 37 during October 1980.

Mr. J.D. Wanzeck of Bechtel Geotech reviewed the soil investigations performed to date and noted that 199 borings had been submitted to NRC. He also identified test pits, cross-hole shots and settlement information which have been described to NRC. Mr. Wanzeck stated that it would be futile to take additional borings in view of the large number of borings already done. Mr. Wanzeck noted that 66 additional borings had been taken in the power block area in the previous two months and would be submitted to the staff in mid-September.

Bechtel consultant, Dr. Ralph Peck, reviewed the technical basis for the applicant's position that the preload program provides an acceptable solution to the unanticipated settlement recorded at the Diesel Generator Building. He reviewed typical settlements observed during surcharging, piezometer measurements, and predicted settlements extrapolated from the surcharge settlement results which he finds to be reasonably acceptable. Dr. Peck stated that he could find no reason to believe settlement of the structure in excess of this pessimistic prediction will occur. He felt predictions derived by other means would be erroneous and too large since the state of the art is limited.

Bechtel consultant, Dr. A.J. Hendron, Jr., discussed errors inherent in settlement predictions derived from consolidation tests from undisturbed samples obtained from borings. He concluded that the need for accuracy requires reliance upon the field approach proposed by the applicant. Dr. Hendron also described his more recent calculations of bearing capacity which had been revised from earlier calculations. The new results indicate a factor of safety from bearing capacity failure of about 6 for static loading which meets the normally accepted value of 2. He concluded that additional borings were unnecessary to demonstrate adequate bearing capacity.

Bechtel consultant, Dr. M.T. Davisson, described the use of piles under the Service Water Structure and caissons under the Auxiliary Building. He stated that piles and caissons eliminate reliance upon fill characteristics. He felt that in place tests under load to be conducted as the underpinnings are installed provides a better technique to establish adequacy of the remedial action.

These presentations by Mr. Wanzeck and by the Bechtel consultants are described in further detail by two documents forwarded by Amendment 81. These are entitled, "Discussion of the Applicant's Position on the Need for Additional Borings", and "Settlement Update". The applicant's position is also described in Mr. J. Cook's letter of September 16, 1980 to Mr. R.H. Vollmer.

Staff Presentation

Dr. L. Heller of the NRC Hydrologic and Geotechnical Engineering Branch explained that the purpose of the staff's request for additional borings was to supplement, rather than replace, the field data and prediction technique intended by the applicant. The borings and tests are necessary to better understand certain anomalies or questions associated with the applicant's data. Mr Heller noted that 18 additional borings would seem to be a small addition to the 900 already taken. He illustrated the staff's need for increased assurance by reference to North Anna settlement projections which were based upon use of field data and which were twice erroneous.

Mr. Joseph Kane, staff geotechnical engineer, described the basis for the request for borings in the cooling pond dike. The dike in the vicinity of the emergency pond excavated within the cooling pond must remain stable so as not to jeopardize the emergency water needed for safely shutting down the Midland plant. The borings are needed to show that the soil materials actually placed in the cooling pond dikes are stable and contain adequate engineering properties. It was noted that the upper phreatic surface for the dike has likely not had sufficient time to develop and further saturation of the dike materials can be anticipated.

The borings near the Service Water Structure and Auxiliary Building are needed to permit testing of undisturbed samples in order to estimate pile and caisson capacity. The field load tests described by Dr. Davisson will also be needed. However, the staff noted that it is normal engineering practice to analyze pile and caisson capacities based on foundation material properties before installing the piles and caissons in the field. The additional borings and testing are also needed to establish properties of the plant fill in order to estimate negative skin friction and this additional drag loading on the piles during plant life.

The borings near the Diesel Generator Building are needed to estimate bearing capacity and to assure that future settlements will not overstress underground piping. Mr. Kane explained that the pore pressure behavior recorded in piezometers after removal of the sand surcharge leaves some doubt whether secondary consolidation of the fill has been achieved. The data requested by the staff should help to eliminate this doubt. Mr. Kane also noted that the fill may have been placed dry of optimum and was not fully saturated under seepage developing from the raised pond before the surcharge load was removed. Mr. Kane further noted that it is highly unusual to surcharge a completed structure similar to what was performed at Midland. The induced settlements and cracking caused by the surcharge load further complicate the staff's safety evaluation of the involved structure.

At the conclusion of Mr. Kane's presentation, Mr. Davisson noted that the caissons would be installed with friction breakers (i.e., bentonite slurry) to facilitate penetration through the soil, and therefore, downdrag around the caissons should be minimal.

Questions

Messrs. Vollmer and Knight asked several questions.

Mr. Vollmer stressed the need for independence and a priori aspects of the staff review, and of the need to avoid overreliance upon technical specifications to monitor settlement in the future if this can be avoided. He stressed the need for proper assurances to be provided at the front end of the review and construction process. He noted that the staff's requests were intended to provide for expedient resolution of the problems and noted that he was somewhat surprised at Consumer's attitude toward not supplying additional technical information. He inquired of Mr. Cook whether his objection was based upon his perception of staff need or upon a concern that the results might be misleading or unfavorable and lead to further questioning by the staff. Mr. Cook replied that he feels that the staff's request "would contribute more to confusion than anything else."

Mr. Knight inquired into the basis for the 66 additional borings yet to be furnished to the staff. Mr. Wanzeck replied that they result from studies of groundwater drawdown, seismic cross-hole shots and investigations of the tank farm area requested by the staff. Detailed laboratory tests were not conducted for the samples obtained.

Mr. Vollmer questioned the basis for the applicant's position on additional borings in the cooling pond dike. Mr. Wanzeck replied that little settlement had occurred to date, that the dike was placed by Canonie using large equipment, that Bechtel's consultants advise against borings with the pond filled, and that it was considered unnecessary because the dike is not needed for any safety purpose. Mr. Vollmer asked about possible obstruction of the emergency pond channel or loss of emergency pond usable volume due to cooling pond dike failure. Mr. Knight noted the potential significance of the dike to the concrete service water discharge pipes between the dike and the emergency cooling pond. Mr. Davisson noted that seepage, rather than stability, is the element of interest to dam failures in general. Mr. Kane commented that borings could be conducted in a manner where hydraulic fracturing would not be a concern. Proper backfilling of the drilled holes would eliminate future concerns for uncontrolled seepage through the holes which remained at the completion of the borings.

Decision

Following a brief caucus, Mr. Vollmer noted that new information had been presented during the meeting which would require consideration before a decision is reached. The new information included (1) 66 additional borings which the applicant intended to submit for review, (2) a plot of load versus elevation beneath the Diesel Generator Building, and (3) use of a friction breaker for the caissones. He also stated that if a decision were to be made immediately, he would have to agree with the NRC staff's position that the additional information in the staff's letter of August 4, 1980 is needed. Mr. Vollmer stated that the applicant's position regarding the need for borings in the cooling pond dike appear to warrant further thought on his part. He requested that a

FEB 10 1981

summary of the applicant's positions be submitted along with the additional 66 borings by September 15, 1980 and that his decision would be deferred pending review of that further information.

Darl Hood
Licensing Branch #3
Division of Licensing

Enclosures:
1) Attendees List - 8/29/80
2) Tour Participants - 8/28/80
3) Viewgraph slides

FEB 16 1983

MEETING SUMMARY DISTRIBUTION

Docket File
NRC PDR
Local PDR
TIC/NSIC/Tera
NRR Reading
LB#3 Reading
H. Denton
E. Case
D. Eisenhut
R. Purple
B. J. Youngblood
A. Schwencer
F. Miraglia
J. Miller
G. Lainas
R. Vollmer
J. P. Knight
R. Bosnak
F. Schauer
R. E. Jackson
Project Manager D. Hood
Attorney, OELD
J. Lee
OIE (3)
ACRS (16)
R. Tedesco

NRC Participants:
A. Schwencer
G. Lear
R. Vollmer
J. Knight
R. Landsman, Reg. III, IE
G. Gallagher, Reg. III, IE
B. Jones, OELD
R. Gonzales
J. Kane
L. Heller
bcc: Applicant & Service List

G. Lear
V. Noonan
S. Pawlicki
V. Benaroya
Z. Rosztoczy
W. Haass
D. Muller
R. Ballard
W. Regan
D. Ross
P. Check
R. Satterfield
O. Parr
F. Rosa
W. Butler
W. Kreger
R. Houston
T. Murphy
L. Rubenstein
T. Speis
W. Johnston
J. Stolz
S. Hanauer
W. Gammill
T. Murley
F. Schroeder
D. Skovholt
M. Ernst
R. Baer
C. Berlinger
K. Kniel
G. Knighton
A. Thadani
D. Tondi
J. Kramer
D. Vassallo
P. Collins
D. Ziemann

FEB 10 1981

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FEB 10 1981

Enclosure 1

Attendees

Name	Organization
D. Hood	LB3, DL/NRR/NRC
A. Schwencer	Acting Chief, LB3, DL/NRR/NRC
G. Lear	Chief, HGEB/DE/NRC
R. Vollmer	Director, DE, NRC
J. Knight	A/D, CS-D/NRC
J. Cook	CPCo, VP-Midland Project
G. Keeley	CPCo, Proj. Manager-Midland
M. Davisson	Consultant to Bechtel
A. Hendron, Jr.	Consultant to Bechtel
J. Wanzeck	Geotech
R. Peck	Consultant to Bechtel
S. Afifi	Bechtel
J. Rutgers	Bechtel, Proj. Manager-Midland
K. Wiedner	Bechtel, Engineer Manager
W. Ferris	Bechtel, Chief, Soil Engineer
T. Thiruvengadam	CPCo, Section Head-Civil Engineering
J. Brunner	CPCo Attorney
M. Miller	Isham, Lincoln & Beale
N. Saari	CPCo, Public Affairs Director
T. Cooke	CPCo-Project Superintendent
A. Marshall	Bechtel, Geotech
D. Sibbald	CPCo, Sr. Const. Adv.
J. Kates	The Saginaw News
A. Brodde	Mapleton Intervenors
R. Landsman	NRC, Reg. III, IE
G. Gallagher	NRC, Reg. III, IE
J. Linsley	Bay City Times
B. Jones	NRC/ELD
J. Burroughs	Dow Chemical
D. Sanks	Midland Daily News
S. Warren	Lone Tree Council & Intervenor
B. Timmons	Observer
J. Timmons	Observer
B. Stamiris	Intervenor
N. Gehrig	U.S. Army Corps of Engineers
B. Malamud	U.S. Army Corps of Engineers
H. Narain Singh	U.S. Army Corps of Engineers
R. Erickson	U.S. Army Corps of Engineers
T. Smith	U.S. Army Corps of Engineers
R. Gonzales	HGEB/NRR/NRC
J. Kane	HGEB/NRR/NRC
D. Hebert	Resident of Midland
C. Handler	Resident of Midland
A. Wilson	Resident of Midland
P. Vollmer	Observer
L. Heller	HGEB/NRR/NAL

FEB 10 198!

Enclosure 3

Viewgraph Slides Used During

Applicant's Presentations

MIDLAND PROJECT MEETING WITH THE NRC/CORPS OF ENGINEERS ON SOILS MIDLAND

August 29, 1980

Agenda

1. History of Soils Issues
2. Investigative Program (Summary)
3. Consultants Review of Adequacy of Remedial Actions
   (a) Preload Program (Settlement)
   (b) Bearing Capacity (Diesel Generator Buildi..)
   (c) Caissons & Piling

GSK/sld
8/29/80

G. Keeley Presentation
9/29/80
4 pages

SUMMARY OF SOILS INFORMATION

FEB 10 1981

• 9/7/78	VERBAL REPORT TO REGION 3
• 9/29/78	ISSUED 50.55(E) REPORT
• 11/1/78	KEPPLER MEMO TO THORNBURG ASKING STAFF TO TAKE OVER RESPONSIBILITY
• 12/21/78	50.55(E) NOTIFICATION THAT PRELOAD IS CORRECTIVE ACTION WE ARE GOING TO IMPLEMENT
• 3/21/79	RECEIVED FIRST SET OF 50.54(F) QUESTIONS 1 THROUGH 22.
• 4/24/79	STARTED RESPONDING TO 50.54(F) QUESTIONS 1 THROUGH 22
• 7/18/79	MET WITH NRC STAFF IN WASHINGTON ON RESULTS OF PRELOAD PROGRAM, SITE INVESTIGATION, PROPOSED FIXES INCLUDING CAISSONS, UNDERPINNING AND DEWATERING

SUMMARY OF SOILS INFORMATION (CONTD)

· 9/5/79	MET WITH STAFF ON QA QUESTION 23 50.54(F)
· 10/16/79	NRC STATED THAT CORPS OF ENGINEERS IS TO HELP STAFF ON GEOTECH REVIEWS
· 11/13/79	SUBMITTED ANSWER TO 50.54(F) QUESTION 23 AND COMPLETE RESPONSE TO ALL OTHER 50.54(F) QUESTIONS EXCEPT FOR QUESTIONS 4 AND 14 WHICH WERE COMMITTED TO BE COMPLETED IN DECEMBER 1979.
· 11/14/79	CORPS OF ENGINEERS VISITS SITE
· 11/19/79	RECEIVED 50.54(F) SUPPLEMENTAL QUESTIONS 24 - 35
· 12/6/79	PREAWARD MEETING ON UNDERPINNING
· 12/6/79	NRC ISSUES ORDER MODIFYING CONSTRUCTION PERMIT.

SUMMARY OF SOILS INFORMATION (CONTD)

• 12/26/79	CPCO REQUESTS HEARING
• 1/16/80	MET WITH NRC STAFF AND CORPS OF ENGINEERS IN WASHINGTON ON 50.54(F) QUESTIONS AND RESULTS OF PRELOAD PROGRAM. SITE INVESTIGATION, PROPOSED FIXES INCLUDING CAISSONS, UNDERPINNING AND DEWATERING
• 2/26/80	REQUEST FROM NRC THAT NAVY WEAPONS CENTER RECEIVE ALL DOCUMENTS ON SOILS ISSUES
• 2/27-28/80	MEETING WITH NRC STAFF AND THEIR CONSULTANTS ON SITE FOR SITE TOUR AND TO DISCUSS PRELOAD PROGRAM, SITE INVESTIGATION AND PROPOSED FIXES INCLUDING CAISSONS, UNDERPINNING AND DEWATERING.
• 2/28/80	STARTED SUBMITTING ANSWERS TO QUESTIONS 24 AND 37

SUMMARY OF SOILS INFORMATION (CONTD)

- 2/29/80 — NRC MEMO THAT ETECH WOULD BE NRC CONSULTANT ON MECHANICAL ENGINEERING ASPECTS OF SOILS ISSUES

- 4/1/80 — NRC REQUESTED ADDITIONAL REPORTS, DRAWINGS AND OTHER INFORMATION. THIS WAS PROVIDED IN MAY 1980

- 6/30/80 — SCHWENCER MEMO TO JWCOOK REQUESTING ADDITIONAL INFORMATION (QUESTIONS 36, 37 AND 38). QUESTION 37 ASKED FOR ADDITIONAL EXPLORATION, SAMPLING AND LAB TESTING

- 7/31/80 — MET WITH STAFF AND CORPS OF ENGINEERS TO DISCUSS ADEQUACY OF OUR PROGRAM ON CORRECTIVE ACTION.

- 8/4/80 — SCHWENCER MEMO TO JWCOOK ATTACHING MARKED UP LETTER REPORT DATED 7/7/80 WITH QUESTIONS 39 - 48 FROM CORPS OF ENGINEERS

J. Wanzeck

MIDLAND PROJECT

FEB 10 1981

Observed Settlements (Inches)
of Structures

September 79 to Present

1. Diesel Gen. Bldg. (.0625")

2. Aux. Bldg. Elect.
Penetration Rooms (0.0625" (Approx. 0.02" Dewatering))

3. Feedwater Iso. Pits (0.080")

4. Service Water Structure (0.120")

5. Serv. Water Struct. Wing Wall (0.010")

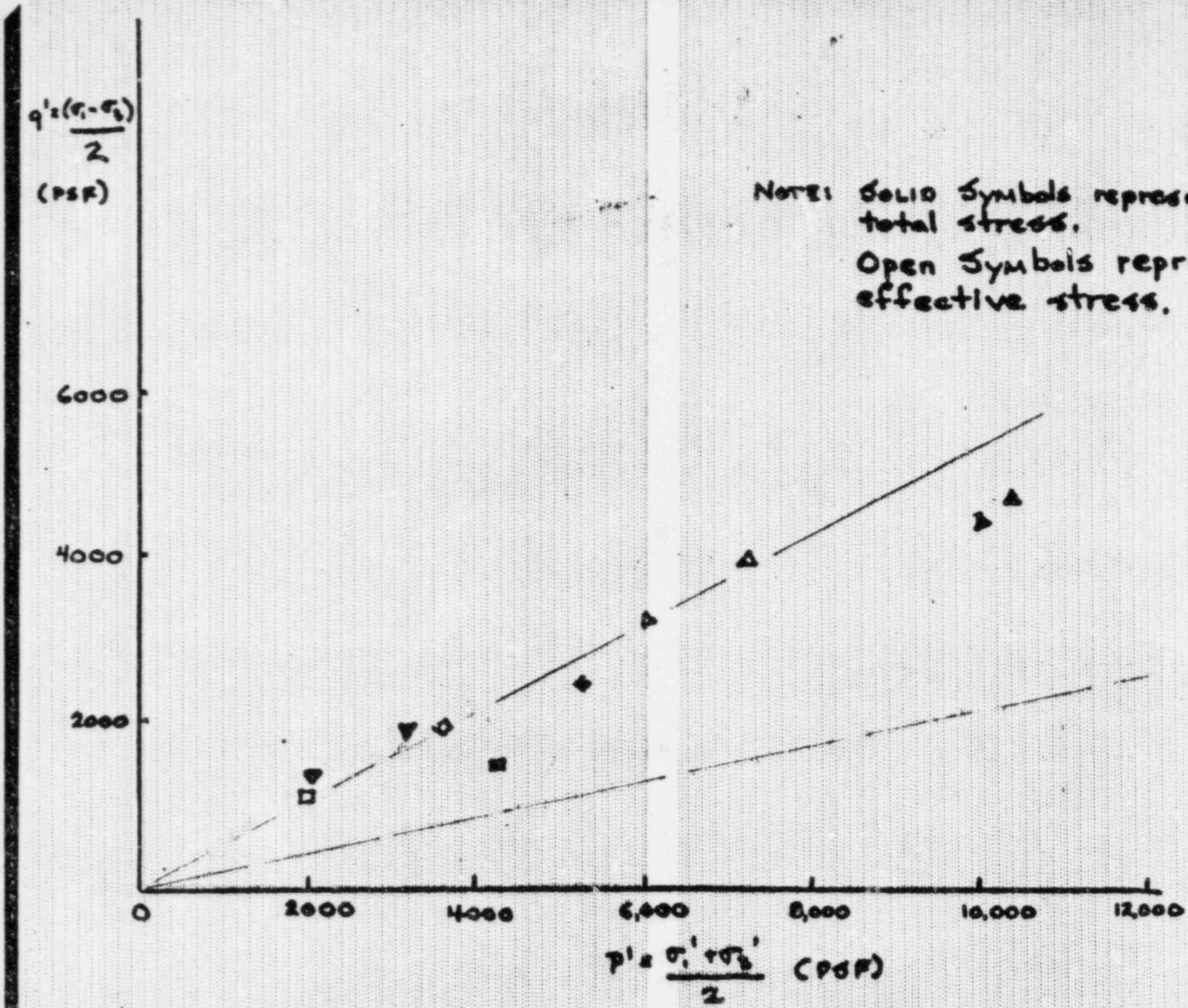
6. Diesel Fuel Oil Stor. Tanks (0.010")

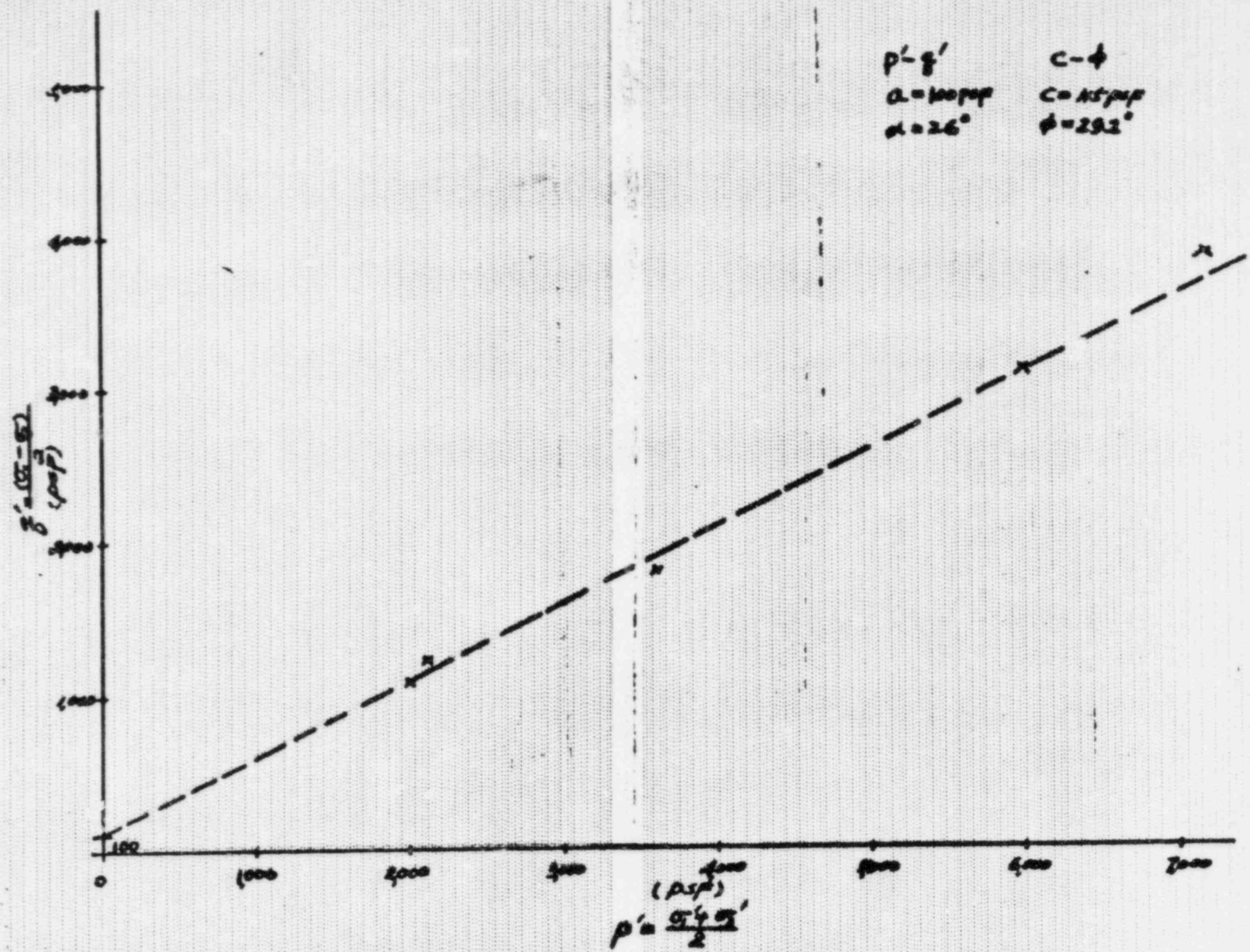
*7. Condensate Stor. Tank (1.625" during Load Test)
(0.06" Last 90 Days)

*8. Circ. Water Wing Walls (0.040")

*9. Cooling Pond Dike (3 Points 1.875". - Since 6/6/78 0.010")

*Non-Category 1


$q' = \frac{(\sigma_1 - \sigma_3)}{2}$ (PSF)
NOTE: Solid Symbols represent total stress.
Open Symbols represent effective stress.
6000
4000
2000
0
2000
4000
6,000
8,000
10,000
12,000
$p' = \frac{\sigma_1' + \sigma_3'}{2}$ (PSF)


p'-q'
a = 100 psf
α = 26°
c-φ
c = 115 psf
φ = 29.2°
100
0
1000
2000
3000
4000
5000
6000
7000
q' = (σ1-σ3)/2 (psf)
p' = (σ1+σ3)/2 (psf)

SUMMARY OF SOIL PROPERTIES

TO DETERMINE p' - q' RELATIONSHIP

Sample No.	γ_d (pcf)	wt	$p' = \frac{\bar{\sigma}_1 + \bar{\sigma}_3}{2}$ (psf)	$q' = \frac{\bar{\sigma}_1 + \bar{\sigma}_3}{2}$ (psf)
T9 - 8 - 213	117.9	14.4	2000	1100
T18 - ? - 222	118.6	14.2	7200	3850
T16 - 5 - 225	114.4	16.9	2100	1225
TR3 - D3 - 140	114.6	14.6	3600	1800
TR5 - 2 - 147	117.9	14.1	6000	3100

T9 - 8 - 213

Boring No. — Test Series No.

Sample No.

BEARING CAPACITY (D/G bldg.)

B. BASED ON FIVE SAMPLES WITH LOWER DENSITIES

$\bar{\phi} = 29^{\circ}$

$\bar{c} = 114$ psf

$N_c = 27 \quad N_q = 16 \quad N_\gamma = 15$

$q_d = (114)(27) + (125)(6)(16) + 1/2\,(125)(10)(15)$

$= 3,078 + 12,000 + 9,375$

$= 24,453$ psf

$(q_d)_{net} = 23,703$ psf

$F.S. = \frac{23,703}{3,400} = 6.97$

IF WE NEGLECT $\bar{c}$, ASSUME = 0

$q_d = (125)(6)(16) + 1/2\,(125)(10)(15)$

$= 12,000 + 9,375$

$= 21,375$ psf

$(q_d)_{net} = 20,625$ psf

$F.S. = \frac{20,625}{3,400} = 6.07$

BEARING CAPACITY (D/G bldg.)

A. BASED ON ALL CIU TESTS

$\bar{\phi} = 29^{\circ}$

$\bar{c} = 260$ psf

a). Use T & P

$N_c = 27 \qquad N_q = 16 \qquad N_\gamma = 15$

$q_d = (260)(27) + (125)(6)(16) + 1/2\,(125)(10)(15)$

$= 7,020 + 12,000 + 9,375$

$= 28395$ psf

$(q_d)_{net} = 27,645$

$$F.S. = \frac{27,645}{3,400} = 8.13$$

b). Use Vesic

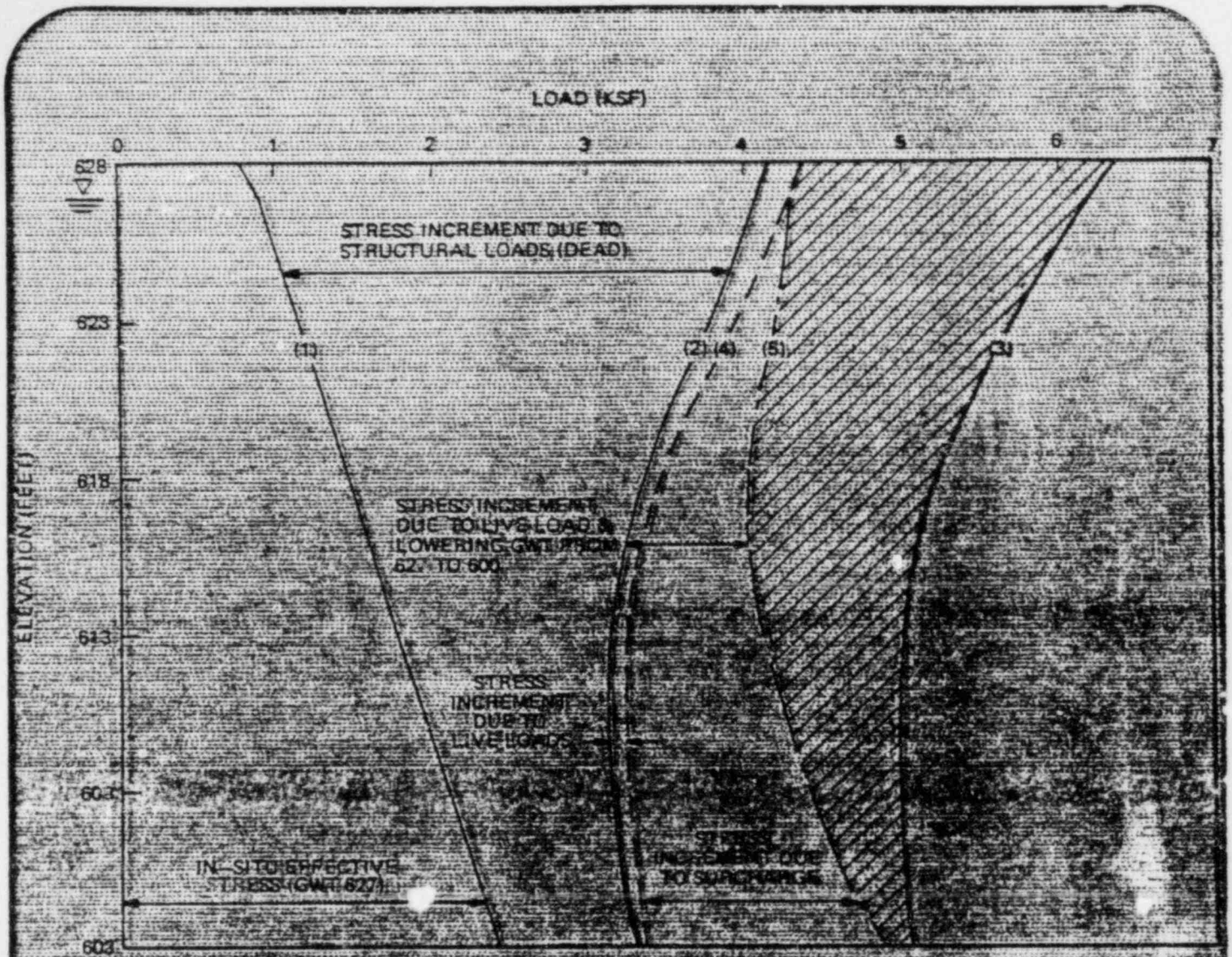
$N_c = 27.9 \qquad N_q = 16.4 \qquad N_\gamma = 19$

$q_d = (260)(27.9) + (125)(6)(16.4) + 1/2\,(125)(10)(19)$

$= 7,254 + 12,300 + 11,875 = 31,425$ psf

$(q_d)_{net} = 30,679$ psf

$$F.S. = \frac{30,679}{3,400} = 9.02$$

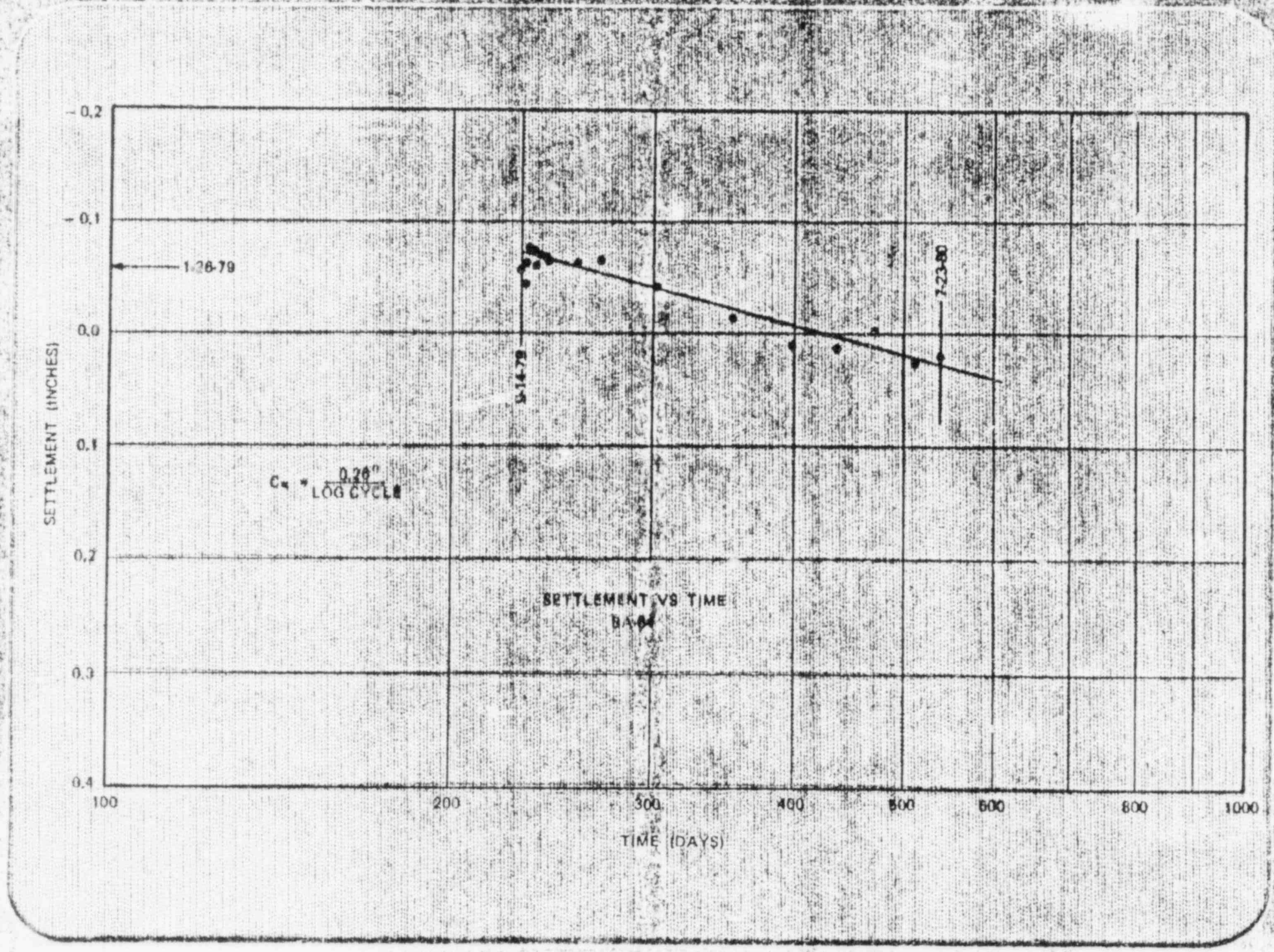


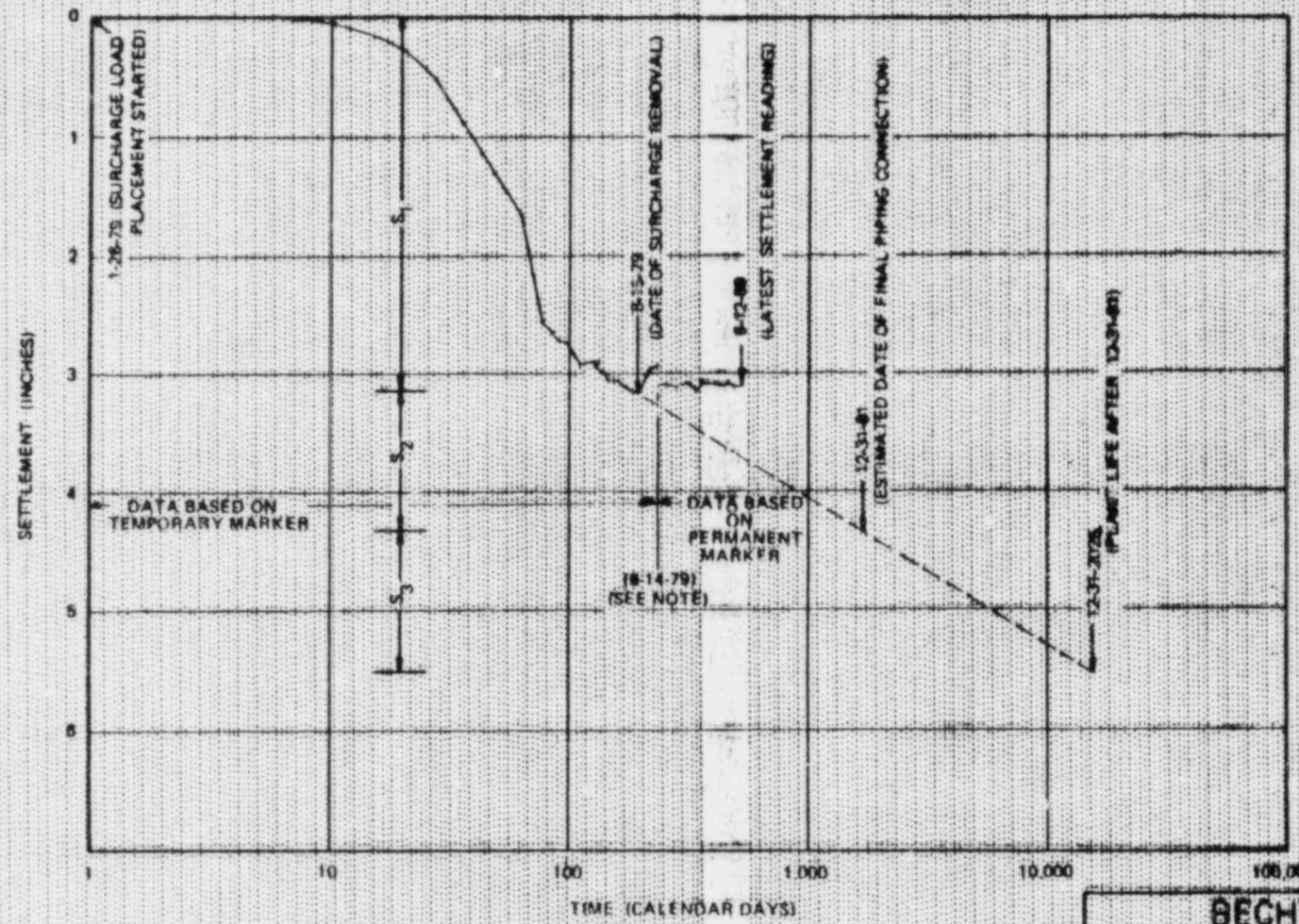
NOTES:

1. (1) In-situ effective overburden pressure, GWT at 622'.
2. (2) Total effective pressure due to in-situ effective overburden pressure and structural dead loads.
3. (3) Total effective pressure at the end of surcharge due to in-situ effective overburden pressure, structural dead loads, & surcharge loads.
4. (4) Total effective pressure due to in-situ effective overburden pressure, structural dead loads, & live loads.
5. (5) Total effective pressure during the life of plant operation due to in-situ effective overburden pressure, structural dead loads, decreasing loads, & live loads.

COMPARISON OF EFFECTIVE STRESS AT (1) END OF SURCHARGE AND (2) DURING LIFE OF PLANT OPERATION

SOUTHWEST CORNER OF DIESEL GENERATOR BUILDING


SETTLEMENT (INCHES)
0.2
0.1
0.0
0.1
0.2
0.3
0.4
1-26-79
3-14-79
7-23-80
0.26"
LOG CYCLE
SETTLEMENT VS TIME
100
200
300
400
500
600
800
1000
TIME (DAYS)



LEGEND

—— MEASURED SETTLEMENT

– – – PREDICTED SECONDARY COMPRESSION SETTLEMENT ASSUMING SURCHARGE REMAINS

NOTE

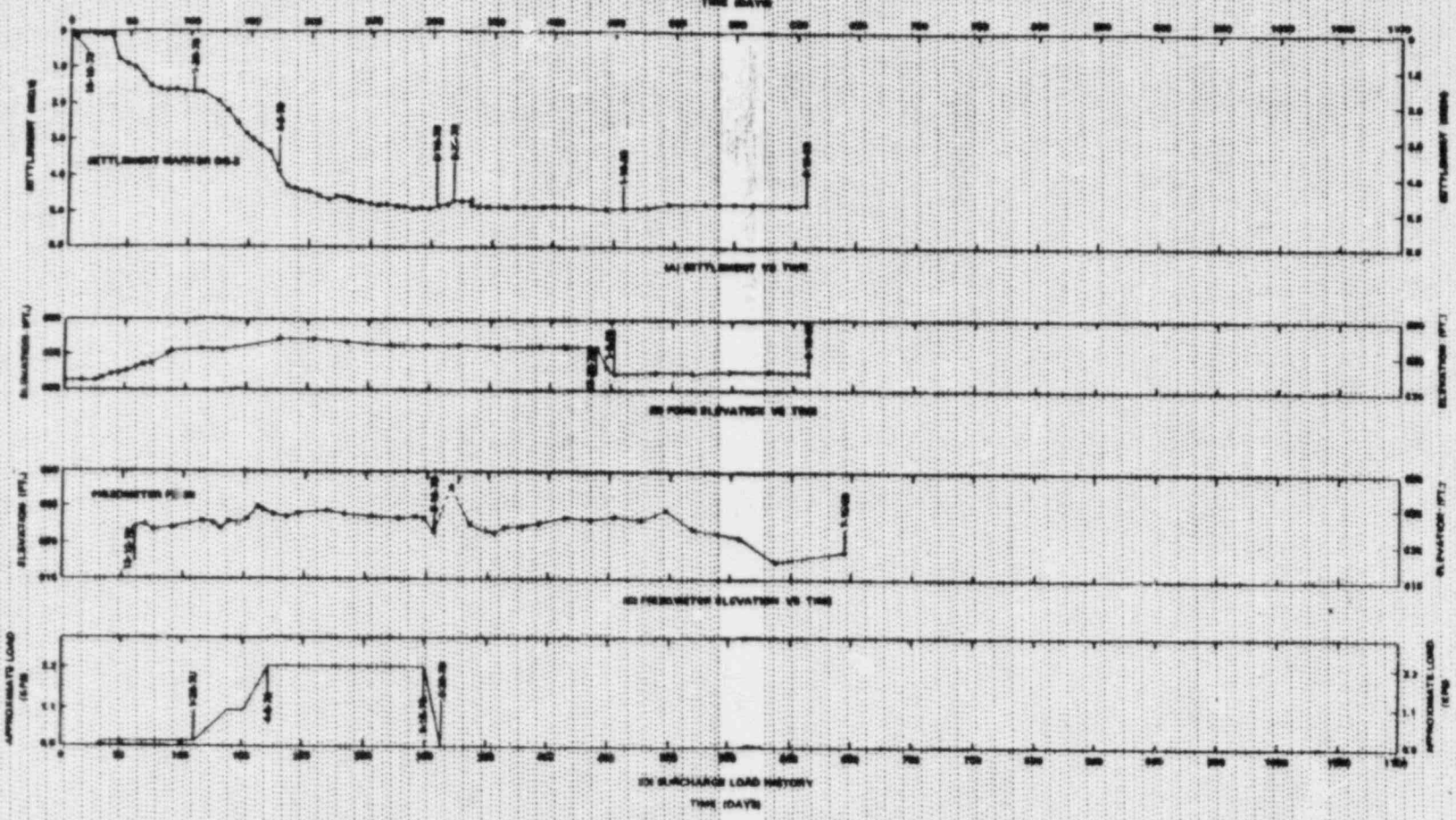
The permanent marker could not be monitored from 3-22-79 to 9-14-79 due to surcharge. Temporary markers at elevation 664'-0" ± were used during this period to estimate the settlement of the permanent markers. On 9-14-79 the settlement was again taken directly upon the permanent markers.

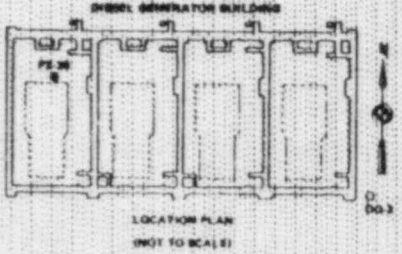
BECHTEL
ANN ARBOR

MIDLAND POWER PLANT

MEASURED AND PREDICTED SETTLEMENT VS LOG OF TIME (DG-3)

JOB NO.	DRAWING NO.	REV.
7220	FIGURE	





NOTE:

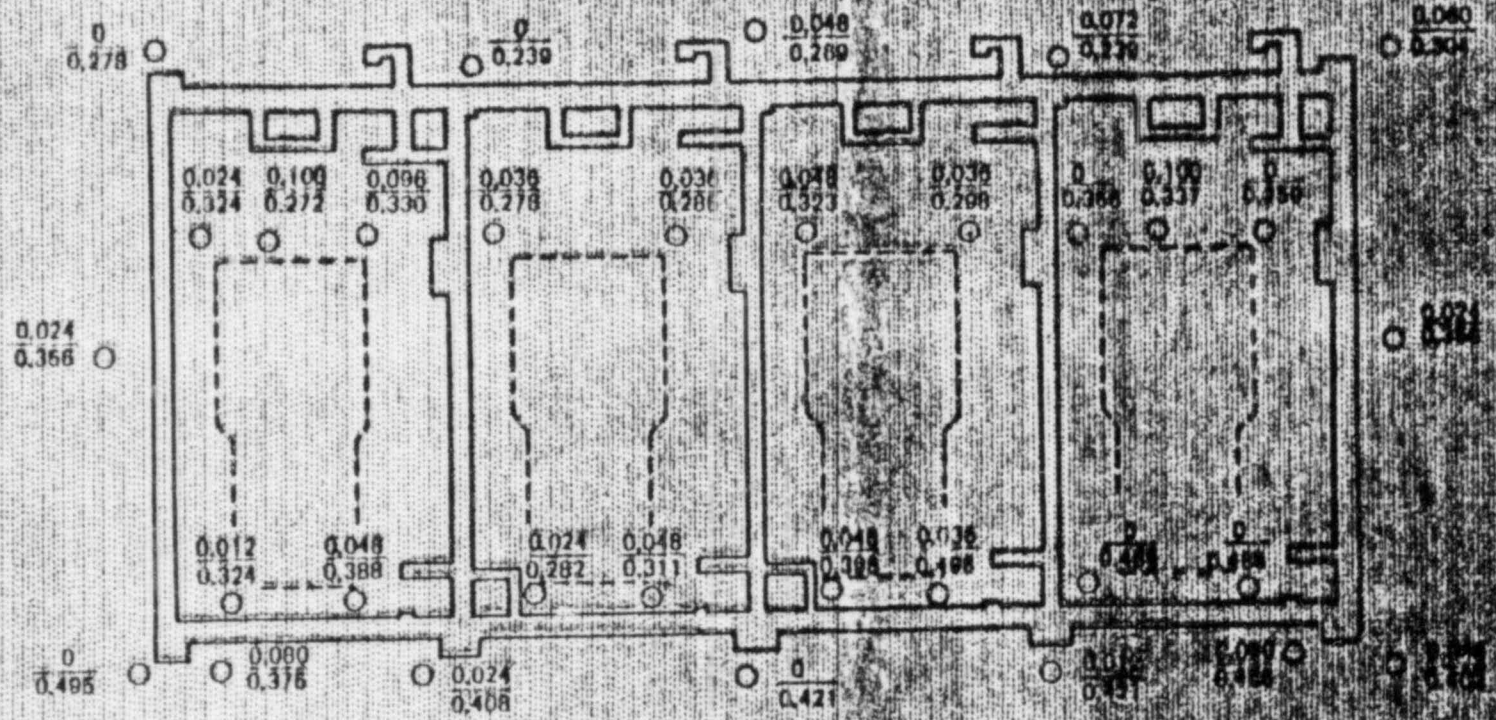
On 10-10-78 the measured settlement at marker DG-3 was 2.862 inch.

BECHTEL

MIDLAND POWER PLANT

DIESEL GENERATOR BUILDING
TYPICAL SETTLEMENT, LOCK-IN, POND LEVEL,
PIEZOMETER LEVEL AND SURCHARGE LOAD HISTORY

7220 FIGURE 3.7-4 A



LEGEND:

O — BUILDING / PEDESTAL SETTLEMENT MARKER

0.012 — MEASURED SETTLEMENT BETWEEN 8-15-79 and 8-12-80 IN INCHES

0.421 — PREDICTED SETTLEMENT BETWEEN 8-15-79 and 8-12-80 IN INCHES ASSUMING SURCHARGE REMAINS DURING PLANT LIFE

NOTE:

The measured settlements do not include the heave observed approximately between 8-15-79 & 9-14-79.

BECHTEL
ANN ARBOR

MIDLAND POWER PLANT

MEASURED VS PREDICTED SECONDARY COMPRESSION SETTLEMENT (8-15-79 / 8-12-80) ASSUMING SURCHARGE REMAINS

	JOB NO.	DRAWING NO.
	7220	FIGURE 27-15

FEB 10 1981

Enclosure 2

NRC Tour Participants

8-28-80

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R. Vollmer	DE/NRC
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G. Lear	HGEB/DE/NRC
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D. Sibbald	CPCo Midland
T. Cooke	CPCo Midland
K. Wiedner	Bechtel
L. Heller	HGEB/NRC
T. Thiruvengadam	CPCo
R. Gonzales	HGEB/NRC
R. Erickson	Corps of Engineers
J. Wanzeck	Bechtel-Geotech
T. Smith	Corps of Engineers
H. Narain Singh	Corps of Engineers
J. Kane	HGEB/NRC
D. Budzik	CPCo
G. Keeley	CPCo

7/82

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

int to
DRL by Source
Lett also!

JAN 8 1981

Docket Nos.: 50-329/330 OM, OL

Mr. J. W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. Cook:

SUBJECT: FOLLOW-UP ON DECISION REGARDING ADDITIONAL SOIL BORINGS AND TESTING - MIDLAND PLANT, UNITS 1 AND 2

By letter of November 10, 1980, I informed you of our decision relative to your request for relief from making additional borings and associated tests of soils in eighteen areas on the Midland Plant site. That letter noted that a relaxation of certain requirements for six Standard Penetration Tests (SPT) in the vicinity of plant structures were in order on the basis of additional boring data which you submitted on September 14, 1980 and our extensive discussion on the merits of your position. My letter of November 10, 1980 also stated that certain borings which we had requested June 30, 1980 along portions of the cooling pond embankments should be relocated to areas of the dike immediately adjacent to the submerged emergency cooling water reservoir. The details of this relaxation, including the changed boring locations, are provided herein.

The new borings in the areas of interest for which subsurface information was provided by your letter of September 14, 1980, and the six SPT borings identified by Question 37 of our June 30, 1980 letter which may now be eliminated, are as follows:

Structure	New Borings Provided 9/14/78	Eliminated SPT Borings
Diesel Generator Building	CH-13, CH-14, CH-15, CH-16, CH-17, CH-18	COE-8 COE-13
Service Water Structure	CH-1, CH-1A, CH-2, CH-3	COE-16
Retaining Wall	PD-9	COE-14
Auxiliary Building	TW&TEW Series	COE-17, COE-18

8101220104 3pp

Details of this relaxation are further described in the enclosed letter of December 2, 1980 by Mr. P. McCallister of the U. S. Army Corps of Engineers, our geotechnical consultant. Mr. McCallister's letter includes a revised sketch (Figure 1) showing all the borings in the plant fill area and noting the six borings from which the SPT's have been eliminated. Mr. McCallister's letter also includes a revised sketch (Figure 2) showing the relocated boring locations on the cooling pond dikes. Figure 2 shows the new locations for borings COE-1, COE-2 and COE-3 (previously located in the south and east dikes), and boring COE-7 (previously located in the northwest area). We further endorse Mr. McCallister's comments regarding selection of undisturbed sample locations and his requests that the guidance of Regulatory Guides 1.132, "Site Investigation for Foundation of Nuclear Power Plants," and Regulatory Guides 1.138, "Laboratory Investigation of Soils for Engineering Analysis and Design of Nuclear Power Plant" be used as appropriate.

Your letter of November 21, 1980 forwarded Amendment 85 to the Midland application and noted your belief that Amendments 85 and 81 satisfy the concerns raised in Question 37. We find that these submittals do not fully satisfy the concerns of Question 37. Except as changed herein for the six SPT borings and the relocation of four dike borings, it remains our position that the requested soil borings and testing are still required as stated in my letter of November 10, 1980.

Sincerely,

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

Enclosure:
McCallister's letter dtd. 12/2/80

cc: See next page.

JAN 8 1981

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DEPARTMENT OF THE ARMY

DETROIT DISTRICT CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

REPLY TO
ATTENTION OF

2DEC 80

NCEED-T

SUBJECT: Interagency Agreement No. NRC-03-79-167, Task No. 1 Midland Plant Unit 1 and 2 Subtask No. 2

Mr. George Lear, Chief
U.S. Nuclear Regulatory Commission
Hydrologic & Geotechnical Engr. Br.
Division of Engineering
Mail Stop P-214
Washington, DC 20555

Dear Mr. Lear:

Reference is made to the letter of 10 November 1980 from Mr. R. L. Tedesco, Assistant Director for Licensing, Division of Licensing, to Mr. J. W. Cook, Vice President, Consumer Power Company, conveying the NRC action on the applicants request of 29 August 1980 for relief from making additional borings and testing of soil samples from eighteen (18) areas on the Midland plant site.

We have reviewed the NRC letter, and concur with the decision reached. The six (6) boring locations, from which requirements of the Standard Penetration Tests (SPT) have been relaxed were provided in our letter of 30 September 1980. We are inclosing a new map (Figure 1) showing all the borings in the plant fill area with special identification of the six (6) borings from which the SPT's have been eliminated. We are also inclosing a map (Figure 2) showing the relocated boring locations on the cooling pond dikes. In our opinion, relocations of the three borings (COE-1, COE-2 and COE-3) from the south and east dikes and one boring (COE-7) from the northwest area to the emergency cooling pond dikes are advisable. Data from these four relocated borings will help evaluate the stability of the dike around the Category I Emergency Cooling Pond (baffle dike and main dike). This will also help evaluate any potential impact on Category I discharge pipes which are located along either side of the emergency cooling pond and ultimately enter the reservoir at the south end.

Selection of undisturbed samples locations should be based on the results of the SPT's to be performed prior to taking samples at each boring location. For the six (6) boring locations in the plant fill area where SPT data is

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SUBJECT: Interagency Agreement No. NRC-03-79-167, Task No. 1 Midland Plant Unit 1 and 2 Subtask No. 2

available, the taking of undisturbed samples should be based on this data. The NRC Regulatory Guide 1.132 entitled "Site Investigation for Foundation of Nuclear Power Plant" should provide guidance for explorations and taking of undisturbed samples. Laboratory testing of the recovered samples should follow the guidance of NRC Regulatory Guide 1.138 entitled "Laboratory Investigation of Soils for Engineering Analysis and Design of Nuclear Power Plant."

Sincerely,

for P. McCALLISTER
Chief, Engineering Division

2 Incl
As stated

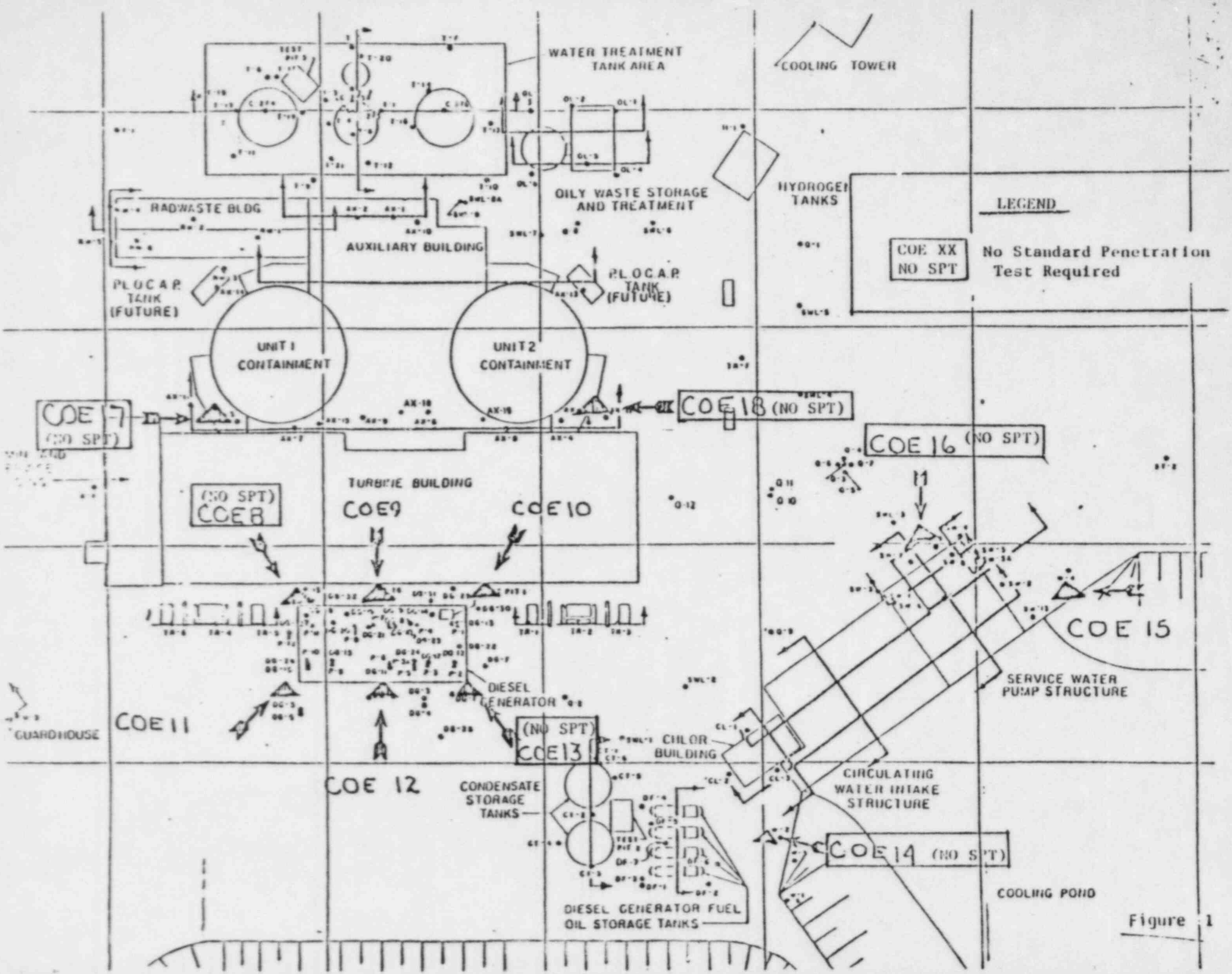
WATER TREATMENT TANK AREA
COOLING TOWER
OILY WASTE STORAGE AND TREATMENT
HYDROGEN TANKS
RADWASTE BLDG
AUXILIARY BUILDING
PLOCAP TANK (FUTURE)
PLOCAP TANK (FUTURE)
LEGEND
COE XX NO SPT
No Standard Penetration Test Required
UNIT 1 CONTAINMENT
UNIT 2 CONTAINMENT
COE 7 (NO SPT)
COE 18 (NO SPT)
COE 16 (NO SPT)
TURBINE BUILDING
(NO SPT) COE 8
COE 9
COE 10
COE 15
SERVICE WATER PUMP STRUCTURE
DIESEL GENERATOR
GUARDHOUSE
COE 11
(NO SPT) COE 13
CHLOR BUILDING
COE 12
CONDENSATE STORAGE TANKS
CIRCULATING WATER INTAKE STRUCTURE
COE 14 (NO SPT)
COOLING POND
DIESEL GENERATOR FUEL OIL STORAGE TANKS

Figure 1

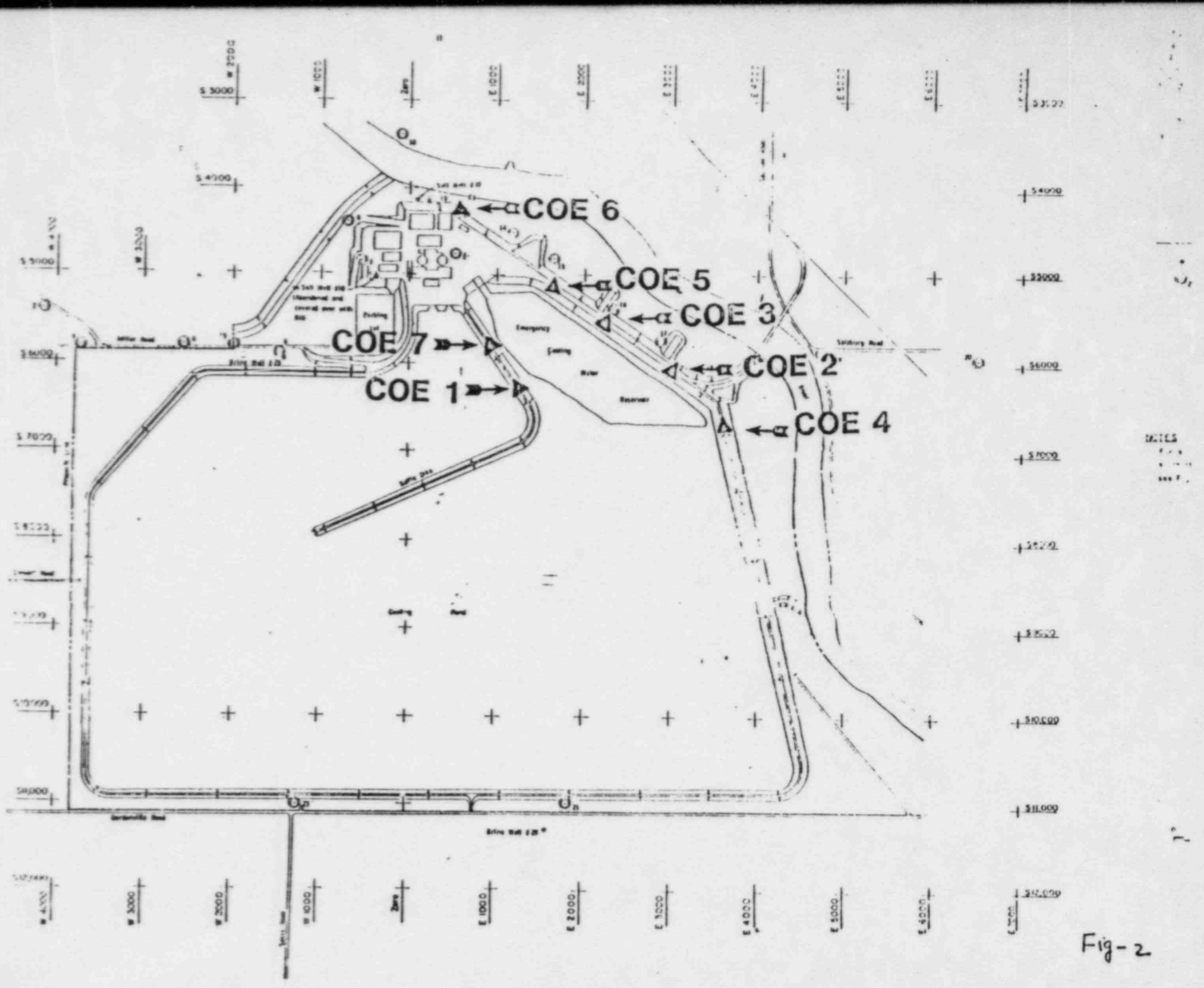

Fig-2

Consumers Power Company

James W Cook
Vice President - Projects, Engineering and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

June 11, 1982

Mr J G Keppler, Regional Administrator
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND PROJECT -
INSPECTION REPORT NO 50-329/82-06 & 50-330/82-06, ITEM 2
FILE: 0.4.2 SERIAL: 17513

References: (1) NRC Letter, C E Norelius to J W Cook, dated April 26, 1982, transmitting Inspection Report 82-06.

(2) CPCo Letter, J W Cook to J G Keppler, dated May 28, 1982, Serial 16182, responding to Inspection Report 82-06

Reference (1) deals with misinstalled cables and incomplete cable reel numbers. A meeting was held in Glen Ellyn on May 14, 1982, at which time Consumers Power presented a draft report on misinstalled cables. This letter, as promised by Reference (2), provides the released report on misinstalled cables. The released report has been updated to address the comments generated during the May 14 meeting. The report also provides the dates for which the corrective actions will be completed in order to put the plant in full compliance. A special training session (QCT-1616) was conducted for Bechtel Quality Control on PQCI E-4.0, "Cable Pulling," on March 15, 1982. This training emphasized Activity 2.5 of tne PQCI which concerns itself with cable vias, especially in regard to the type of problems identified during the Special Overinspection of cable routing. This training along with the continued emphasis in the training and certification of new electrical QC engineers provides the process corrective action to help assure better performance in this area.

With regard to cable reel numbering, the following actions have been taken to correct the specific instances and to preclude recurrence:

1. The cable reel numbers have been corrected, as necessary.

2. A cable reel list, with a cross-reference between the old numbers recorded and the real numbers that incorporate the purchase order number and the manufacturer's reel number, has been made a part of the E-4.0 "Cable Installation" record files in the QC vault.

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3. The number being recorded on inspection records at this time does incorporate the purchase order number and the manufacturer's reel number.

NCR M01-9-2-022 which documents these actions was closed on 5/17/82 and the plant is now in full compliance.

Consumers Power Company

By James W. Cook
James W Cook

Sworn and subscribed to before me on this 14th day of June, 1982.

Barbara L Townsend
Notary Public, Jackson County, Michigan

My commission expires September 8, 1984

WRB/BWM/lr

CC: RJCook, NRC Resident Inspector, Midland Site (w/enc)
RLandsman, NRC Region III (w/enc)
RGardner, NRC Region III (w/enc)

Enclosure: "Report on Cable Installation, Midland Plant Units 1 and 2, June 4, 1982"

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 Region 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 PQCI 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, certai.. 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

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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	I
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.

Attachment 1 to
Report on Cable Installation

RESULTS OF THE SPECIAL ELECTRICAL OVERINSPECTION REQUESTED BY NRC

7 1 2 3 0

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

071298

TO: Distribution

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
DEMiller, Midland
JARutgers, Bechtel-Ann Arbor
ESmith, Bechtel-Midland

Attachment 2 to
Report on Cable Installation

Consumers Power Company
8417-0

NONCONFORMANCE REPORT

BECTEL ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

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

6. PROJECT NAME:	7. NONCONFORMING PART NO:	8. NONCONFORMING PART NAME:	1. NCR SERIAL NO: MSI-9-2-013
Midland 1 and 2	CAB 4511 H	Electrical Cables	2. DATE: 2/3/82 CLOSED 4/16/82
4. SERIAL NUMBER: N/A	10. ORG. CONCERNED 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

12. "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 CAB 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
ACTION COPY:
LHCurtis
LEDavis
ESmith

INFO COPY:
WRBird JLWood
JWCook DANott
MADietrich ALAB-2
BWMarguglio MJSchaeffer
REMcCue/CPoirin BHPeck
DBMiller RDJohnson
~~BHPeck~~ MLCurland
JARutgers
DATaggart
~~DMTurnbull~~
RANells

13. QA RECOMMENDATION FOR PART CA:

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

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

15. ARE ADDITIONAL HOLD TAGS REQUIRED? YES [ ] NO [X] NUMBER, LOCATION & TYPE OF HOLD TAGS APPLIED:

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

16. DOES NC AFFECT Q-LIST ITEM: 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
20. IF YES, WHO MADE REPORT TO NRC: N/A	21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A

22. NCR ORIGINATED BY:	23. WRITTEN REPLY REQUIRED BY: 2/24/82 TO ESTABLISH CA COMPLETION DATE	24. SUPERVISOR'S SIGNATURE/DATE:
V.A. Natt 2/3/82		M 9. Schaefer 2/3/82

25. PART CA DISPOSITION, JUSTIFICATION & COMPLETION DATE:

Curtis response dated 2/23/82 attached.

26. DESIGN/PROJECT SIG. AUTH. DISP.:	27. PMO SIG. AUTH. DISP.:	28. PROCUREMENT SIG. CONC. DISP.:	29. SIG. OF ORG. RESP. FOR C/A:
See Block 25	N/A	N/A	See Block 25
30. QC 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 DISPOSITION DISP.:

34. 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

From: L. H. Curtis

NONCONFORMANCE REPORT

SUS: 7 1298 OCLN 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: NCR-9-2-013
land 1 and 2	OAB 4511 H	Electrical Cables	2. DATE: 2/3/82
AI NUMBER: N/A	10. ORG. CONDITION ORIG.: Bechtel Construction/ Bechtel Quality Control	11. AREA/LOC. OF NC: Lower Cable Spreading Room	3. DATE OF DISC: N/A
			4. FILE NO: 16.0

5. DISTRIBUTION

ACTION COPY:
LEDavis
ESmith

INFO COPY:
WRBird JLWood
JWCook DANott
MADietrich ALAB-2
BWMarguglio
REMcCue/CFollin
DBMiller
BHPeck
JARutgers
DATaggart
DMTurnbull
RAWells

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

tal 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

RECOMMENDATION 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)

NCR DISP. DISPOSITION REQUIRED [X] NOT REQUIRED [ ]

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

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

NC AFFECT 3-LEVEL ITEM: 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
IES, AND MADE REPORT TO NRC: N/A	21. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A

ANTICIPATED BY: 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. Schuster 2/3/82

F CA DISPOSITION, JUSTIFICATION & COMPLETION DATE:

is is Project Engineering's complete response. The actual 'as built' routing for cable B4511H 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.

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

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

26. ENG/PROJECT SIG. AUTH. DISP.: P. Corcoran for L. Curtis 2/3/82	27. PMO SIG. AUTH. DISP.: N/A	28. PROCUREMENT SIG. COMC. DISP.: N/A	29. SIG. OF ORG. RESP. FOR CA: P. Corcoran for L. Curtis
CONST. SIG. AUTH. DISP.:	31. SIG. OF TEST GROUP ACCEPT. CONDITION: N/A	32. PCE MAJOR MOD - PLT. SUPT. SIG. AUTH. DISP.: N/A	33. QA AUTH. SIG. TO DISPOSITION

OF PART CA VERIFICATION:

CONTRACTOR'S COMPANY

NONCONFORMANCE REPORT
PROCESS CORRECTIVE ACTION

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

ROOT CAUSE(S):

071298

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

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

CORRECTIVE ACTION RESULTED FROM:

DESIGN ☐ FABRICATION ☐ CONSTRUCTION ☒ PROCUREMENT ☐ INSPECTION ☒

OTHER

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)

CORRECTIVE ACTION TO BE TAKEN BY ORG(S) CHECKED IN BLOCK #4 & 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		SUBJECT	CODE
ACTION FOR VENDORS	ACTION FOR OTHERS	☐ BECHTEL DRAWINGS	B
1. ☐ APPROVED - MFG. MAY PROCEED	6. ☐ FOR APPROVAL	☐ VENDOR DRAWINGS	V
2. ☐ APPROVED SUBMIT FINAL DWG. MFG. MAY PROCEED	7. ☐ CONSTRUCTION	☐ MATERIAL REQUISITION	MR
3. ☐ APPROVED EXCEPT AS NOTED. MAKE CHANGES AND SUBMIT FINAL DWG. MFG MAY PROCEED AS APPROVED	8. ☐ PRELIMINARY USE	☐ SPECIFICATIONS	S
4. ☐ NOT APPROVED. CORRECT AND RESUBMIT	9. ☐ REFERENCE	☐ BID REQUEST	BR
5. ☐ REVIEW NOT REQUIRED MFG. MAY PROCEED.	10. ☒ Complete response	☐ QUOTATIONS	Q
		☐ PURCHASE ORDER	PO
		☐ CONFERENCE NOTES	CN
		☐ BID SUMMARY	BS
		☐ SUBCONTRACTS	SC
		☐ _____	X
		☐ _____	Y

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

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

CONSUMERS POWER COMPANY

RECEIVED

APR 14 1982

FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

COMMENTS: cc: W. R. Bird
R. W. Marguglio

ACTION PRINT	DAN
INFO PRINTS	
MPQA ROUTING	MLC
PRINT TO FILE	
MAIL TO FILE	16.0

THIS COPY FOR

D. M. Turnbull, MPQAD
Consumers Power Company

FROM

ESmith, Quality Control
Bechtel Power Corp.

☐ VENDOR PRINT
☐ OTHER

BY E. Smith

71283

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

7290

*** 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			

[illegible] COMPANY

RECEIVED

FEB 19 1982

FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

COMMENTS:

ACTION PRINT	DAN
INFO PRINTS	BWM/ELJ/MJS
MTLS ROUTING	DIST.
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 [signature]

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. FCN 6388 has been written to correct E-37 to the "as built" condition.

Attachment 2 to Report on Cable Installation

To: B. W. Marguglio

From: L. E. Curtis

NONCONFORMANCE REPORT

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

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

5. 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 inconsistancies underlined.

The "AS IS" condition of cable routing does not also conform to the "AS REQUIRED" routing referenced in Bechtal PQCI 7220/E-4.0, which was used by Bechtal 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.

6. DISPOSITION

ACTION COPY:
LHCurtis/PCorcoran
LEDavis
ESmith

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

JUSTIFICATION FOR PART CA:

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

(Continued on page 5)

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

PART NCR? [ ] NO [X] NUMBER, LOCATION & TYPE OF HOLD TAGS AFFIXED:

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

NC AFFECT 4-LEFT 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 RESPONSE CA COMPLETION DATE	24. SUPERVISOR'S SIGNATURE/DATE: M. J. Schaeffer 2/11/82

25. RESPONSE, 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. Holler
L. Curtis
P. Corcoran
G. Warner
[redacted]

THIS COPY FOR

26. PROJECT SIG. AUTH. DISP.: P Corcoran for L Curtis 2/12/82	27. PRO SIG. AUTH. DISP.: N/A	28. PROCUREMENT SIG. CONC. DISP.: N/A	29. SIG. OF ORG. RESP. FOR C/A: P Corcoran for L Curtis 2/12/82
30. CONST. SIG. AUTH. DEP. DISP.:	31. SIG. OF TEST GROUP ACTION CONCURRENCE: N/A	32. FOR MAJOR NCR - PLT. SUPT. SIG. AUTH. DISP.: N/A	33. QA AUTH. SIG. TO DOCUMENT:

34. QA VERIFICATION:

Attachment 2 to Report on Cable Installation

Consumers Power Company

NONCONFORMANCE REPORT
PROCESS CORRECTIVE ACTION

PROJECT ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT
M-01-9-2-016
NCR SERIAL NUMBER:
PAGE 2 OF 5

ASPECT OF ROOT CAUSE(S):

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

FINAL 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:

rmine the need for additional Process Corrective Action in view of the fact that AD 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 #4 & DATE OF COMPLETION:

SIGN OF PROCESS CA VERIFICATION:

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

CABLE SCHEME NUMBER	
CAB6501N	AS REQUIRED ROUTING: 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.
CAB6502M	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, BAC32, BJ524, BJA073, BJA05, BJA04, BJA03 and BJA035. AS IS ROUTING BSL938, BDB01, BDA02, BDA01, BJ419, BAC32, BJ524, BJA073, BJA05, BJA04, BJA03 and BJA035.

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

CABLE SCHEME NUMBER	AS REQUIRED ROUTING:
1AB5301E	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.
	AS IS ROUTING:
	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:**
	DTB005, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21, DTA22.
	AS IS ROUTING:
	DTB005, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DFA08, DJA07, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DJA01, DC002, DTA003, DTA21, DTA22.
1DQ396D 1DQ396F 1DQ396H 1DQ396L 1DQ396T	**AS REQUIRED ROUTING:**
	DTB004, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA01, DC003, DTA002, DTA21, DTA22.
	AS IS ROUTING:
	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:**
	DSL907, DGA01, DWW001, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21.
	AS IS ROUTING:
	Coil, DTB03, DFA08, DJA07, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DJA01, DC002, DTA003, DTA21.

T1296

13. 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 per (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 2AB6302K 0AB6502M 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. 'As built' via (verified by Resident Engineering) is BSL937. This via is acceptable as is. E-37 revised, reference DCN number 884 (2/12/82).
1DQ157A 1DQ396D 1DQ396F 1DQ396H 1DQ396L 1DQ396T 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. 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

RECEIVED
FEB 19 1982
FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

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 8-1073

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, 1EQ403D, 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	NFS
INFO PRINTS	
ROUTING	ONT
TO FILE	
THIS COPY FOR → ORIG TO FILE	16.0

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

This is Project Engineering's complete response:

CABLE SCHEME NUMBER	EVALUATION
0AB6501N 2AB6302K 0AB6502M 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. 'As built' via (verified by Resident Engineering) is BSL937. This via is acceptable as is. E-37 revised, reference DCN number 884 (2/12/82).
1DQ157A 1DQ396D 1DQ396F 1DQ396H 1DQ396L 1DQ396T 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. 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).

Attachment 2 to Report on Cable Installation

To: B. W. Marguglio

Consumers Power Company

NONCONFORMANCE REPORT

From: L. H. Curtis

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

Midland 1 & 2	See below	Electrical Cables	2/16/82
N/A	Bechtel Construction/ QC/Project Engineering	Various Class 1E Locations	N/A
			16.0

As IF NONCONFORMING CONDITION VERIFIED "AS IDENTIFIED" CONDITION WERE REPEATED:

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 3)

ACTION COPY: LHCurtis/PCorcoran, LEDavis, ESmith

INFO COPY: DScott, DATaggart, WRBird, DMTurnbull, JWCook, RAWells, MLCurland, JLWood, MADietrich, ALAB-2, RDJohnson, BWMarguglio, REMcCue, DBMiller, EHPeck, JARutgers, MJSh[illegible]

ENGR/PROJECT ENG. RESPONSIBLE ENGINEER [X] NOT ENGINEER [ ]

APPLIES [ ] NO [X]

NUMBER, LOCATION & TYPE OF HOLD TAGS APPLIED:

RECEIVED

FEB 19 1982

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

FIELD QUALITY ASSURANCE
MIDLAND, MICHIGAN

CAN BE ATTRIBUTED TO QA/CONT ITEM? YES [X] NO [ ]	17. IS NR REPORTABLE PER 50.55(e)? YES [ ] NO [X]
IS NR REPORTABLE PER PART 21? YES [ ] NO [X]	18. IF YES, DATE & TIME OF REPORT TO NRC: N/A
IF YES, WAS NR REPORT TO NRC: N/A	19. IF YES, NAME OF NRC OFFICIAL TO WHOM REPORTED: N/A

CA ORIGINATOR NO: M J Schaeffer mjs	21. CA/QA ENGR RESPONSE NO: 2/18/82 TO ESTABLISH CA COMPLETION DATE	22. SUPERVISOR'S SIGNATURE/DATE: Michael J Schaeffer 2/18/82

PART CA DISPOSITION, JUSTIFICATION & COMPLETION DATA:

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	LHC
INFO PRINTS	
MPQA ROUTING	DMT
PRINT TO FILE	
ORIG TO FILE	16.0

THIS COPY FOR → ORIG TO FILE

24. ENGR/PROJECT ENG. CONC. DISP.: 2/17/82	27. PQD CONC. DISP.: N/A	28. PROCUREMENT CONC. CONC. DISP.: N/A	29. CONC. OF CONC. DISP. FOR C/A: DR Chapman for LH Curtis 2/17/82
30. QA/ QC CONC. DISP.:	31. CONC. OF TEST GROUP ACTIONS, CONDITIONS: N/A	32. FOR FIELD NCR - FLD. ENGR. CONC. DISP.: N/A	33. QA ANTIC. CONC. TO DISPOSITION DISP.:

METHOD OF PART CA VERIFICATION:

35. NO. OF CONC. DISP. FOR PART C/A VERIFYING COMPLETION:	36. CONC. 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

PP STS. ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT
M-01-9-2-021
NCR SERIAL NUMBER: _____
PAGE 2 OF 5

QA ASSESSMENT 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 QUAL. RESPONSIBLE FOR PROCESS QA):

PROCESS QA REQUIRED FROM:
VENDOR [ ] ENGINEERING [ ] CONSTRUCTION [X] PROCUREMENT [ ] INSPECTION [X]
OTHER _____

QA RECOMMENDATION FOR PROCESS QA:

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)

PROCESS QA TO BE TAKEN BY ORG(S) CHECKED IN BLOCK 14 & DATE OF COMPLETION:

REVIEW OF PROCESS QA VERIFICATION:

[illegible] 14A. PROCESS QA COMPLETION VERIFIED BY/DATE:

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

CABLE SCHEME NUMBER	
	AS REQUIRED ROUTING:
1DQ 173 D 1DQ 173 E 1DQ 173 F	DSL907, DGA01, DWW001, DTB07, DTB06, DH015, DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC003, DTA002, DTA21.
	AS IS ROUTING:
1DQ 177 F 1DQ 181 B 1DQ 181 D 1DQ 181 F 1DQ 181 H	Coil at DJ475, DTB001, DTB03, DTA07, DTA06, DTA05, DTA04, DTA03, DTA02, DTA01, DC002, DTA003, DTA21.
	AS REQUIRED ROUTING:
CAB 6502 M 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 003 A 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	
1BG 1213 B	AS REQUIRED ROUTING: 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, BFT09.
	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, BFT09.
1EB 5610 C	AS REQUIRED ROUTING: 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.
1EA 0012 A	AS REQUIRED ROUTING: BFT09, 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: BFT09, 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.
1SI 067 A	AS REQUIRED ROUTING: 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
2EA0001F	2C46	2J1145

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

AS IS ROUTING:

FROM	TO
2C46	2C232

BN054, BJ69C, 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 32, 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)

T129c

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

This is Project Engineering's complete response.

Cable Scheme Number	Evaluation
1DQ173D 1DQ173E 1DQ173F 1DQ177D 1DQ177F 1DQ181B 1DQ181D 1DQ181F 1DQ181H 0AB6502M 2AB6302K 2BI005A 2BI004A 1AC113E 1BB5610C 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. NCR 4-040 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 NPQAD, 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 2/20/82
D.S.P. — DATE 2/24/82
PROJ CONSTR QC ENGINEER — DATE
AUTHORIZED INSPECTOR — DATE

25. DISPOSITION RESULTS

17. REPORTED BY: Dale E. Pauley — 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-ROUTED 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

J.S. Cumbee 2-17-82 — D.P. Curley 2/17/82

2/17/82

26. QC ACCEPTANCE

QC ENGINEER — DATE

AUTHORIZED INSPECTOR — DATE

Attachment 2 to Report on Cable Installation

8711290

Track 11b (continued)

(1) Cable 2BB4405 B 2GTD
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 BSL953, 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 ..... AJA05, 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 2658
Ⓐ REQUIRMENTS: PER E-37 REV. 52 VIAS BJH01, BJB03
CONTRARY TO THE ABOVE, CABLE INSTALLED IN VIAS BJH01, BJH02, BJB03
Ⓑ REQUIREMENTS: 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

Exh 11e (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 2BSB
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 INSTALLED 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, BKA04 ....
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 1EGB
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 1EGB
Requirements : Per E-37 Rev. 52, Vias BSL921, BJH01, BKA06 ....
Contrary to the above, cable installed in vias BSL921, BKA06 ....

Block 11e (Continued)

(21) Cable 1AB5526 A 1ALA
Requirements: Per E-37 Rev. 52, Vias ···· AKA05, AJC01 ····
Contrary to the Above, cable installed in vias ···· AKA05, AKA04, 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, AJA04, 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, 1ASL968

(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 ····

(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 1BQ403E 1SAB
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, BJA01, BJA02, BJA03, BJA04, BJF03 ....

(29) Cable 1BQ403D 1SAB
Requirements: Per E-37 Rev. 52, Vias BSL169, BJA044, BJA02, BJA03, BJA04, BJM01, BJF03 ....
Contrary to the above, cable installed in vias BSL169, BJA044, BJA02, BJA03, BJA04, BJF03 ....

58 hold tags applied Q-list Nos 3.003
3.007

BLOCK 22 (CONTINUED)
CABLES 27, 28 & 29 WILL BE REWORKED PER E-37 REV 52 (I.C.) [signature] 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	11	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				
1AB2341B	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 Criteria

The tray wrapping criteria 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 independance of electrical systems.

7. QC Area Walkdown

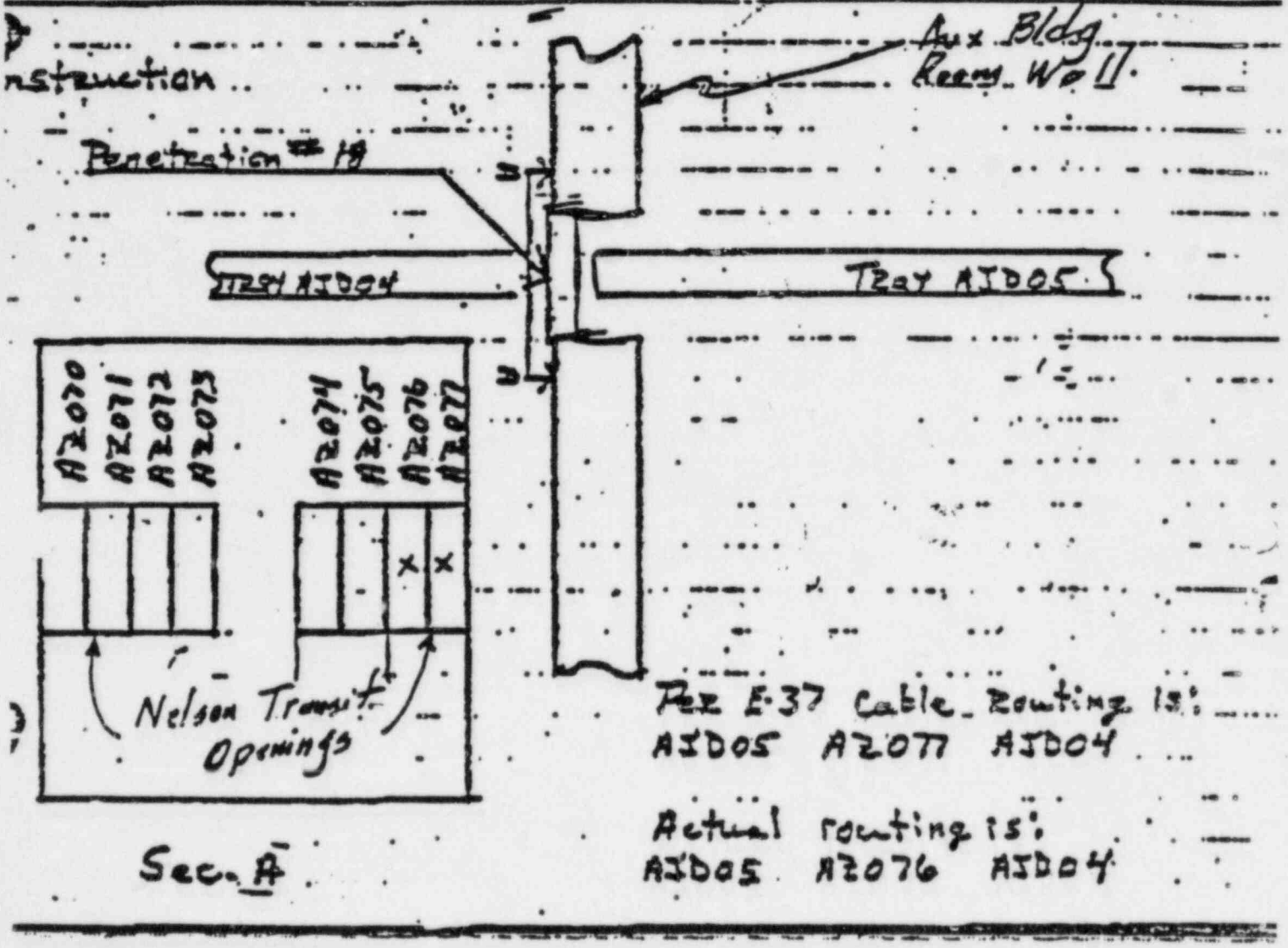
During final area turnover, QC shall verify, in accordance with PQCI 7220/E-3.0, that cables maintain the separation distances as shown in Drawing 7220-E-47, Paragraphs 5.1.3 and 5.1.4, and that all cable installations maintain the proper voltage separation.

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.

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

CABLE # 1AB5514B SL # 1



SK-1

Description of Basic Concern

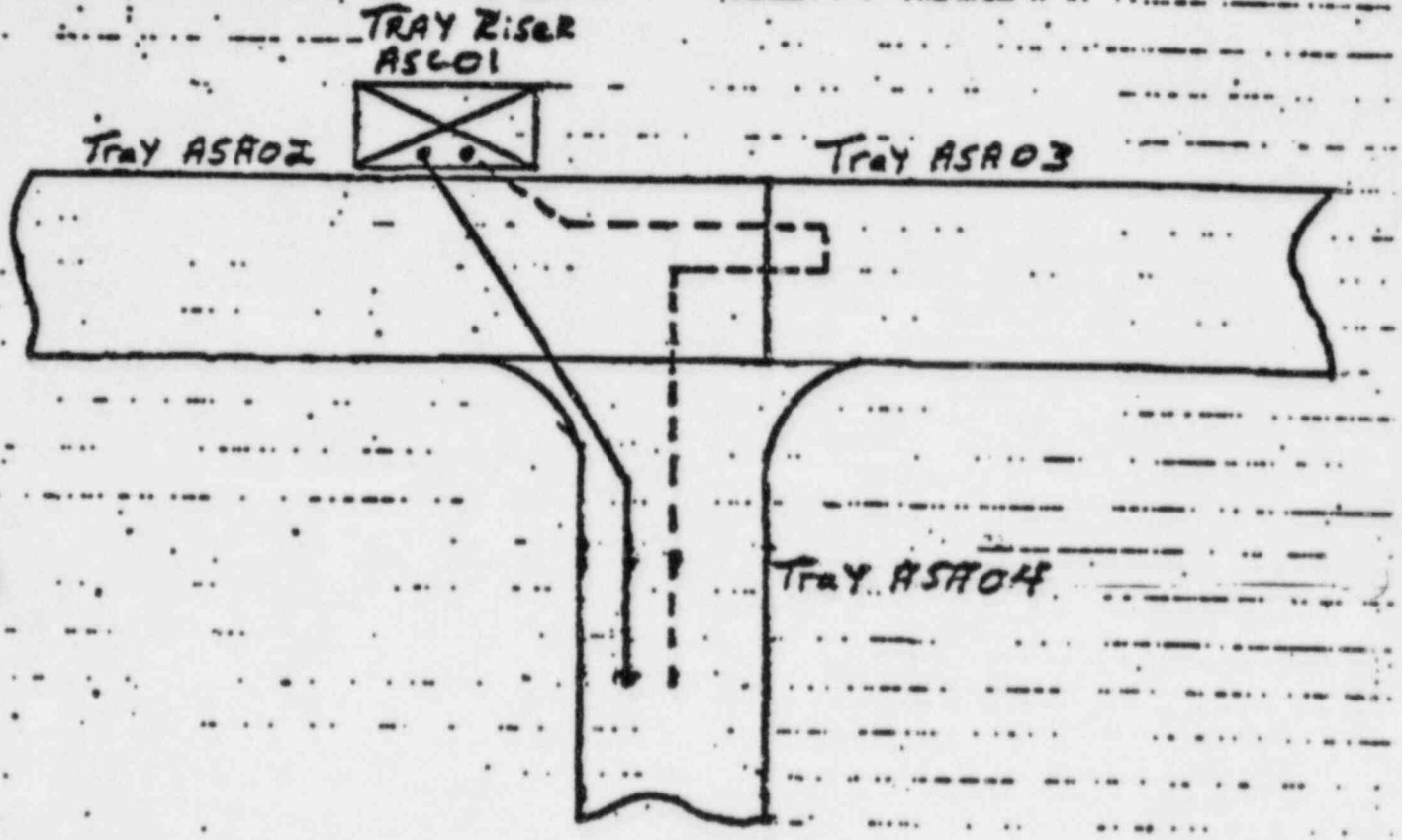
This cable was passed through the wrong Nelson transit (cable seal) window. Both the right and wrong window were for power cables. However, because of the closeness of power and instrument penetrations in the plant, our basic concern was a possible voltage violation if this problem were repeated with 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.6909A and CAB.6909B

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-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.

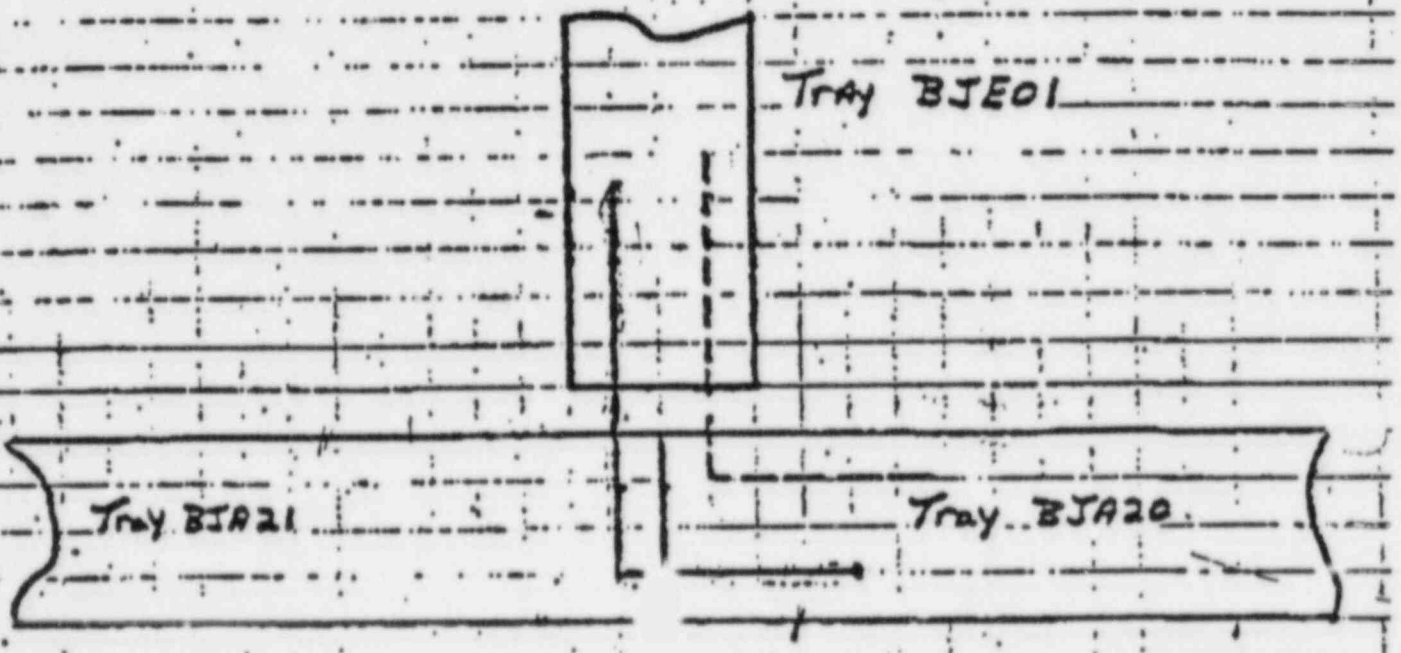
Cable No. 1B22444 B

Code No. 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 is routed - By field

Cable should be - Per E-37

SK-3

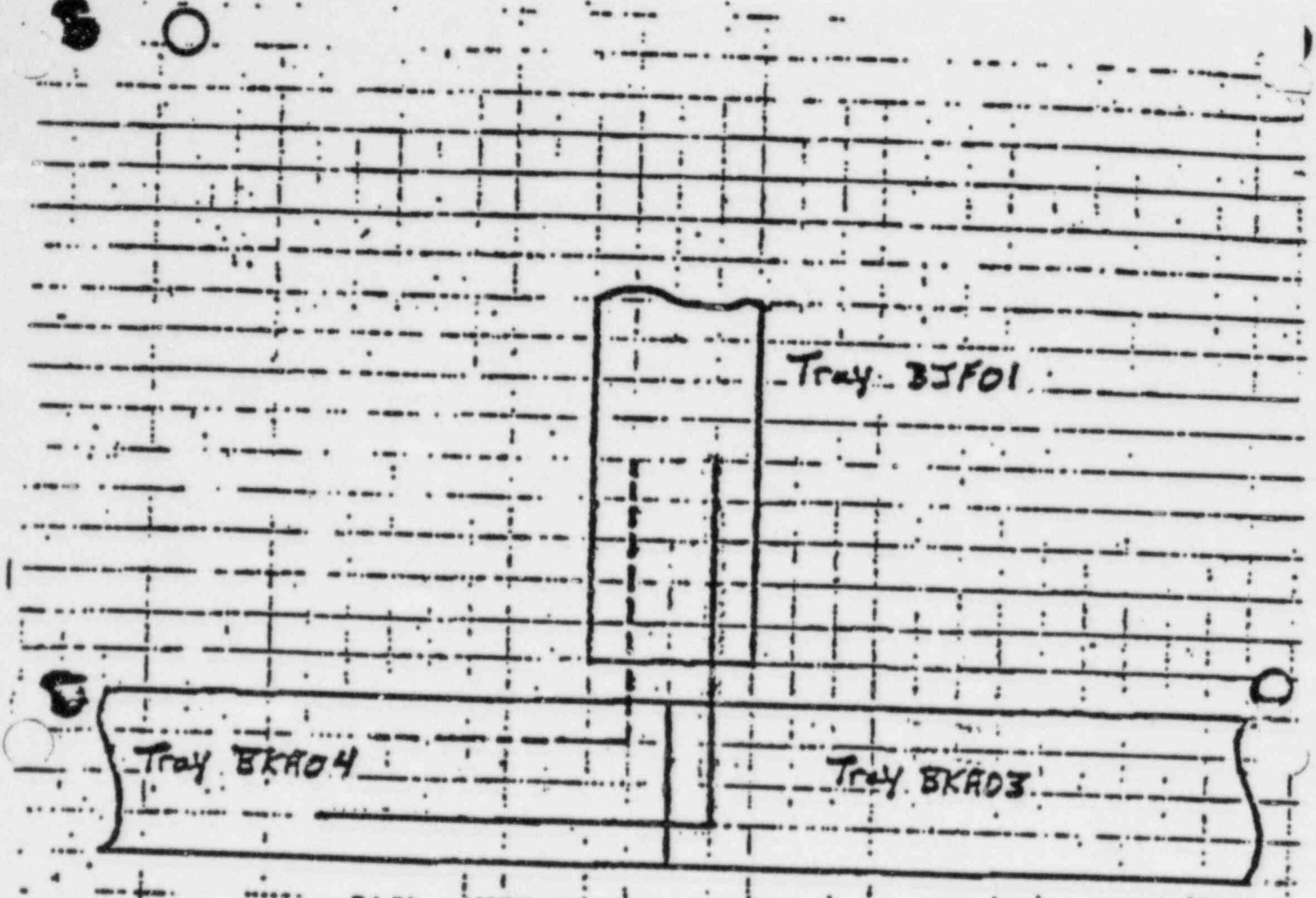
Description of Basic Concern

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 drgs.

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.

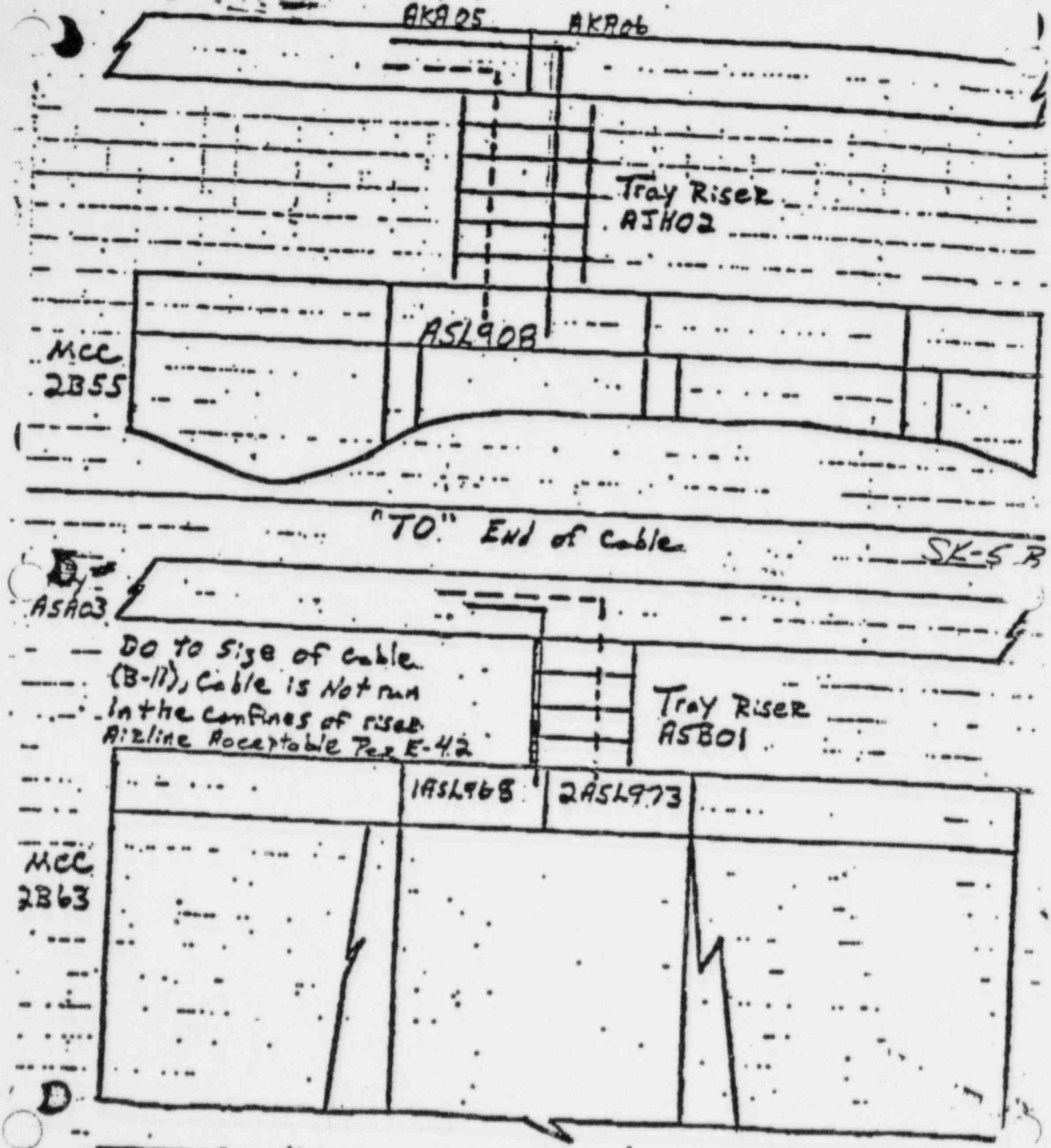
Reason for No Concern

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 ~~1PB553A~~
Code A-1
Design

SK-5-A

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



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.

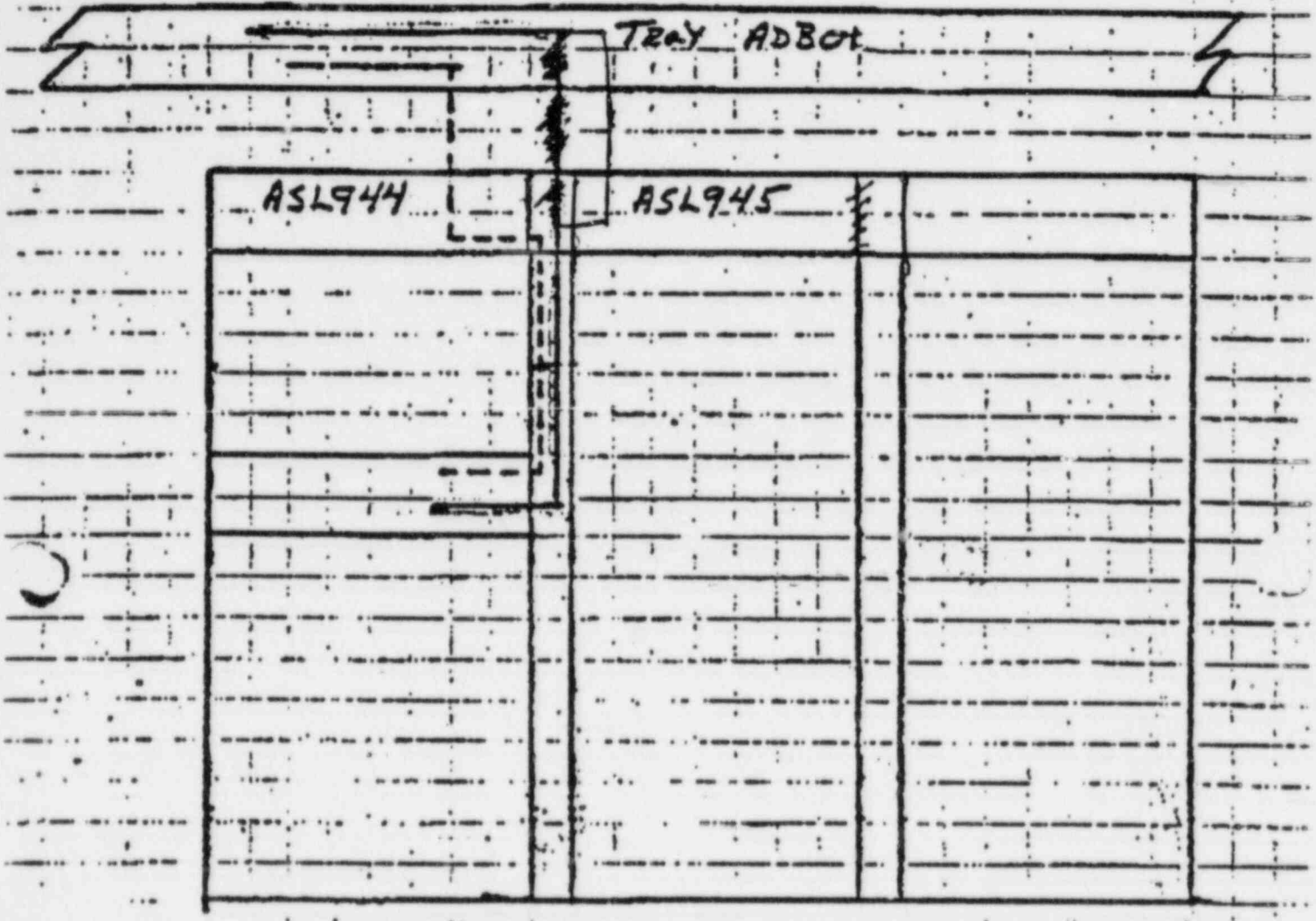
Reason for No Concern

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

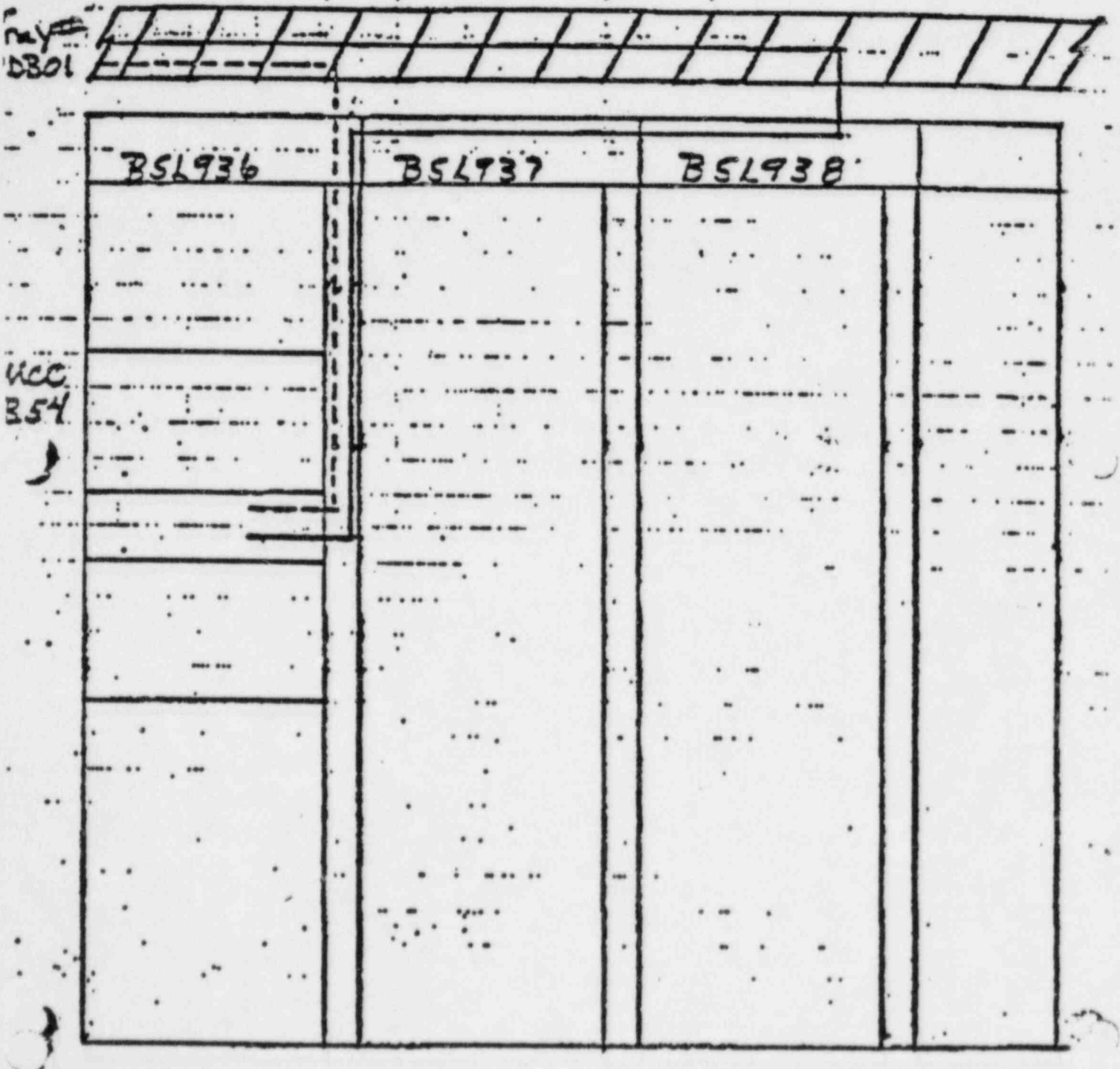
Cable enters the wrong stack of the motor control center.

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.

Cable # OBY3614A
Code = A-1
Design

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



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

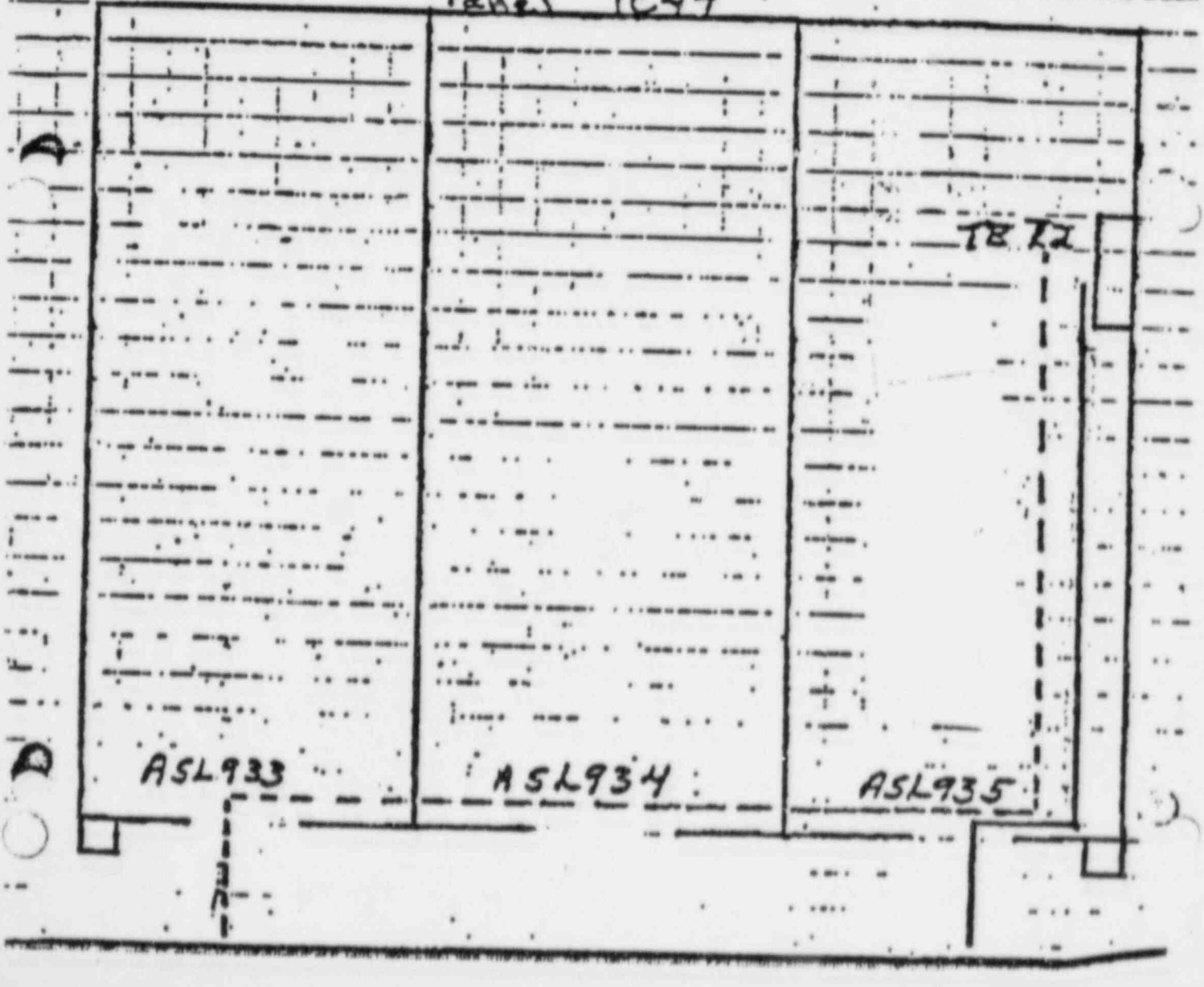
Sh. 8

Code # A-L

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

Design

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



SK-8

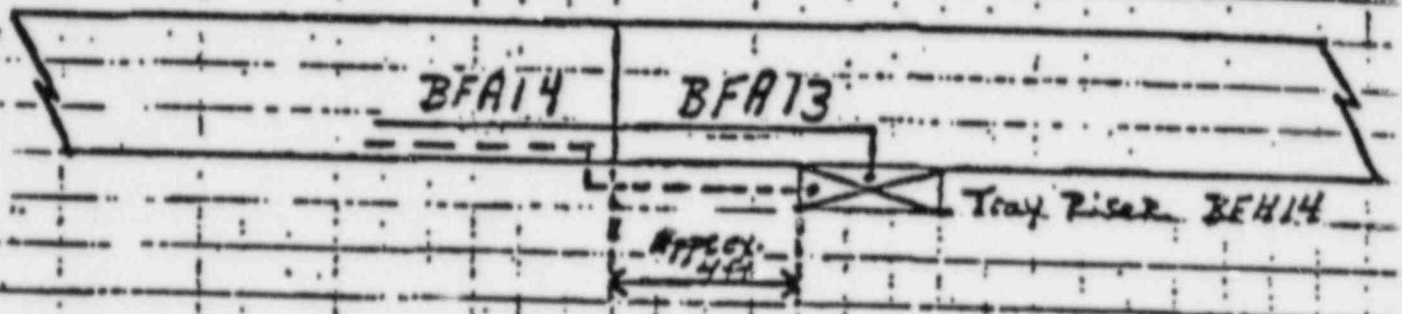
Description of Basic Concern

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

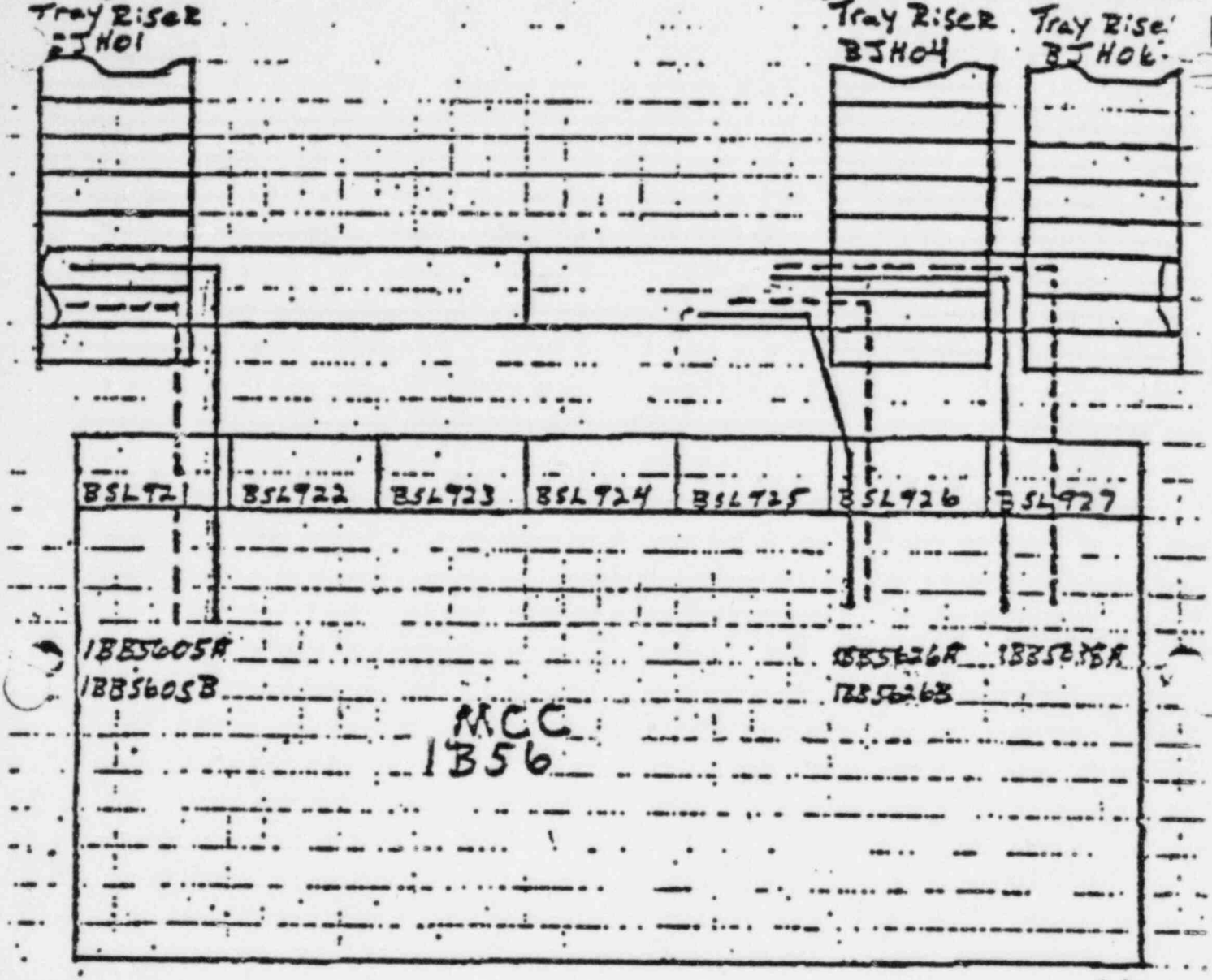
Engineering designed the cable to be airlined between E37 designated vias. The criteria, when in a case like this a Class 1E cable leaves the confines of a raceway, the subject cable will be visually inspected for possible separation violation. This inspection will discover this problem.

Cable [illegible] 1BB5605A FB [illegible] 1BB5358A 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

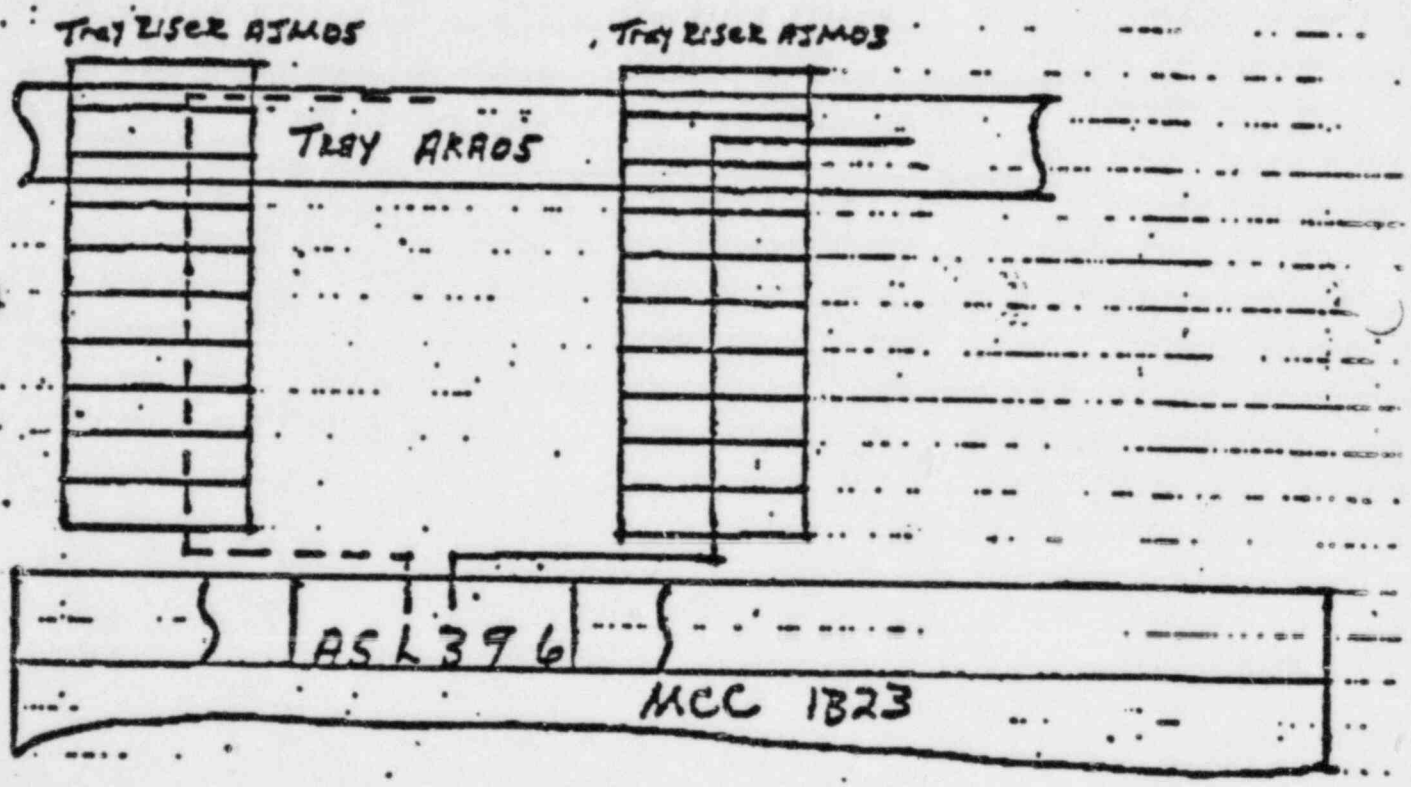
Cables are airlined, and are not in the riser.

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

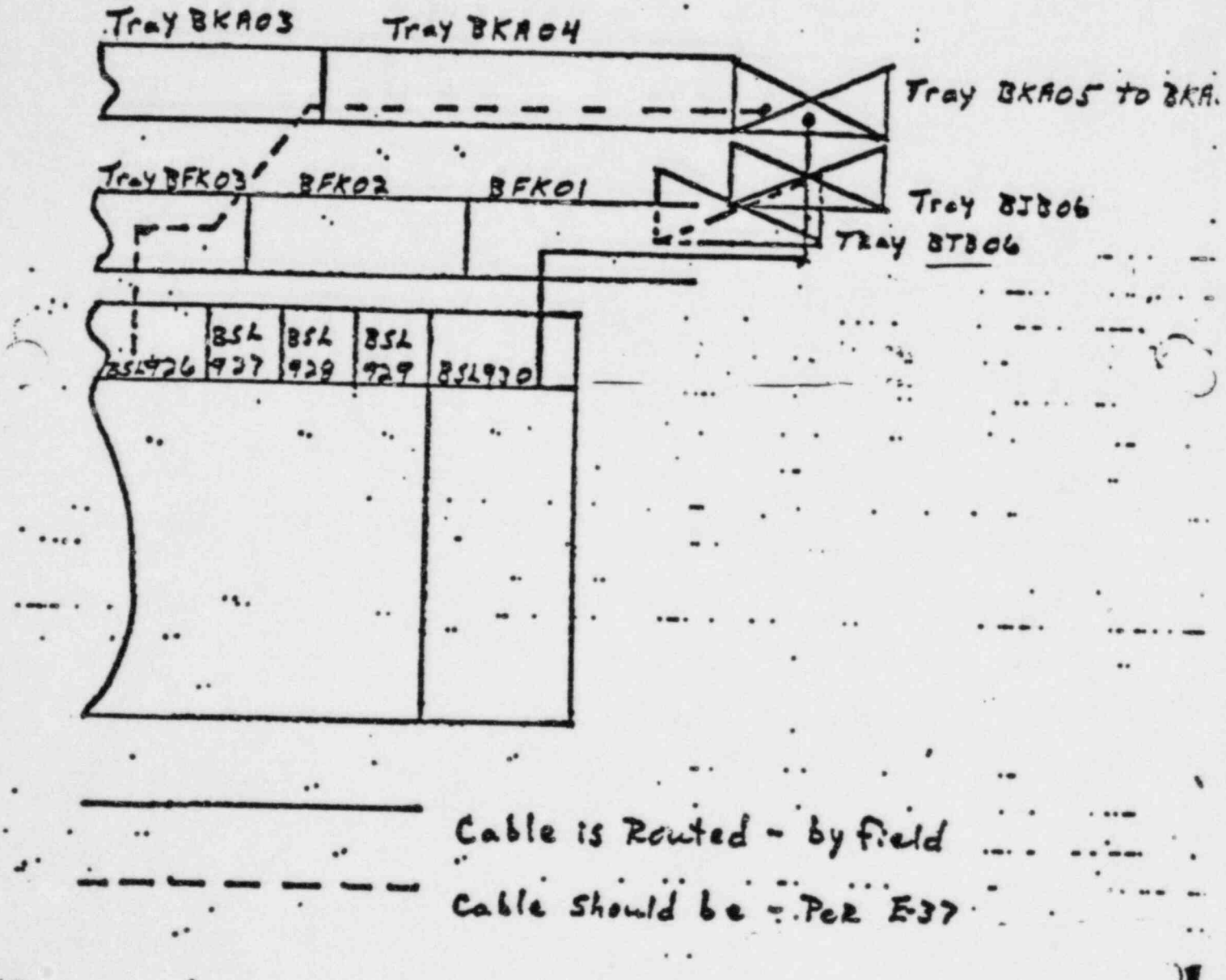
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

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



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.

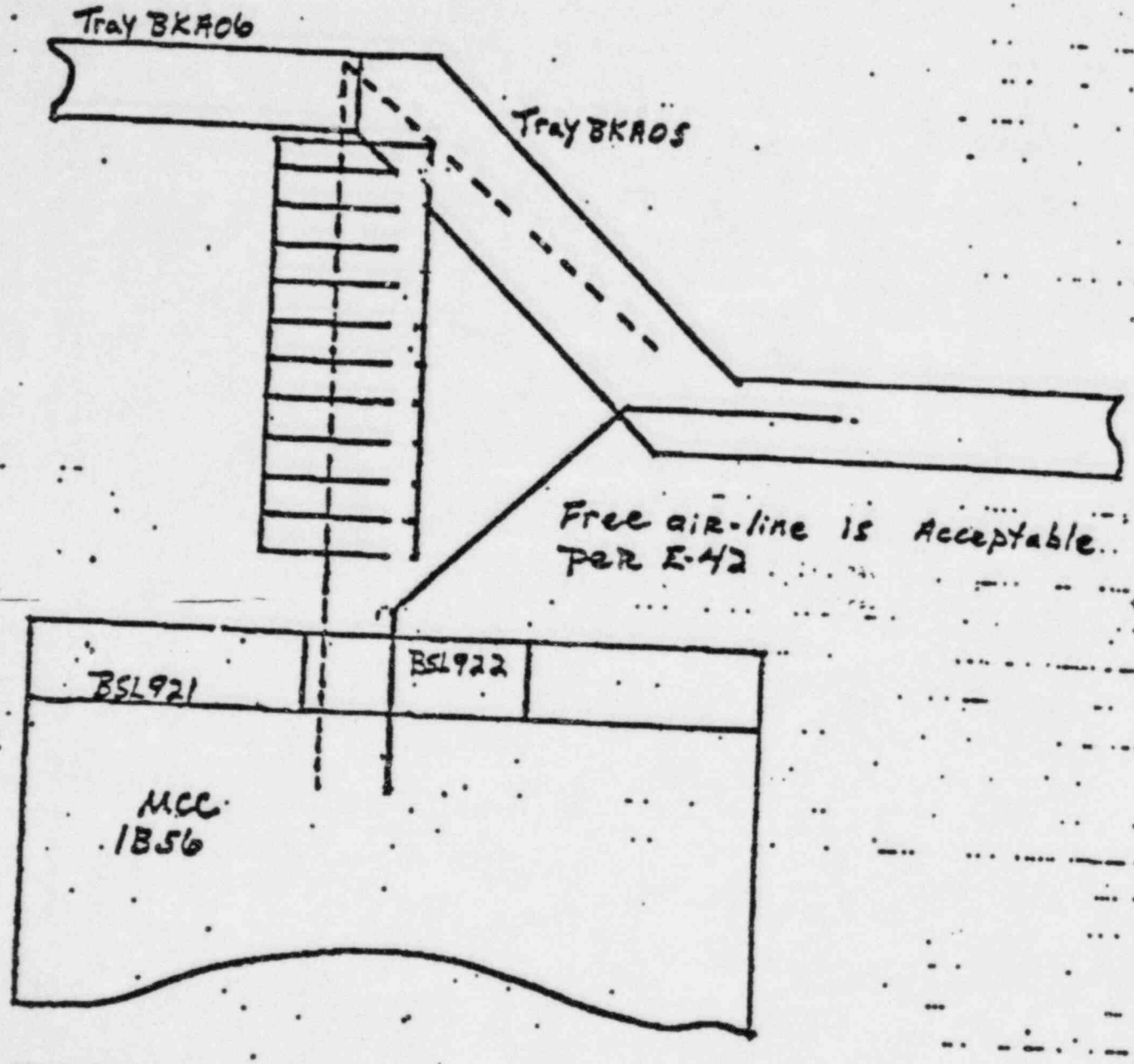
Reason for No Concern

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

Code # 1003010C
Design D-1

SK.13

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



SK-13

Description of Basic Concern

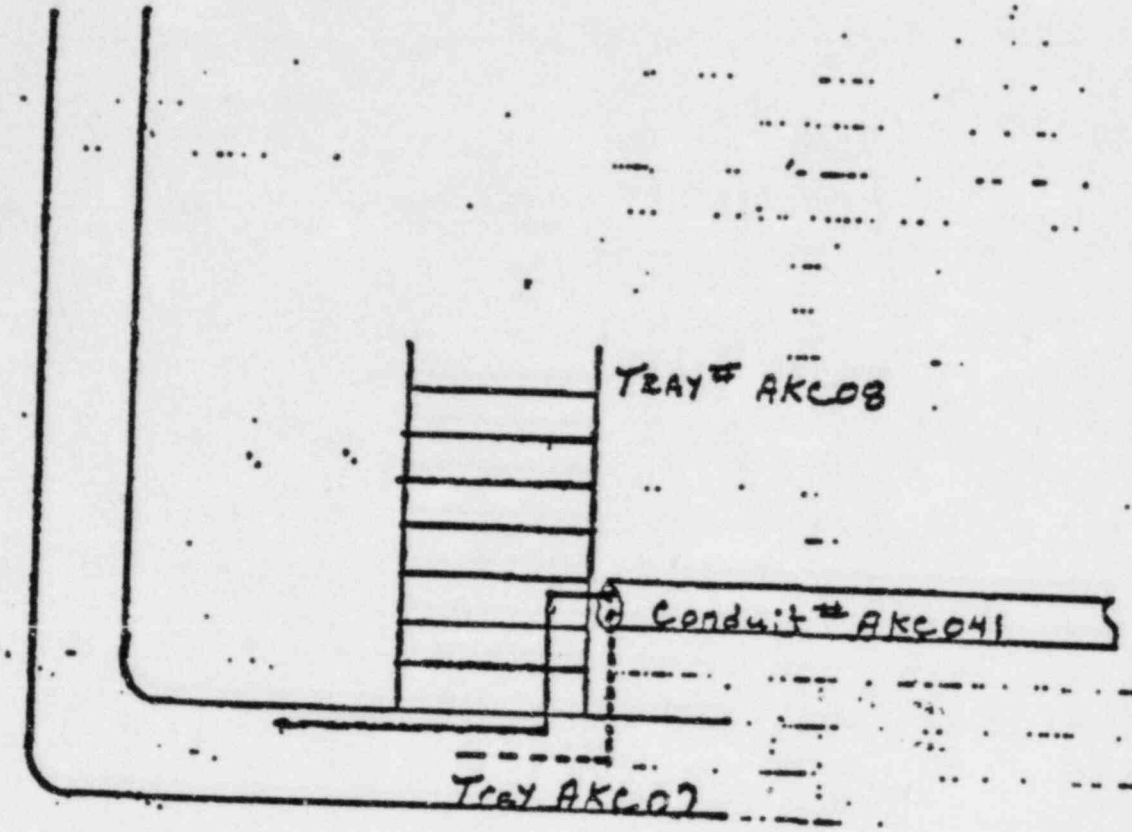
Accountability; i.e., not knowing where a cable is pulled.

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

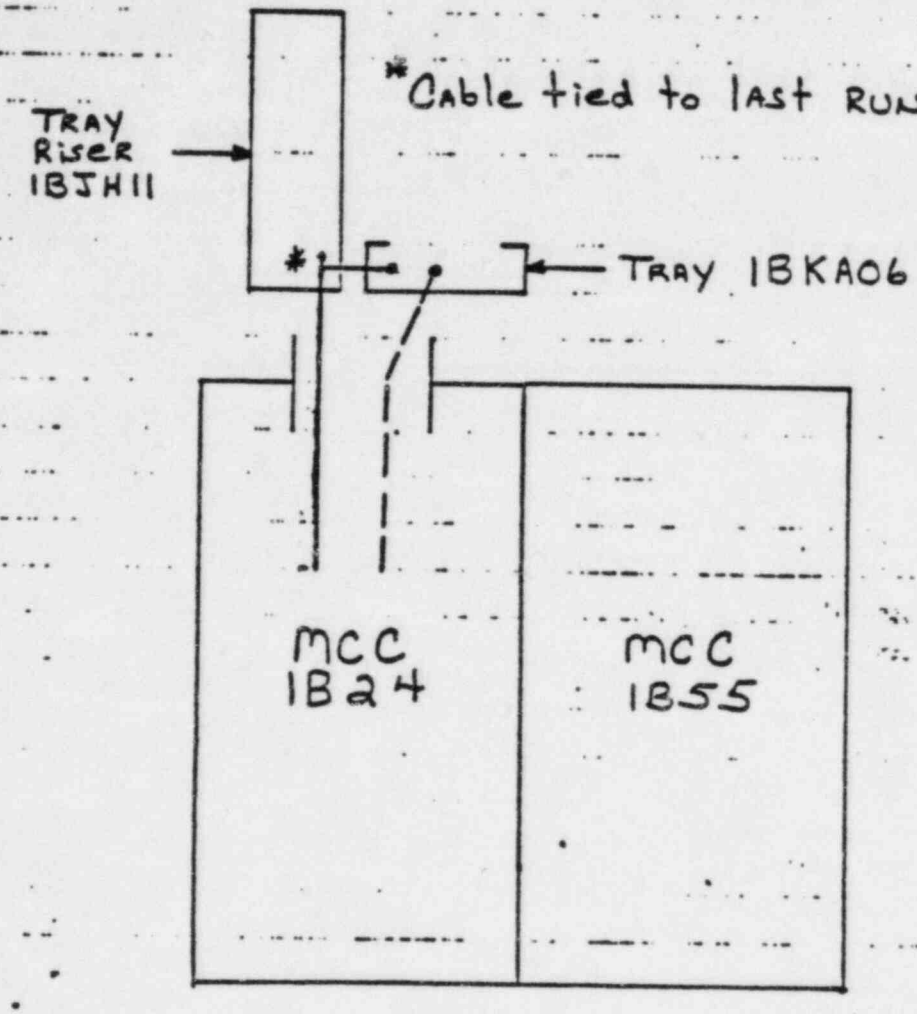
The subject cable enters the confines of additional raceway. If the trays containing the subject cable were required to be wrapped, how do we make sure that the cable portion in the unlisted via is protected.

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

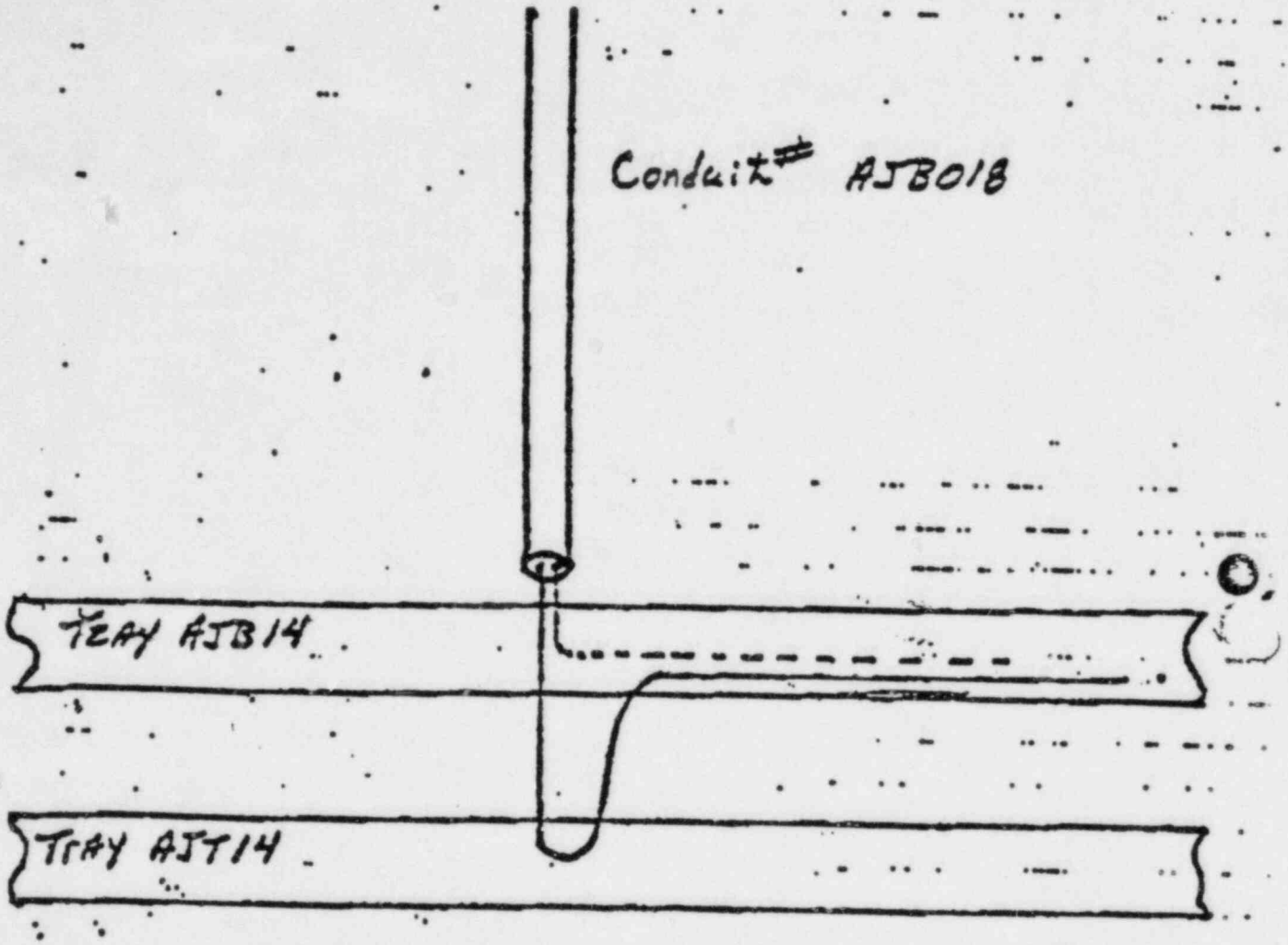
Description of Basic Concern

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 # 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

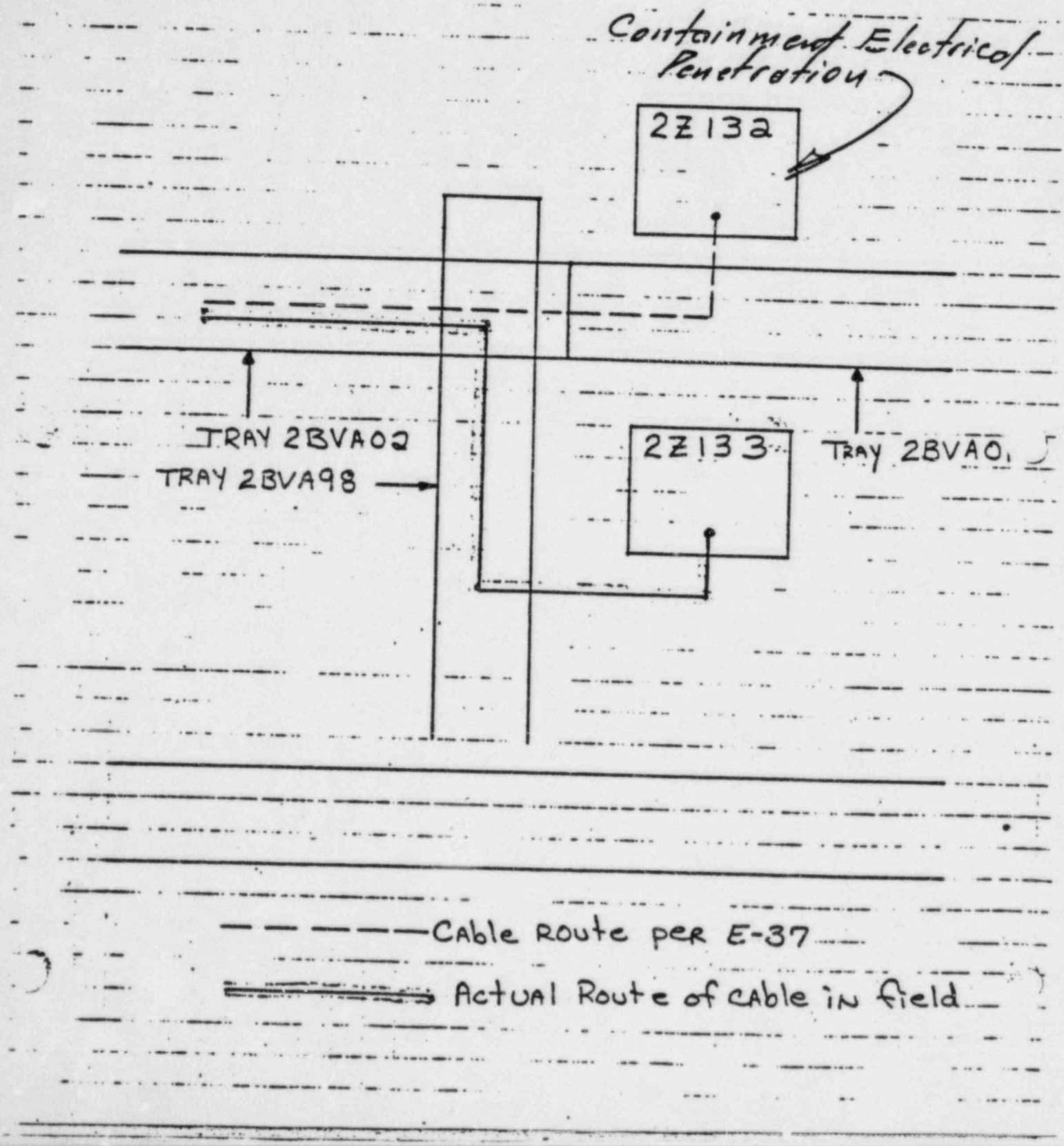
Description of Basic Concern

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

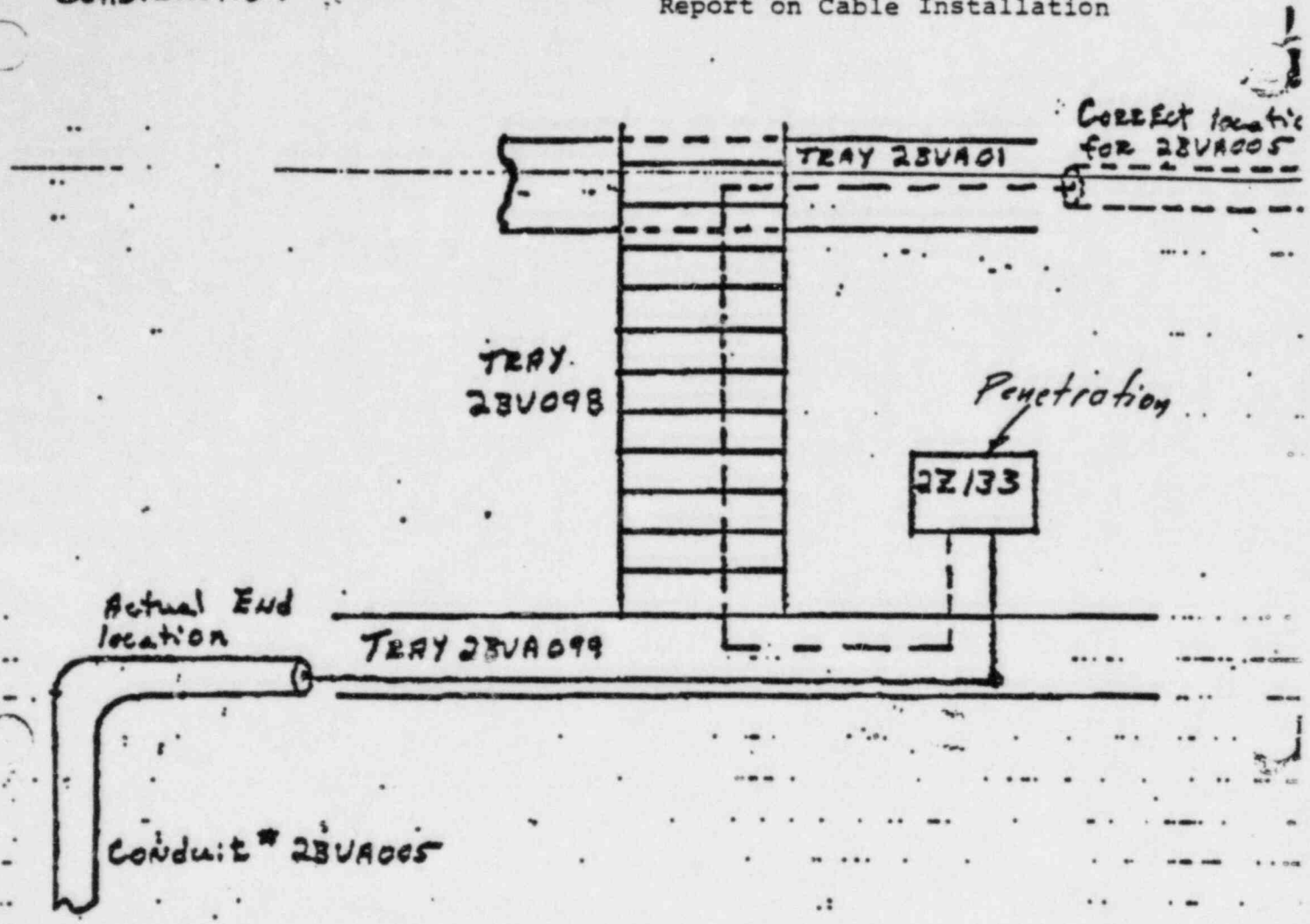
Cable is pulled to the wrong penetration.

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 #6

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



Conduit # 2BVA005 installed at incorrect End locat

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

Cables Vias 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.

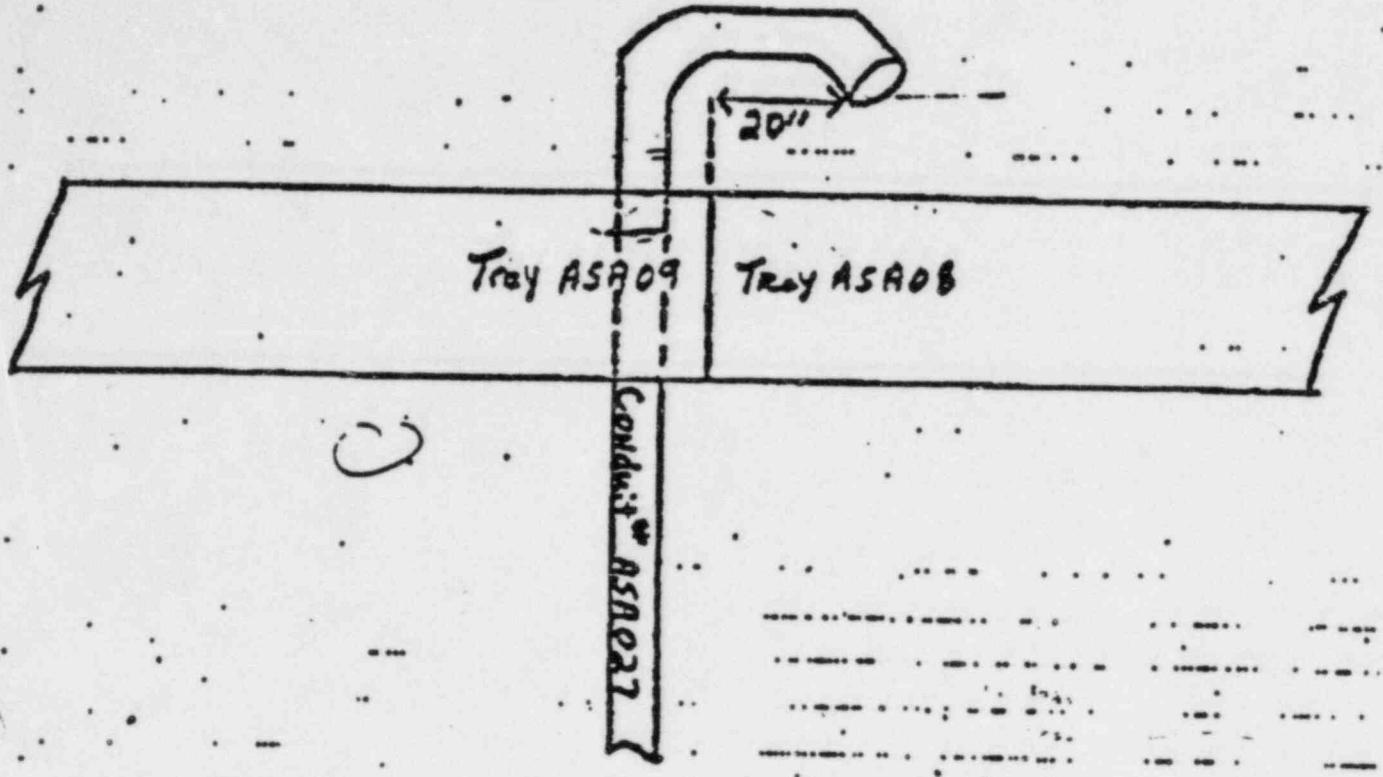
Reason for No Concern

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

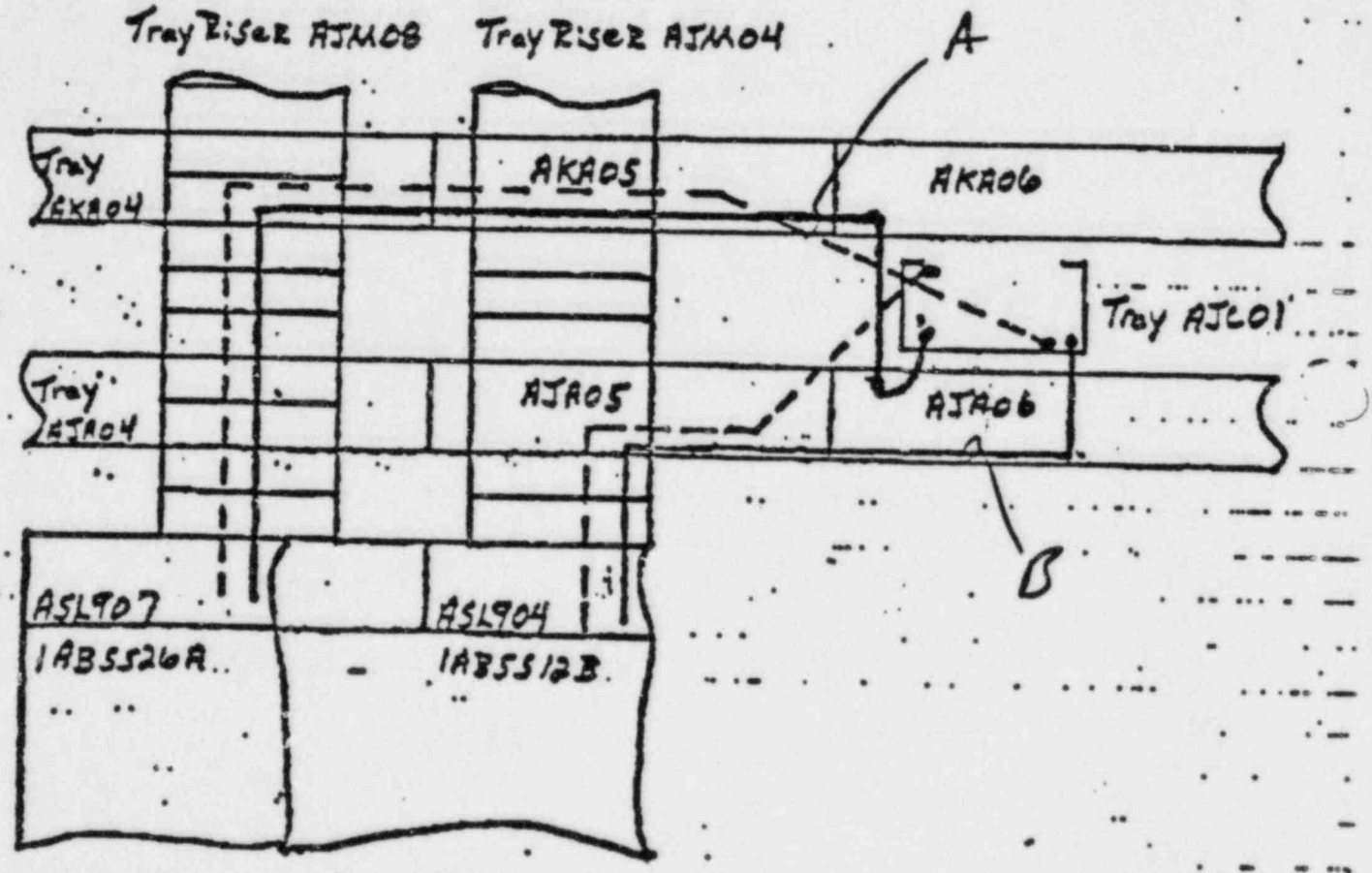
Accountability; i.e., not knowing where a cable is pulled.

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



Cable is routed - by field

Cable should be - Per E-37

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.

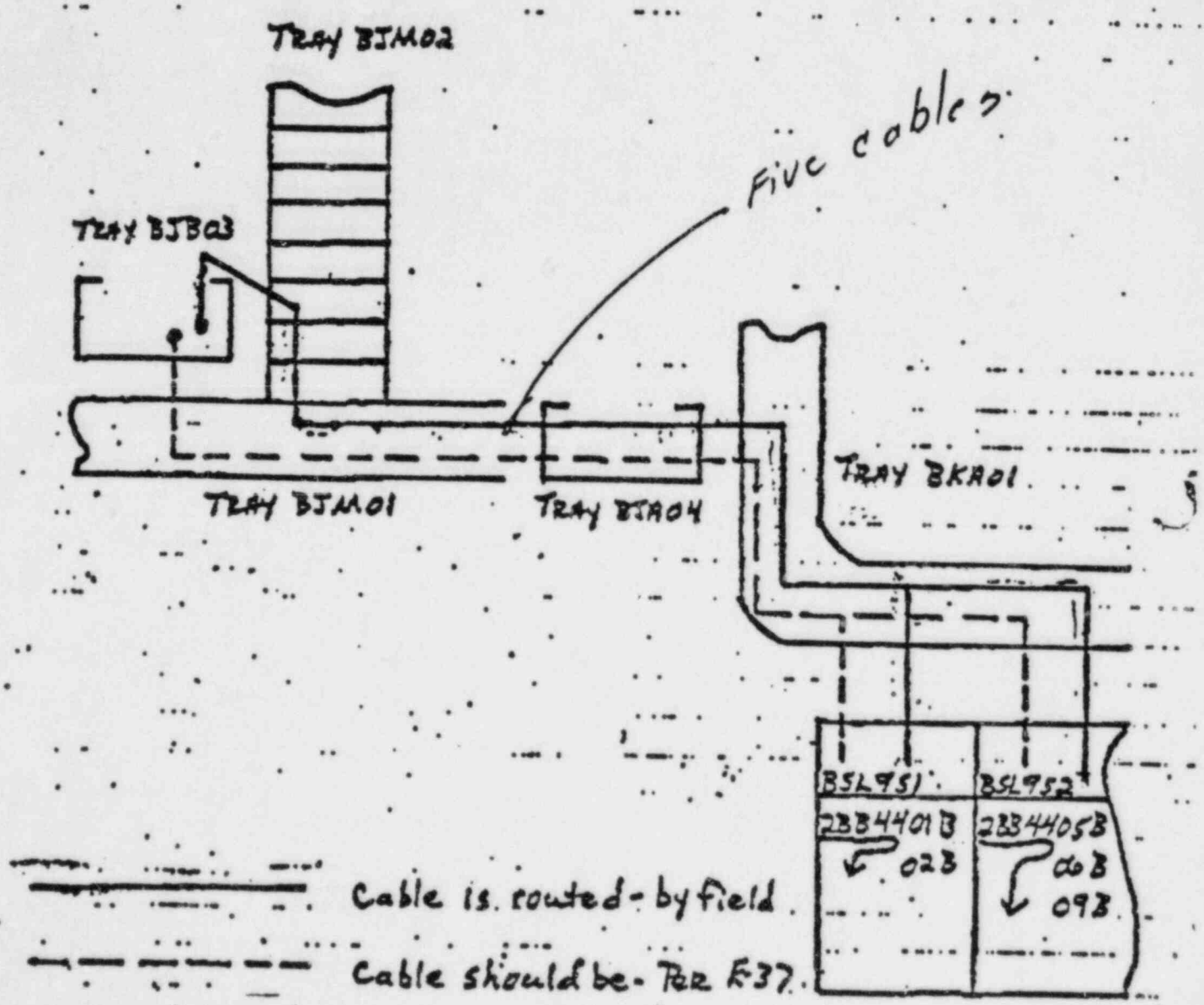
Reason for Concern

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
Cable # 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.

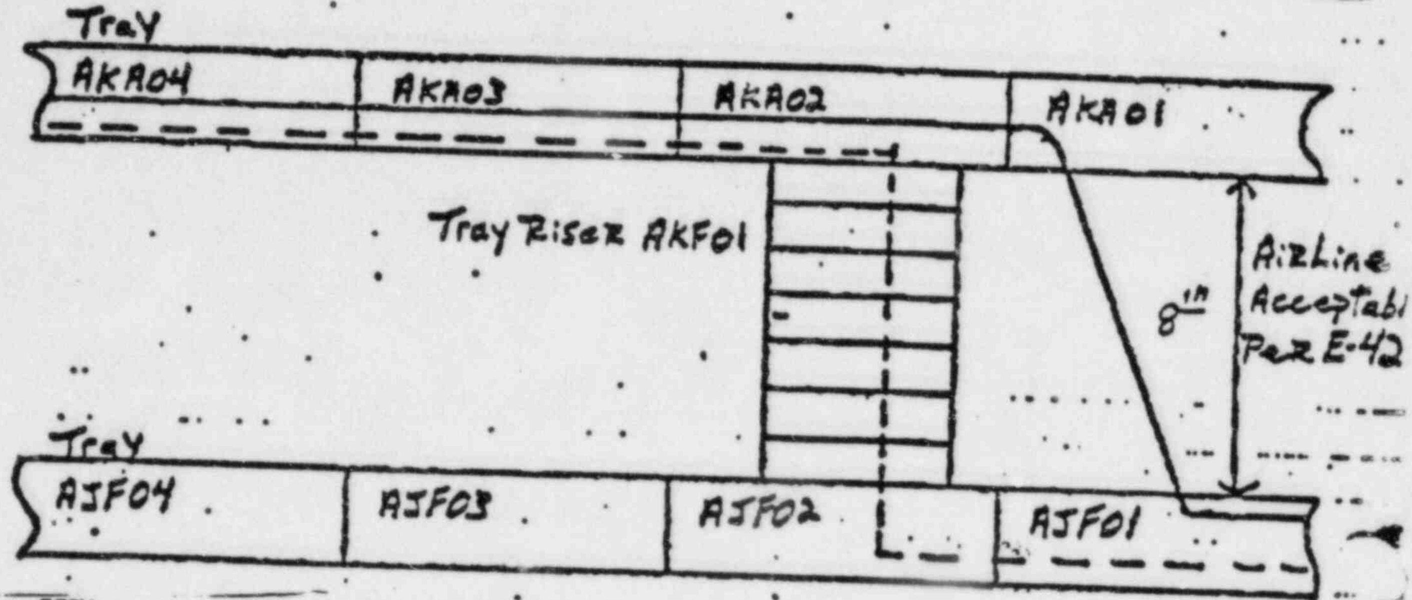
Reason for Concern

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 — 2AB6302K — SK-22
Construction

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

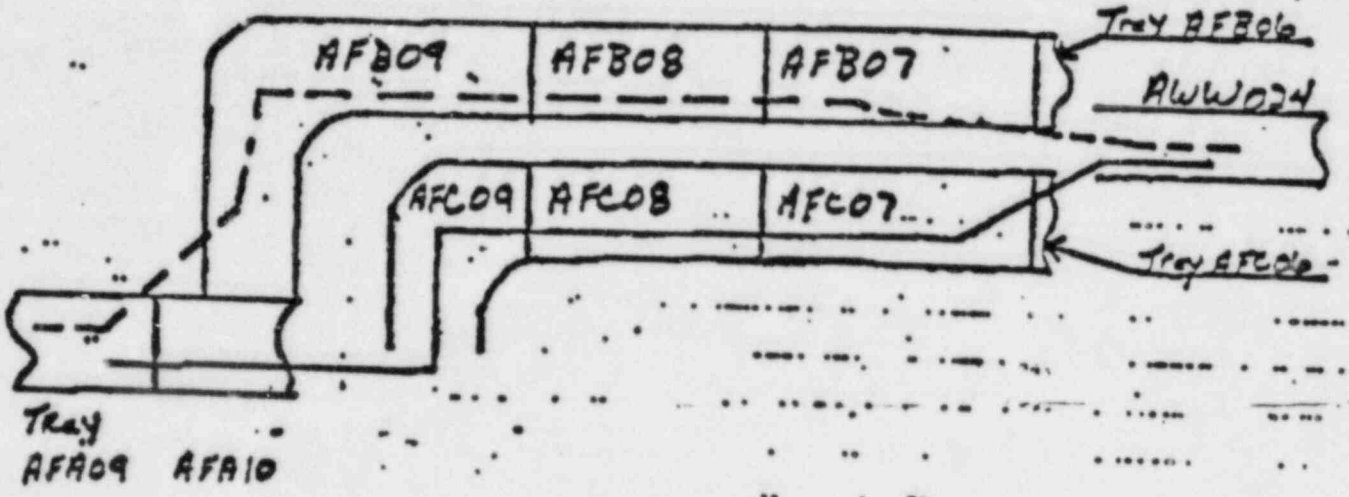
Accountability; i.e., not knowing where a cable is pulled. This problem may have an adverse affect on thermal analysis.

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

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



Cable is routed - by field

Cable Should be - Per E-37

SK-23

Description of Basic Concern

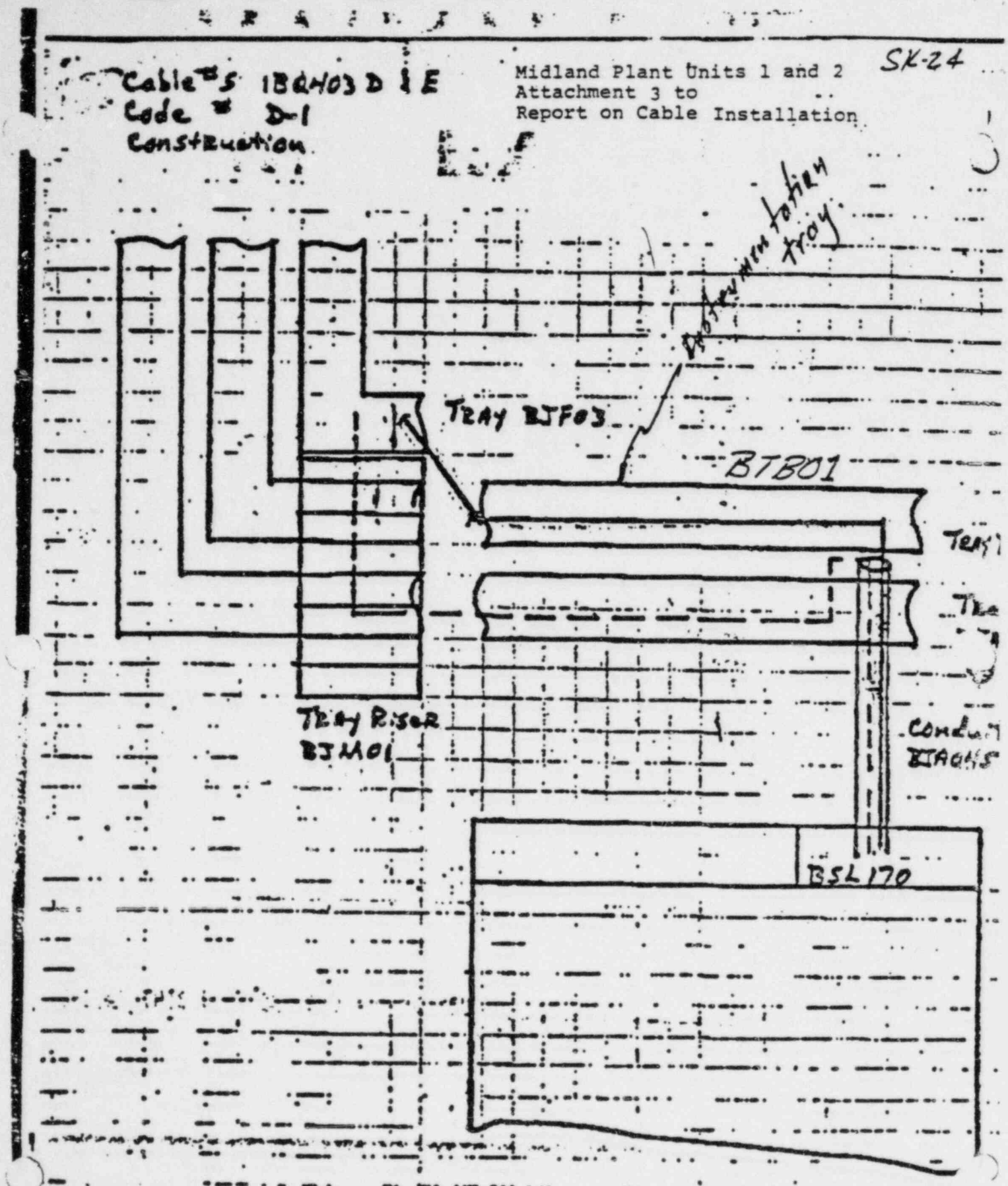
Cable was pulled into tray AFC07-09, not listed in E37 vias, without engineering's knowledge.

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

Description of Basic Concern

Voltage violation - Control cables used instrumentation raceway.

Reason for No Concern

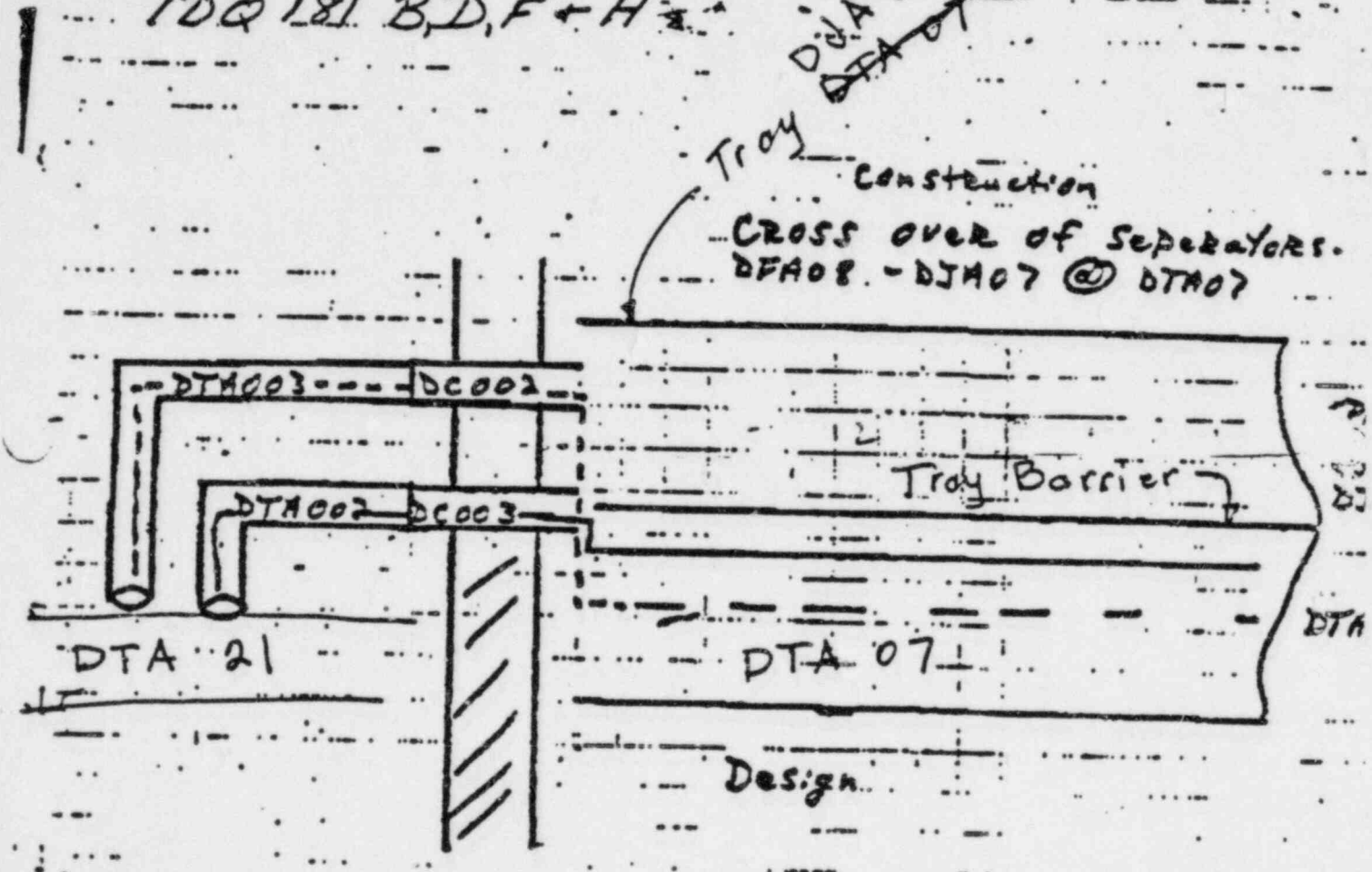
Quality control will inspect all cable transitions from one raceway to another; this inspection will eliminate this concern.

Code = D-1
Construction & Design

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

SK-25

1DQ157A
1DQ296 D,F,H,L,AT
1DQ127 E,D+E
1DQ173 D,E+E
1DQ181 B,D,F+H



Cable routed by Field

Cable Should be Per E-37

SK-25 Unique Case

Description of Basic Concern

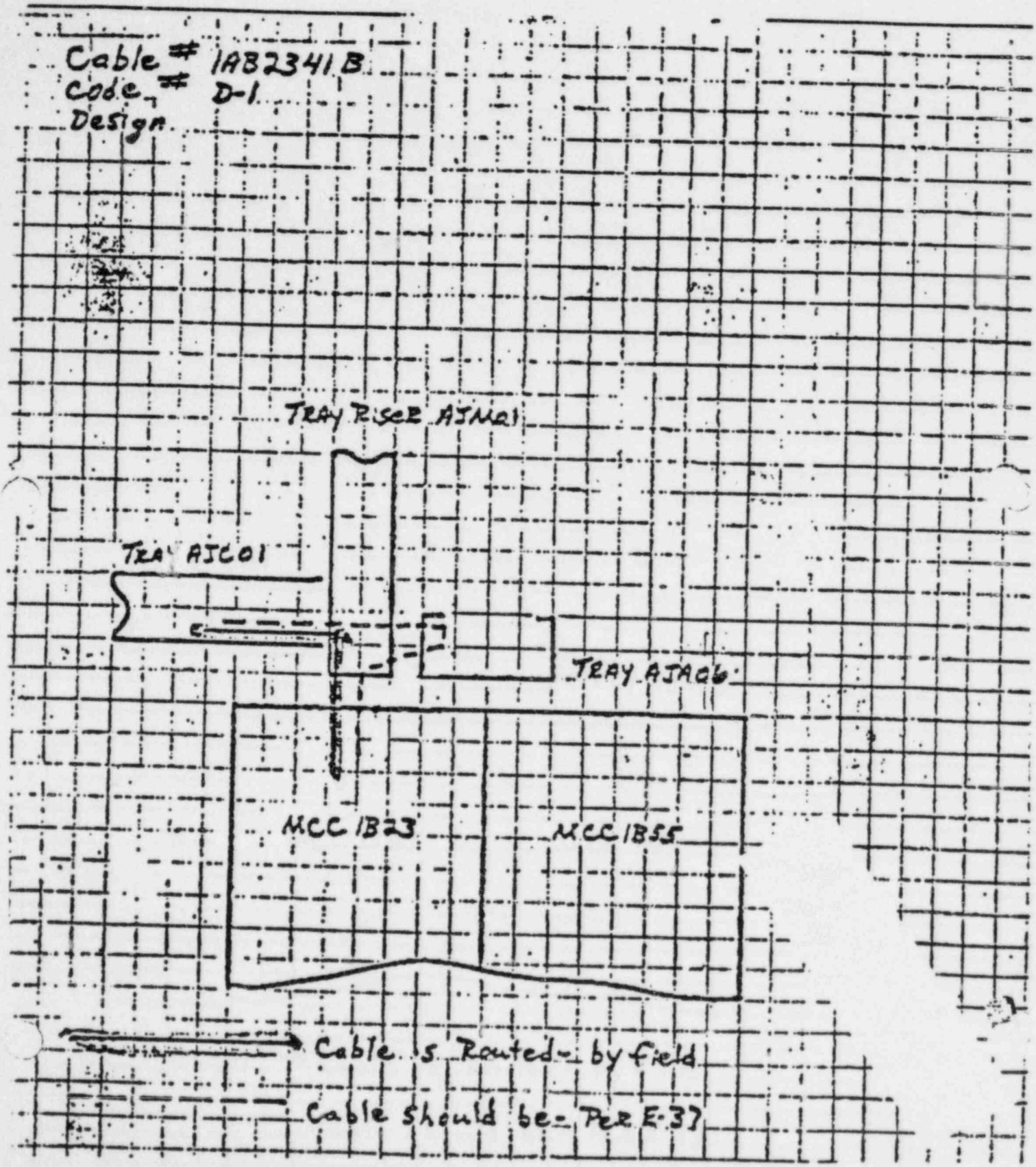
Sixteen small instrument cables were pulled into the wrong conduit.

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

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



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

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.