

Interim Technical Report

DIABLO CANYON UNIT 1
INDEPENDENT DESIGN VERIFICATION PROGRAM
- ELECTRICAL RACEWAY SUPPORTS -

REVISION 0

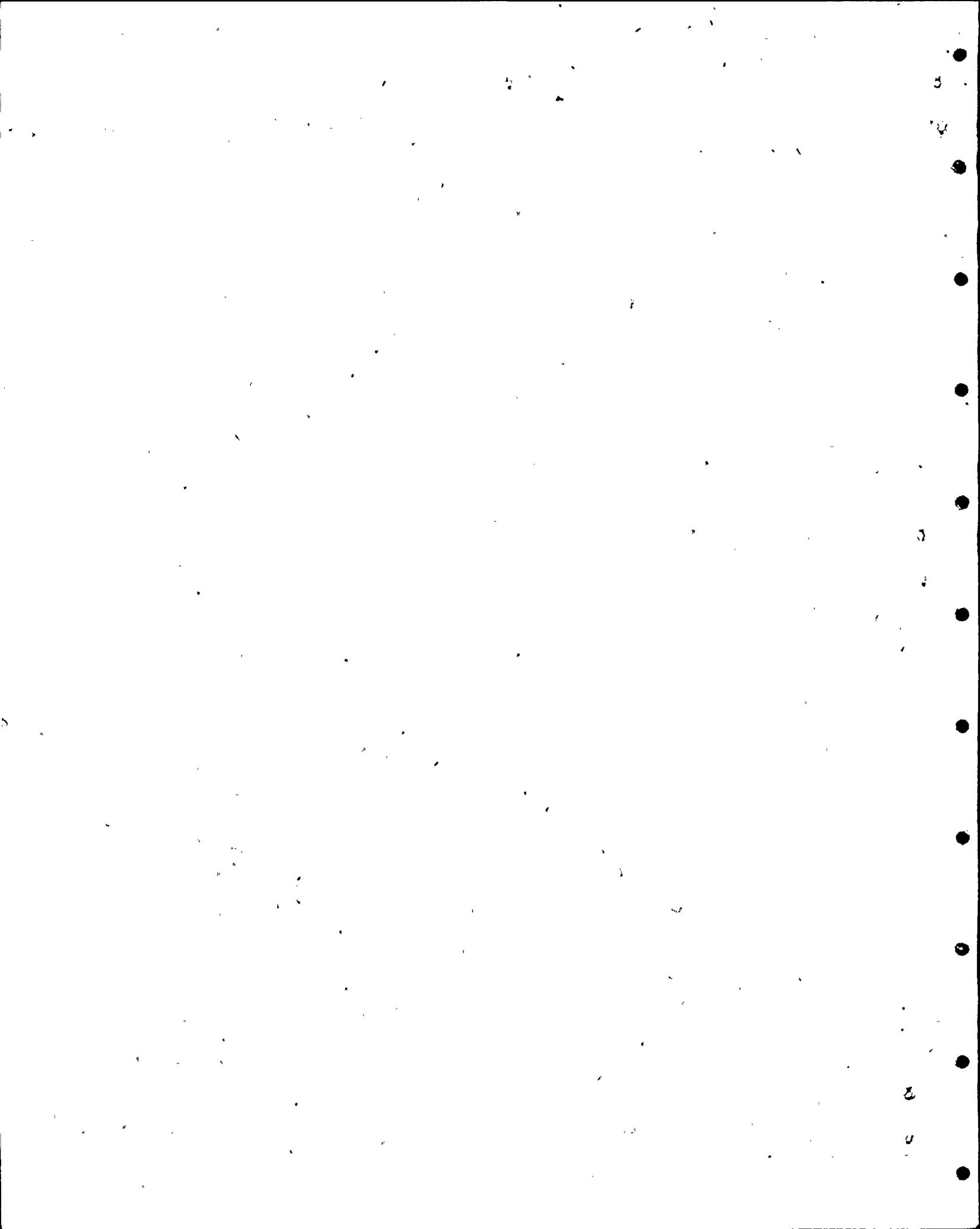
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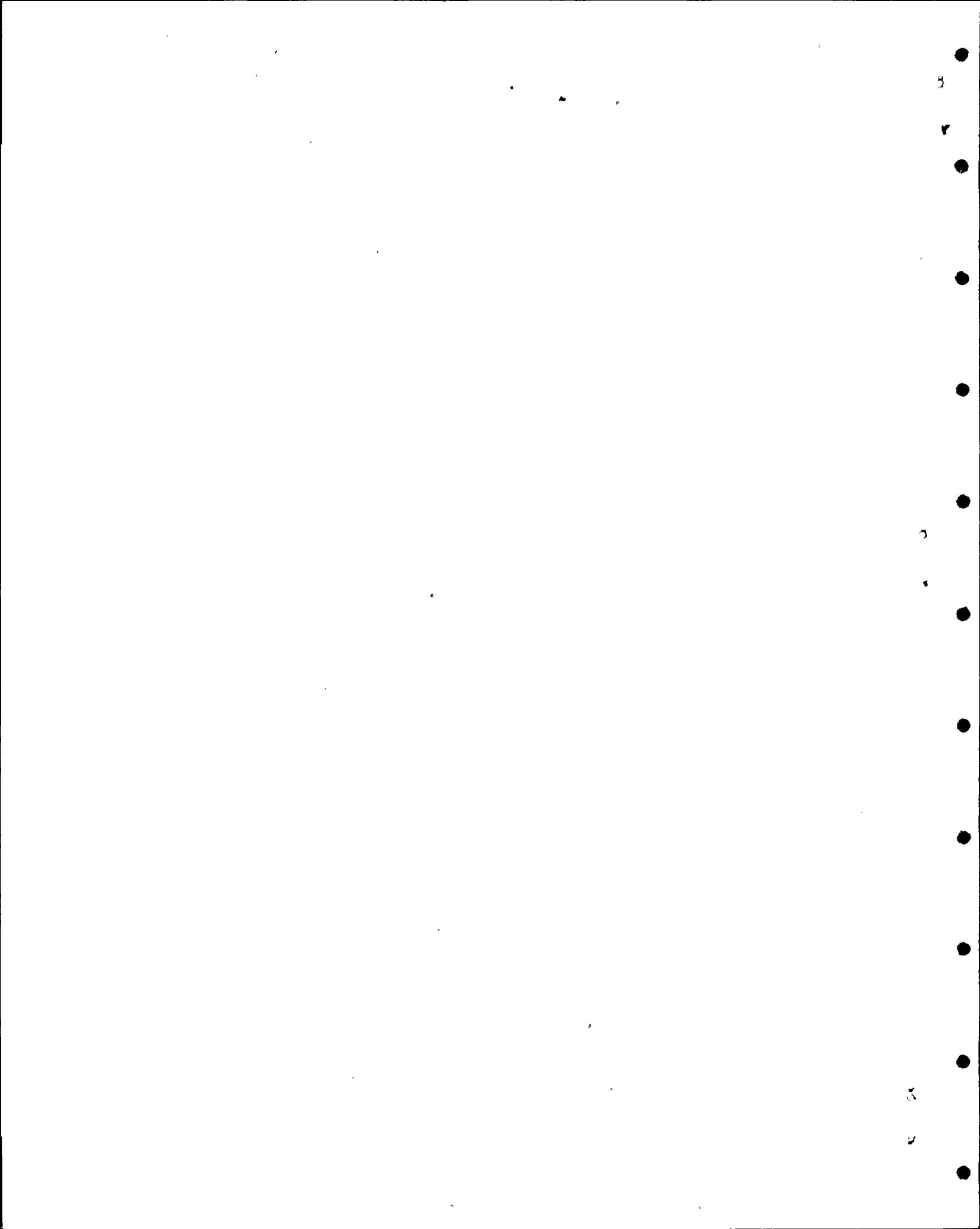
Edward Demison 9/17/82
Project Manager / Date
Approved P105-4-839-007



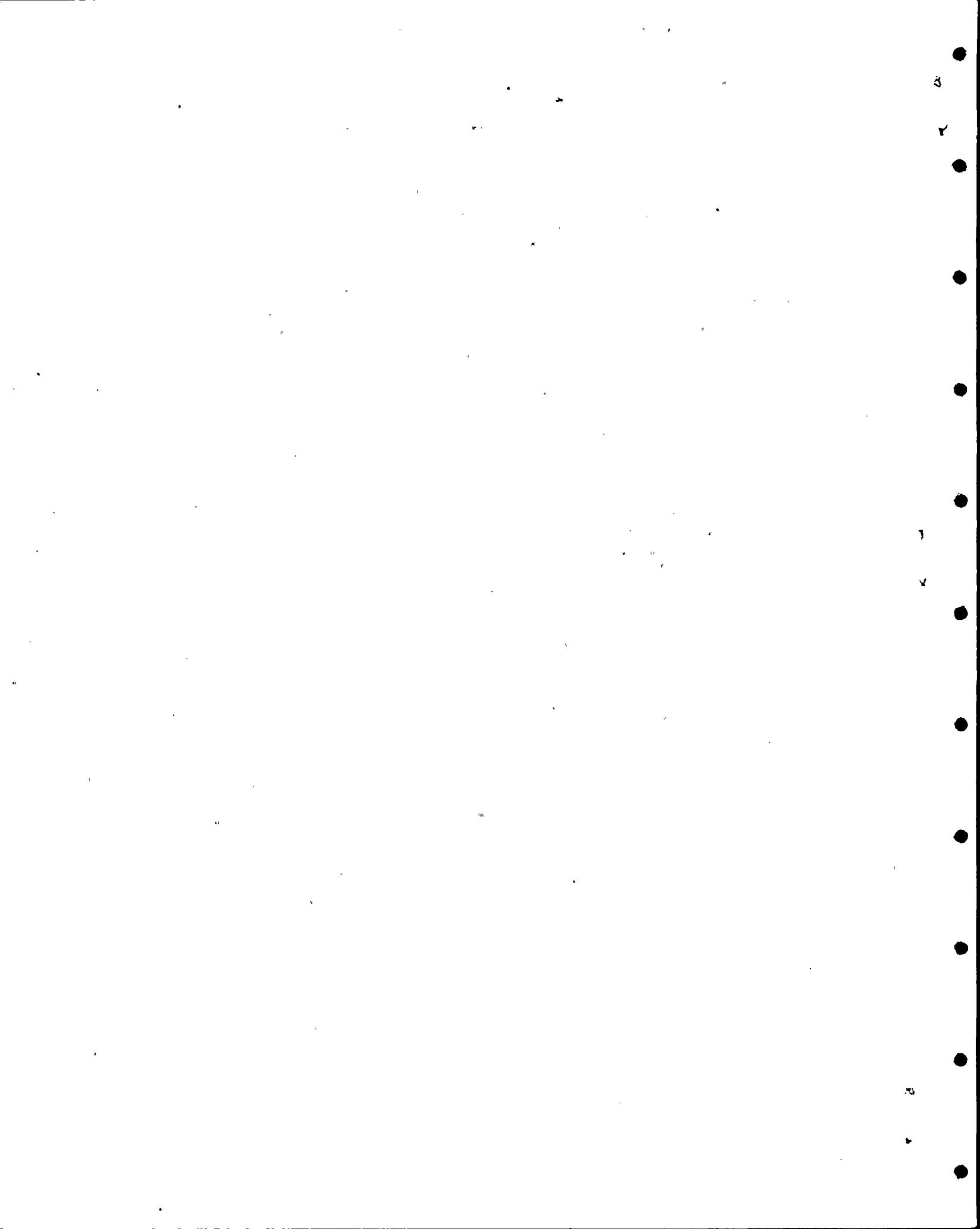
ELECTRICAL RACEWAY SUPPORTS REPORT

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PROGRAM MANAGER'S PREFACE

DIABLO CANYON NUCLEAR POWER PLANT - UNIT I
INDEPENDENT DESIGN VERIFICATION PROGRAM

INTERIM TECHNICAL REPORT

ELECTRICAL RACEWAY SUPPORTS

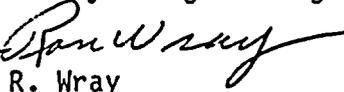
This is the seventh of a series of Interim Technical Reports prepared by the DCNPP-IDVP for the purpose of providing a conclusion of the program.

This report contains the results and conclusions for the IDVP review of the Class IE electrical raceway support sample. This independent review consisted of a review of the PG&E design methodology and criteria as well as a field inspection to verify that the sample supports were installed in accordance with the design installation drawings. A number of findings were issued and the concerns associated with them are stated herein.

Based on the PG&E presentation (July 14-16, 1982) on their Internal Technical Program, a complete reevaluation of all raceway supports is in progress. As a result, the IDVP did not continue with the task of performing independent calculations for the sample supports, rather the IDVP will review the entire PG&E requalification process including their qualification calculations.

As IDVP Program Manager, Teledyne Engineering Services has approved this ITR including the conclusions and recommendations presented. The methodology followed by TES in performing this review and evaluation is described by Appendix D to this report.

ITR Reviewed and Approved
IDVP Program Manager
Teledyne Engineering Services


R. Wray

Assistant Project Manager



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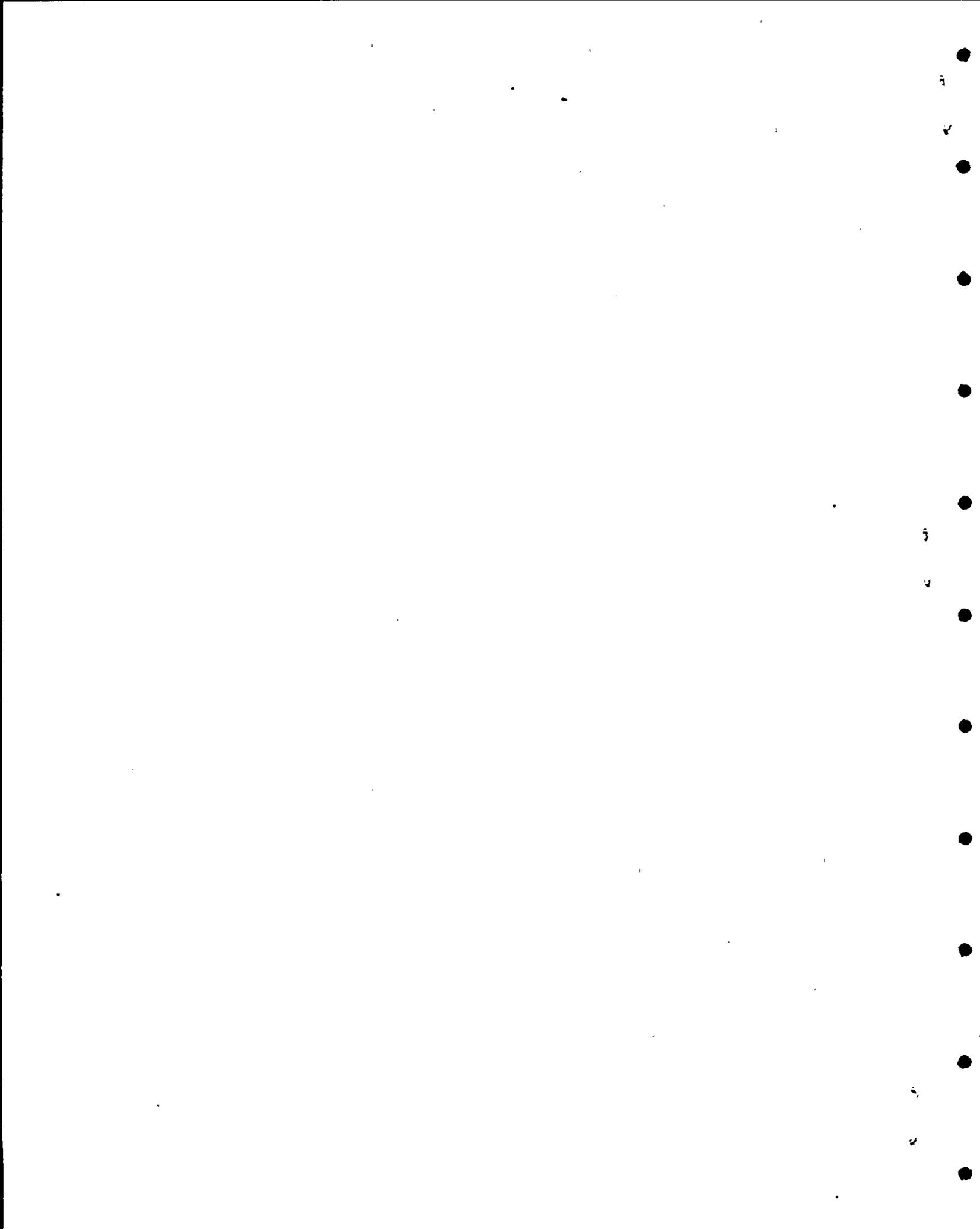
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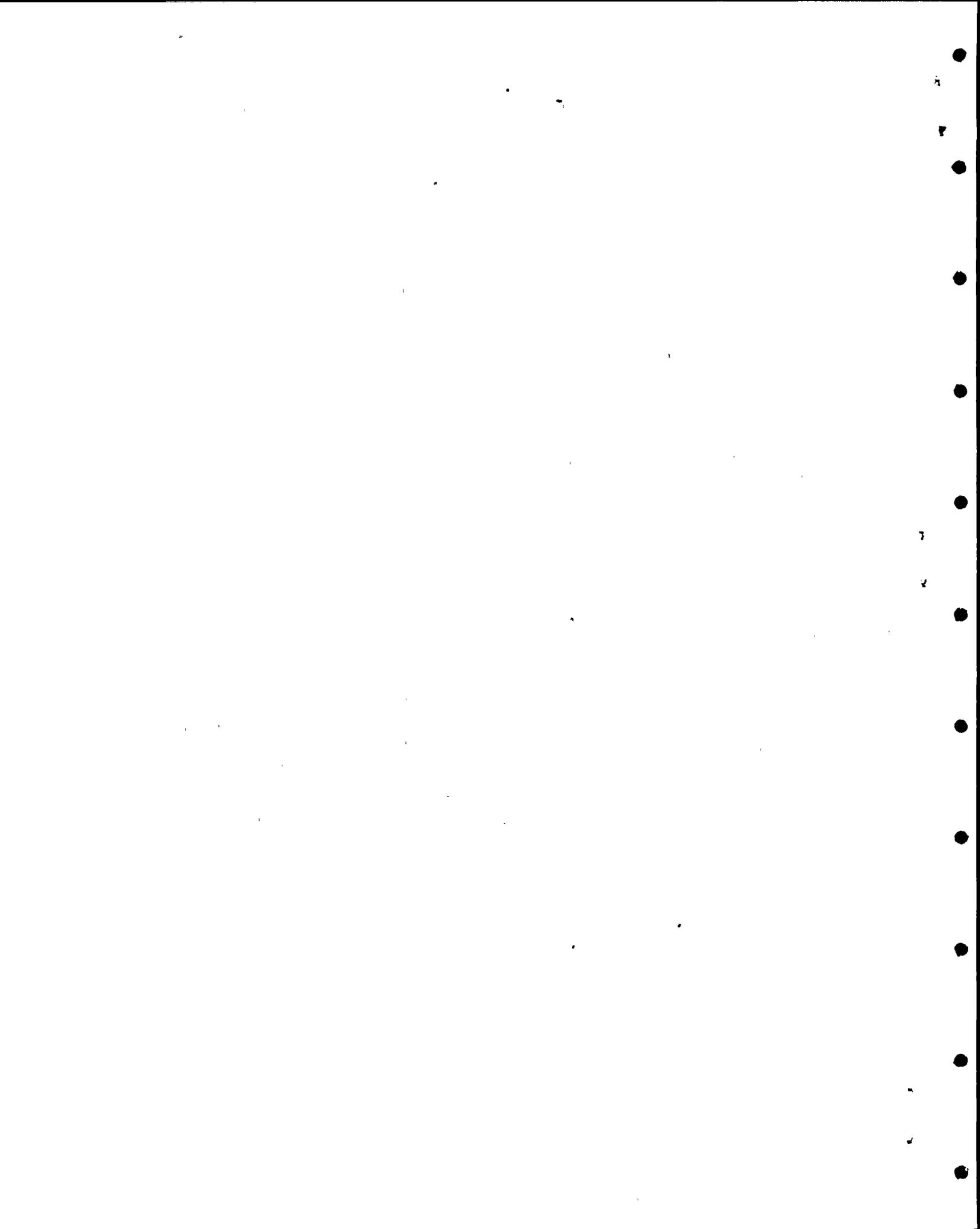
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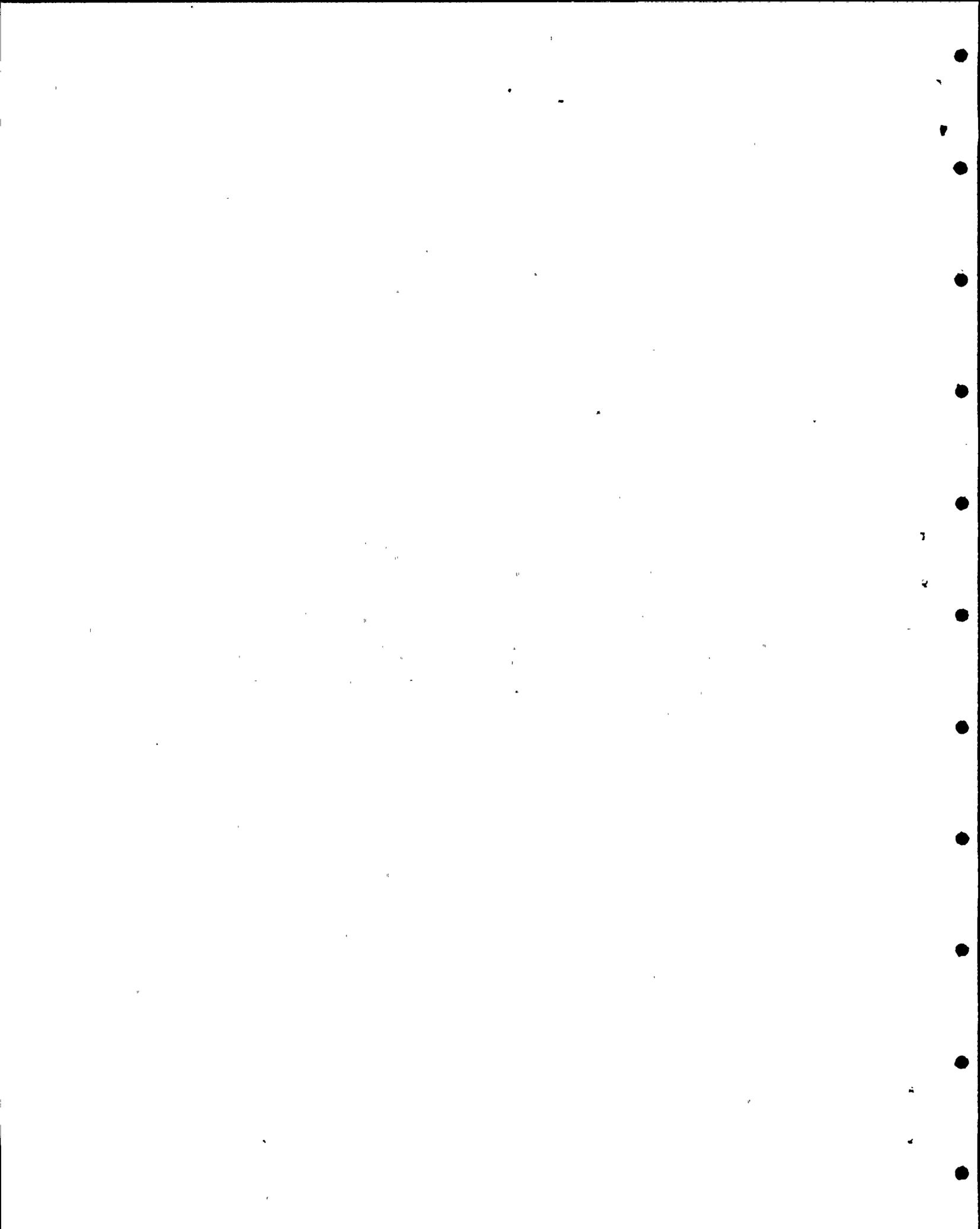
1.0 INTRODUCTION

Purpose and Scope

This interim technical report summarizes the independent review of a sample of twenty Class IE electrical raceway supports at Diablo Canyon Nuclear Power Plant (DCNPP-1). Electrical raceway supports restrain electrical raceways, which consist of conduits and cable trays used to house Class IE cables.

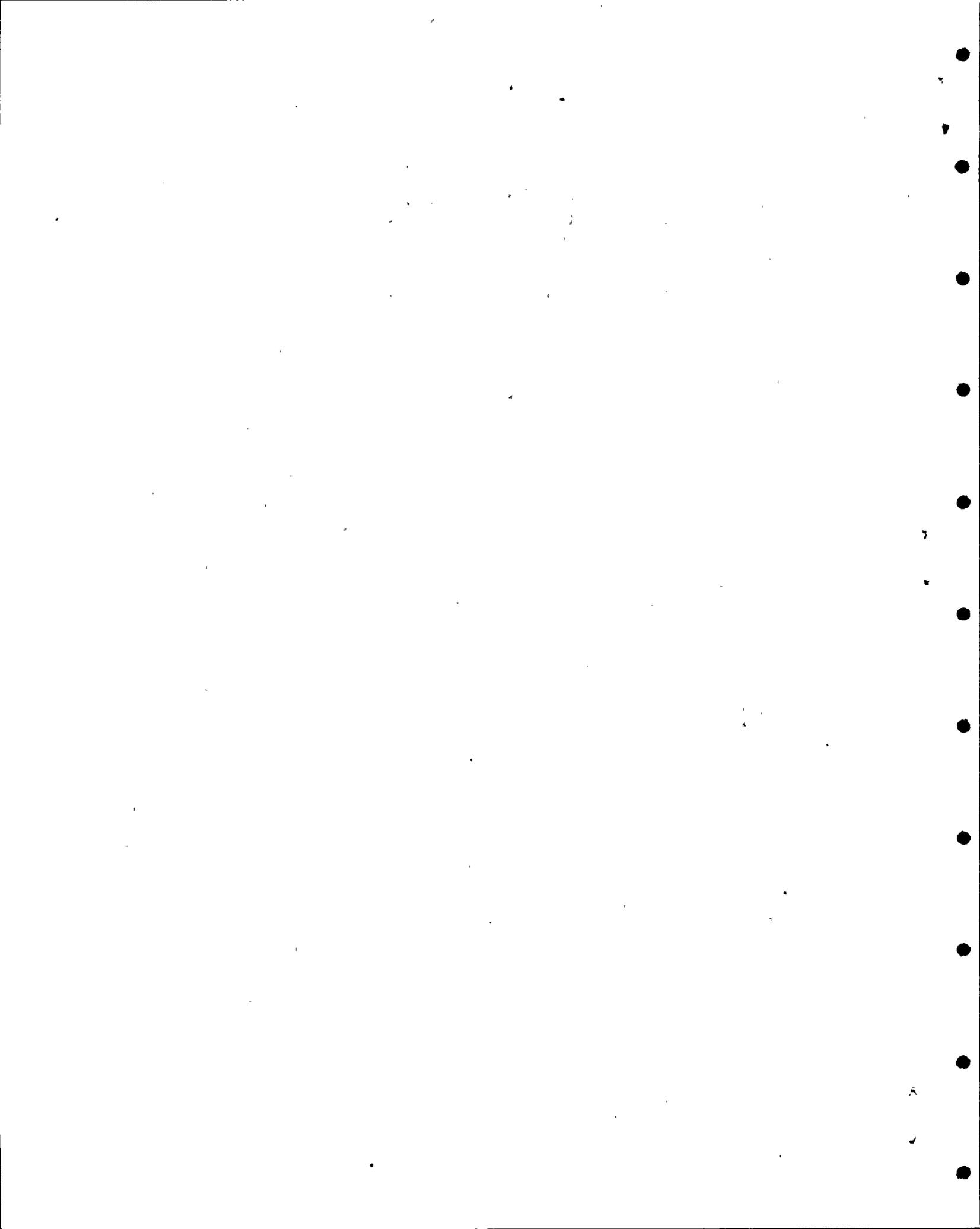
The overall purpose of the independent review is to verify the seismic design of the electrical raceway support sample. This is accomplished by a three step verification which consists of design criteria review, field verification of support installation, and independent analysis of electrical raceway supports. This report summarizes the first two steps. The third step will be addressed by reviewing design raceway support analyses following the PGandE internal technical program completion.

This report is one of many interim technical reports. Interim technical reports include: analytical references, results, sample definitions and descriptions, methodology, a listing of Error and Open Items, an examination of trends and concerns, and a conclusion, as discussed at the June 10, 1982 Nuclear Regulatory Commission (NRC) meeting in Waltham, Massachusetts.



Summary

RLCA completed two of three steps towards seismically verifying Class IE electrical raceway supports. RLCA reviewed the design methods and criteria and field verified the sample of electrical raceway supports against the design installation drawings. As a result, three generic concerns were noted. RLCA made recommendations to address these concerns. The remaining step is to review raceway support analyses following completion of the PGandE internal technical program.



Background

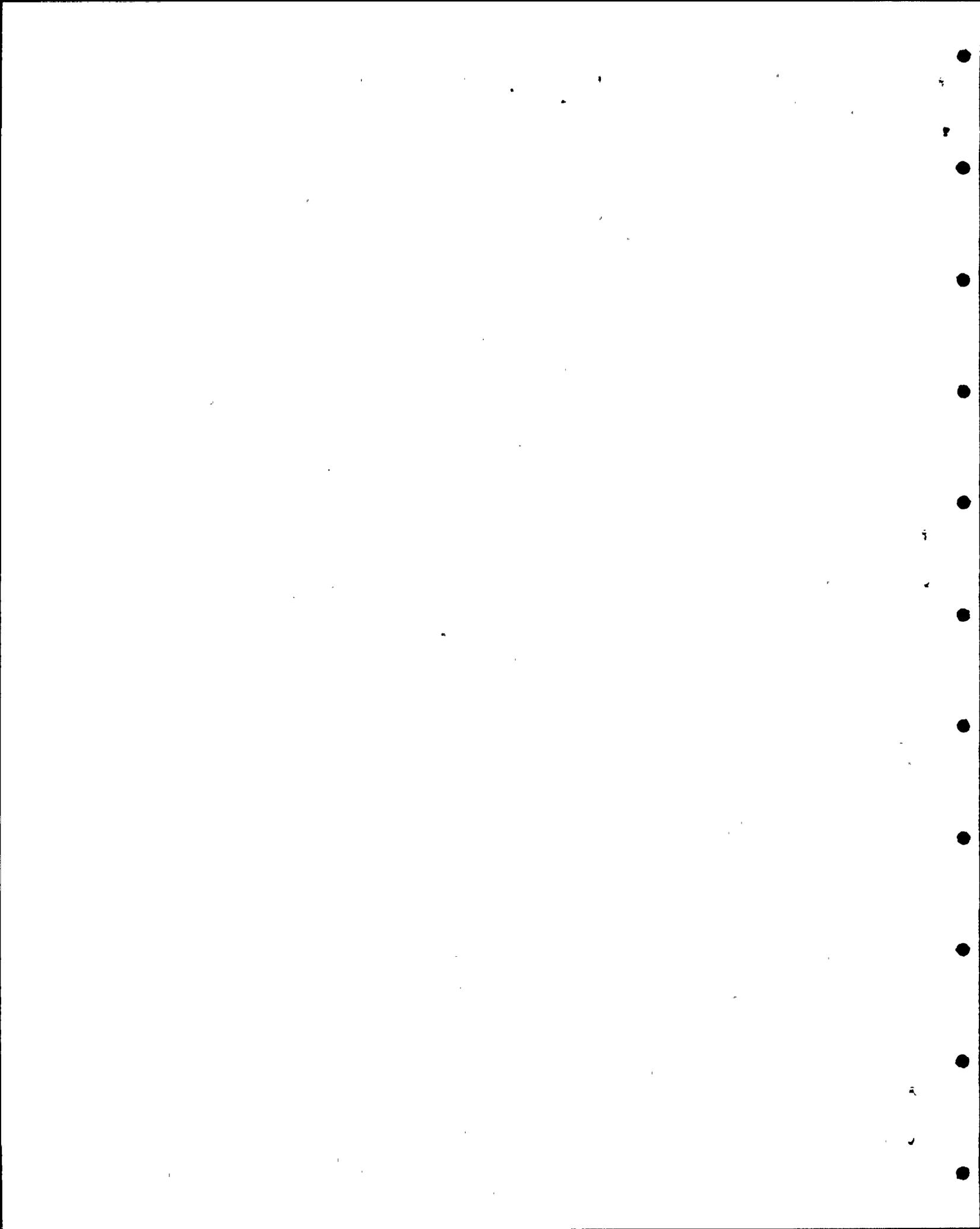
On September 28, 1981, PGandE reported that a diagram error had been found in a portion of the seismic qualification of the Diablo Canyon Unit 1 Nuclear Power Plant (DCNPP-1). This error resulted in an incorrect application of the seismic floor response spectra for sections of the annulus of the Unit 1 containment building. The error originated when PGandE transmitted a sketch of Unit 2 to a consultant. This sketch contained Unit 2 opposite hand geometry incorrectly identified as Unit 1 geometry.

As a result of this error, a seismic reverification program was established to determine if the seismic qualification of the plant was adequate for the postulated Hosgri 7.5M earthquake. This program was presented orally to the NRC in a meeting in Bethesda, Maryland on October 9, 1981.

Robert L. Cloud and Associates (RLCA) presented a preliminary report for the Seismic Reverification Program to the NRC on November 12, 1981. At this time, RLCA noted deficiencies in the seismic inputs for PGandE qualification analyses of Class IE electrical raceway supports. This was based on a review which showed that, of twenty electrical raceway supports RLCA selected at random, nine used inapplicable response spectra to determine seismic loads.

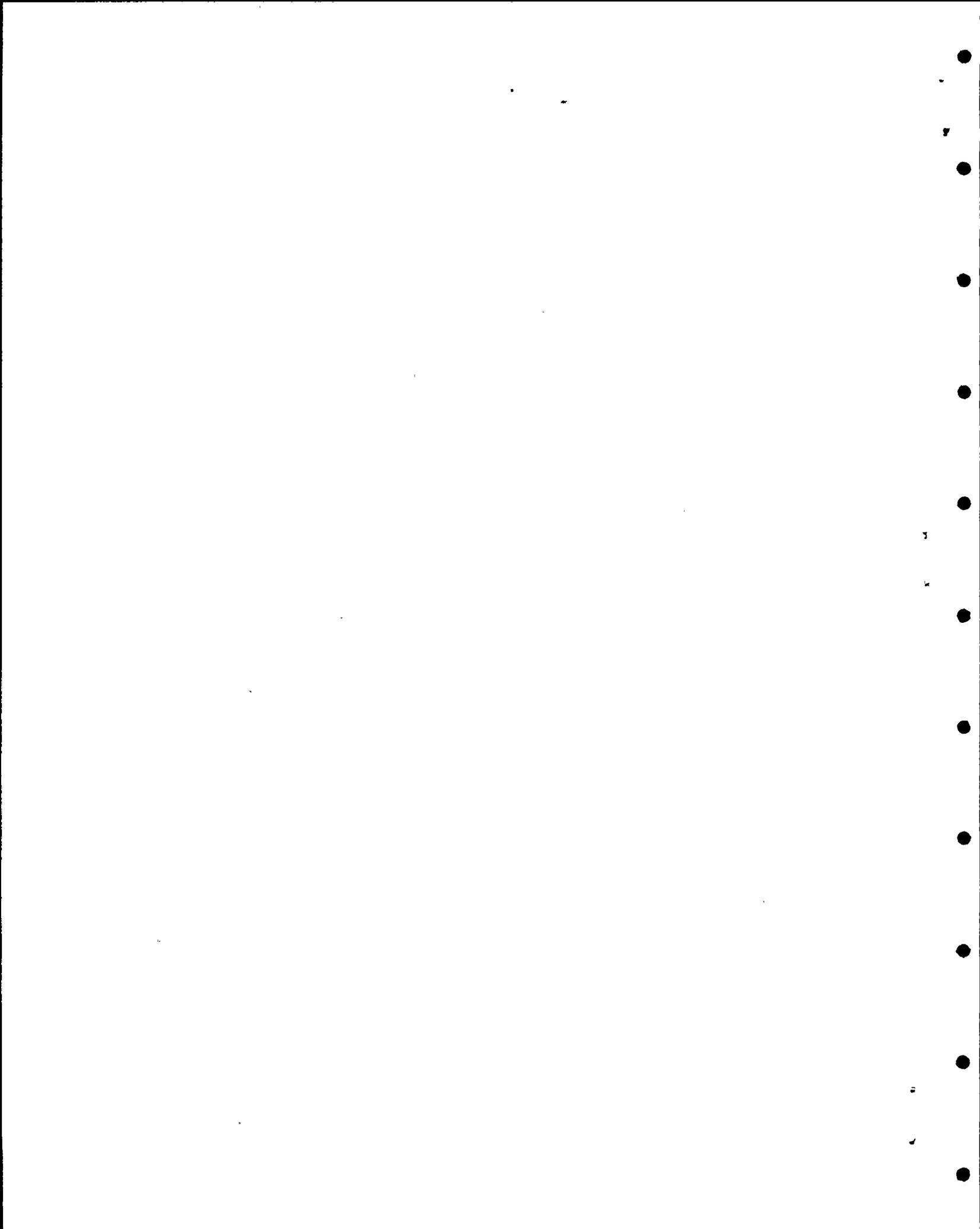
The NRC Commissioners met during the week of November 16, 1982 to review the preliminary report and the overall situation. On November 19, 1981 the NRC issued an Order Suspending License CLI-81-30 which suspended PGandE's license to load fuel and conduct low power tests up to 5% of rated power at DCNPP-1. This suspending order also specified that an Independent Design Verification Program be conducted to assure that the plant met the licensing criteria.

PGandE retained Robert L. Cloud and Associates as program manager to develop and implement a program that would address the concerns cited in the Order Suspending License CLI-81-30. Phase 1 plan for this program was transmitted to the NRC on December 4, 1981 and discussed with the NRC staff on February 3, 1981. Phase 1 deals with seismic service related contracts prior to June 1978.



On March 19, 1982 the NRC approved Teledyne Engineering Services (TES) as program manager to replace Robert L. Cloud and Associates. However, RLCA continued to perform the independent review of seismic, structural and mechanical aspects of Phase I.

The NRC approved the Independent Design Verification Program Phase I Engineering Program Plan on April 27, 1982. This plan dictates that a sample of piping, equipment, structures and components be selected for independent analysis. The results of these analyses are to be compared to the design analyses results. If the acceptance criteria is exceeded, an Open Item Report is to be filed. Interim Technical Reports are to be issued to explain the progress of different segments of the technical work.



2.0 INDEPENDENT DESIGN VERIFICATION METHODS

2.1 PROCEDURES

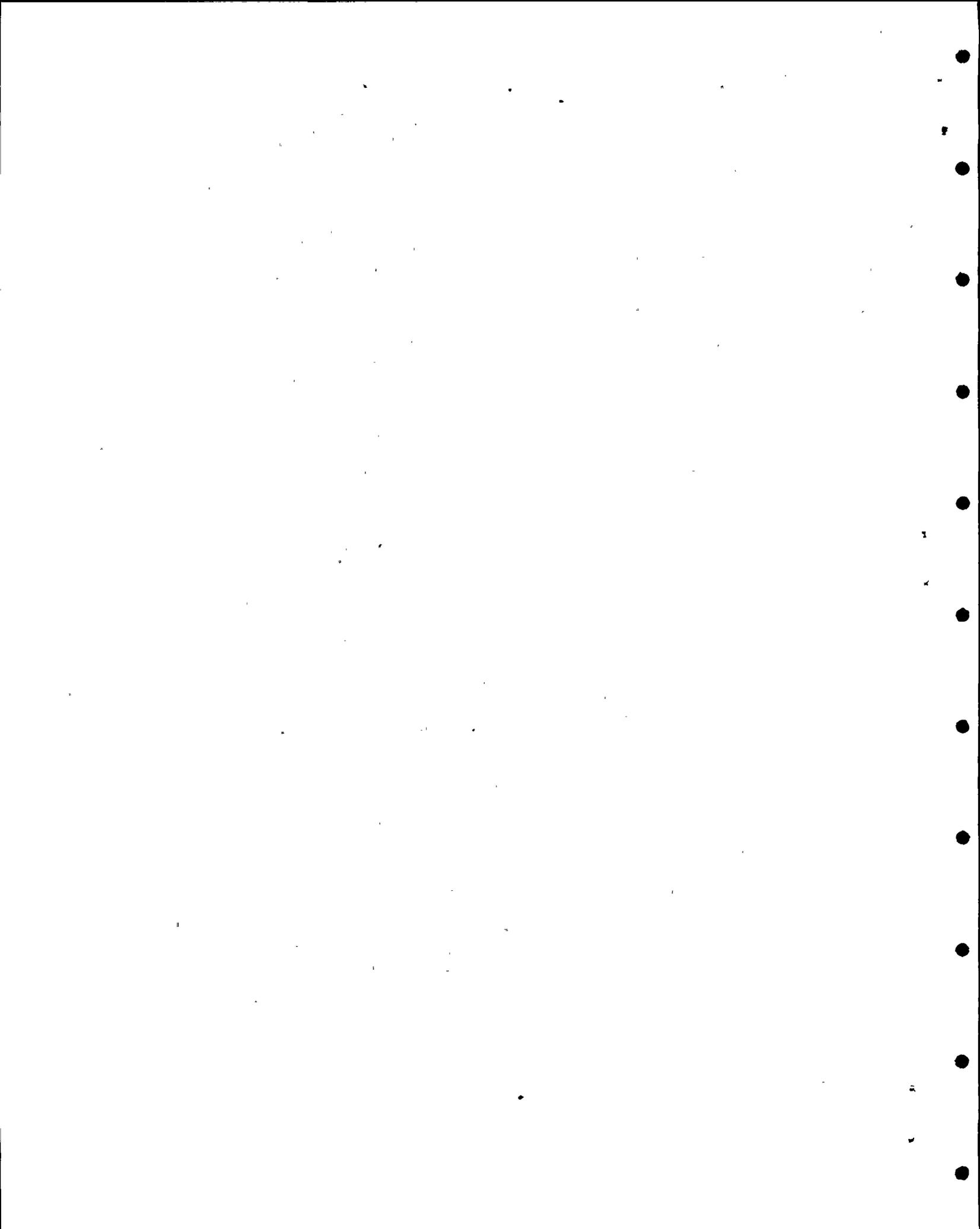
Prior to the independent design verification program, RLCA had randomly selected twenty raceway supports for seismic input review. In a preliminary report to the NRC, RLCA presented their results which showed that deficiencies in seismic inputs existed for nine of the supports.

Once the IDVP program was initiated, RLCA reviewed the design criteria used to seismically qualify Class IE electrical raceway supports. RLCA researched design source documents, design criteria memorandum, a revised conduit weight list, and over four hundred standard installation drawing details. The revised conduit weight list was subsequently field verified. In addition, RLCA reviewed the Hosgri Report to obtain applicable response spectra, which were to be used to calculate seismic loads for the supports.

Once the design criteria were evaluated, RLCA chose a sample of twenty electrical raceway supports at various elevations and locations. This sample in general consists of supports with long cantilever arms, high loadings and large beam spans. RLCA field verified the location, dimensions, and configurations of the sample against the design installation drawings. Discrepancies between the actual installation of the support sample and the design installation drawings were noted in an open item report (EOI).

2.2 LICENSING CRITERIA

To obtain licensing criteria for Class IE electrical raceway supports, RLCA researched several documents. The Hosgri Report, Section 10.3.29 discusses the analysis of raceways (Reference 1). Criteria for the analysis of cable trays and conduits are not explicitly mentioned in the Hosgri Report. In lieu of explicit criteria, RLCA used current American Iron and Steel Institute (AISI) and American Institute of Steel Construction (AISC) design guides to obtain criteria for analysis of cold form steel (Unistrut) and formed members such as angles and wide flanges beams.



3.0 EVALUATION OF DESIGN CRITERIA FOR ELECTRICAL RACEWAY SUPPORTS

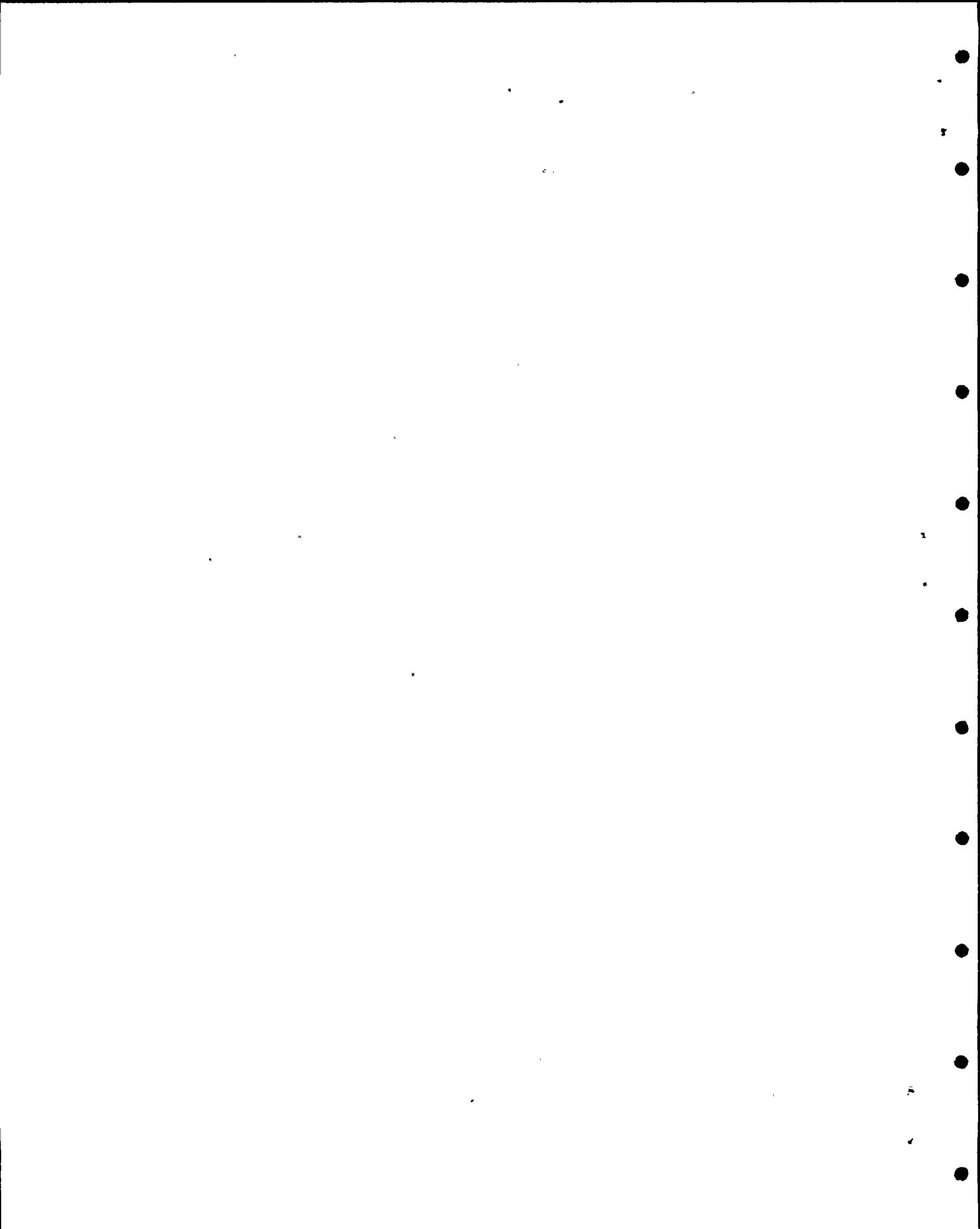
RLCA evaluated the design criteria for all Class IE electrical raceway supports. This information was located in preliminary criteria memorandum, various qualification analyses, drawings, reference and source documents, lists and reports.

A preliminary revision of the PGandE design criteria memorandum was examined (Reference 3). The PGandE revised design list of raceway weights by size was based on PGandE field information which RLCA verified. The weight comparison is discussed in section 4.2.3.

PGandE issued approximately four hundred standard drawings which included the details of electrical raceway supports. The drawings were specified for installation in certain areas of DCNPP-1. RLCA specifically used PGandE installation drawings 050029 Revision 41 (Reference 4) and 050030 Revision 29 (Reference 5).

After reviewing the PGandE design criteria, RLCA noted five concerns as described below. These concerns reflect the possibility that unconservative seismic loads and stresses were calculated in the design analyses.

1. Longitudinal support for conduits is not specified in any installation drawings and was not checked by PGandE in the qualification analysis.
2. Raceway stresses calculated for the largest design span may exceed allowables.
3. Joint fatigue and local joint flexibility may result in more flexible supports that are characterized by higher seismic accelerations.
4. Flexibility of adjacent supports may change the effective load distribution of the support being examined. This may result in higher seismic accelerations.
5. The design methodology does not consider the coupling of support and raceway in determining frequency. This may result in lower frequencies and higher seismic loading.

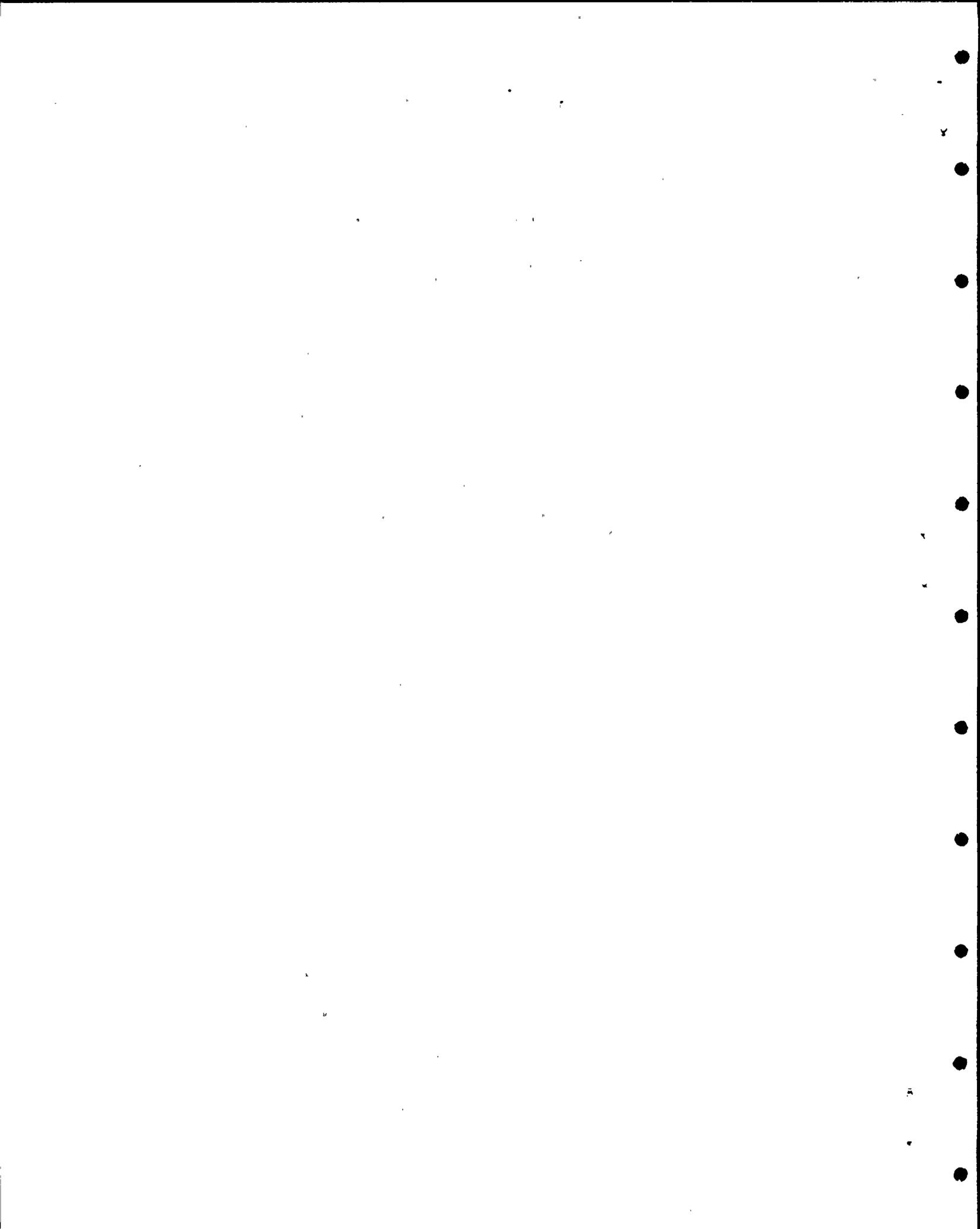


4.0 INDEPENDENT REVIEW OF ELECTRICAL RACEWAY SUPPORTS

4.1 SAMPLE SELECTION

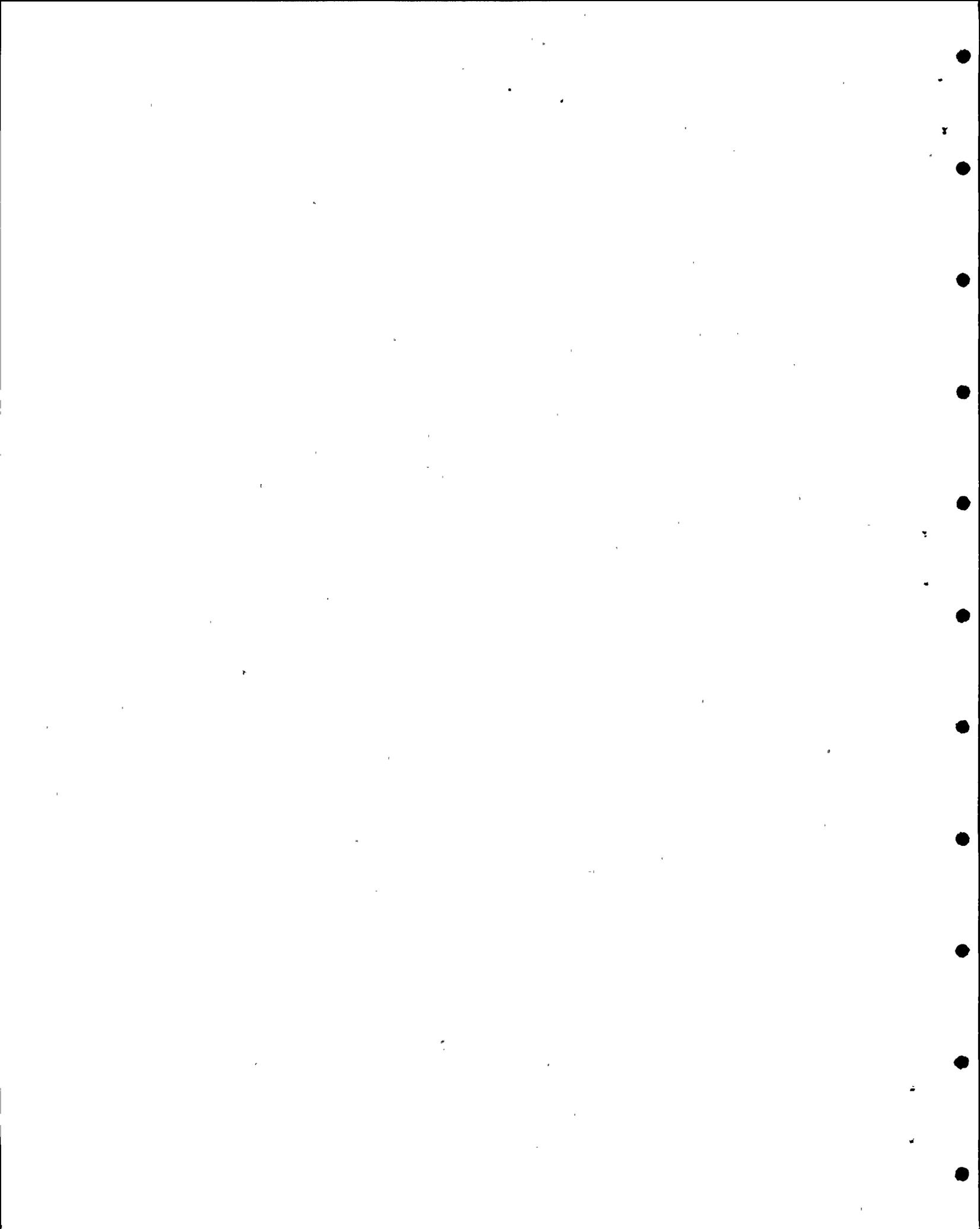
Twenty-two Class IE electrical raceway supports were selected by RLCA. This number was reduced to twenty when Samples 2 and 22 were eliminated. Sample 2 was not a Class IE support and Sample 22 was not required. The sample is listed in Table 1. This table includes building, attachment elevation, applicable torsion arm and applicable cantilever or trapeze arm. (Appendix B describes the method for calculating torsion.)

The sample represents a wide variety of elevations, locations, support types and loadings. Supports were selected in each of the four safety related buildings: containment structure, auxiliary building, turbine building and intake structure. Of the twenty supports, only one represents a raceway pinned to the wall. The remaining nineteen are representative of supports with large cantilever arms or a large trapeze type frame. Figures 1 and 2 show typical examples of these nineteen raceway supports with a large cantilever arm and a large trapeze type frame.



Sample Number	Building	Attachment Elevation (feet)	Torsion Arms (feet)	Trapeze Arm (inches)	Cantilever Arm (inches)
1	Containment Interior	173	50	---	21
2	Sample determined to be Class II				
3	Auxiliary	140	100 EW 28 NS	---	18
4	Auxiliary	140	100 EW 24 NS	---	50
5	Auxiliary	140	50 EW 69 NS	---	30 (Max)
6	Auxiliary	115	81 EW 102 NS	---	68
7	Intake	17.5	---	---	25
8	Turbine	165	---	---	29
9	Turbine	119	---	36	---
10	Turbine	140	---	---	36
11	Turbine	140	---	37	---
12	Turbine	110	---	---	9
13	Turbine	110	---	---	8
14	Turbine	104	---	---	39
15	Containment Exterior	135	---	---	24 (Max)
16	Turbine	140	---	---	36 (Max)
17	Auxiliary	135	30 EW 190 NS	---	18
18	Auxiliary	135	30 EW 190 NS	---	0
19	Auxiliary	115	50 EW 234 NS	---	62
20	Auxiliary	126	54 EW 31 NS	5	---
21	Auxiliary	128	45 EW 39 NS	---	18
22	Sample not used				

Table 1
Electrical Raceway Support Sample



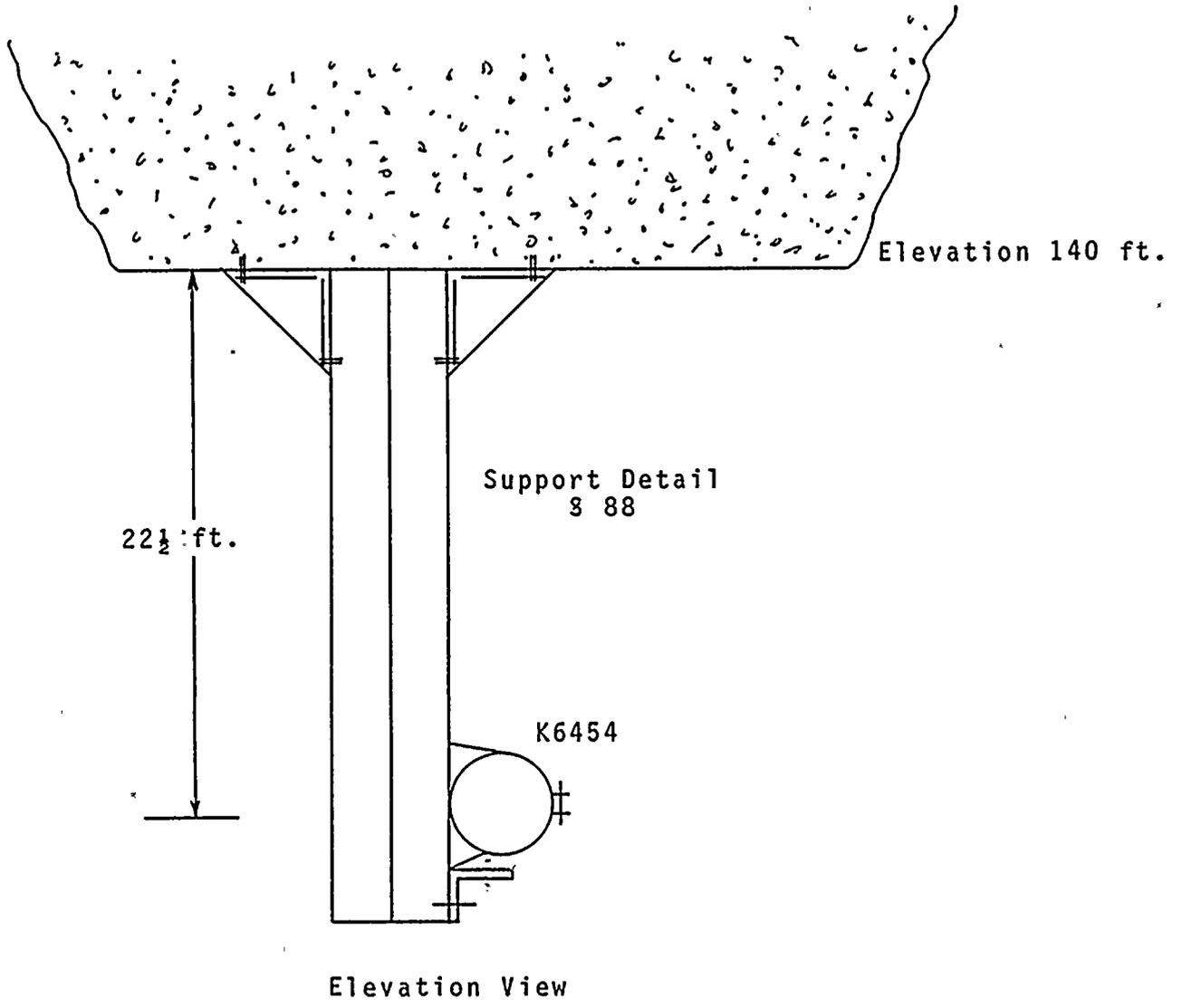
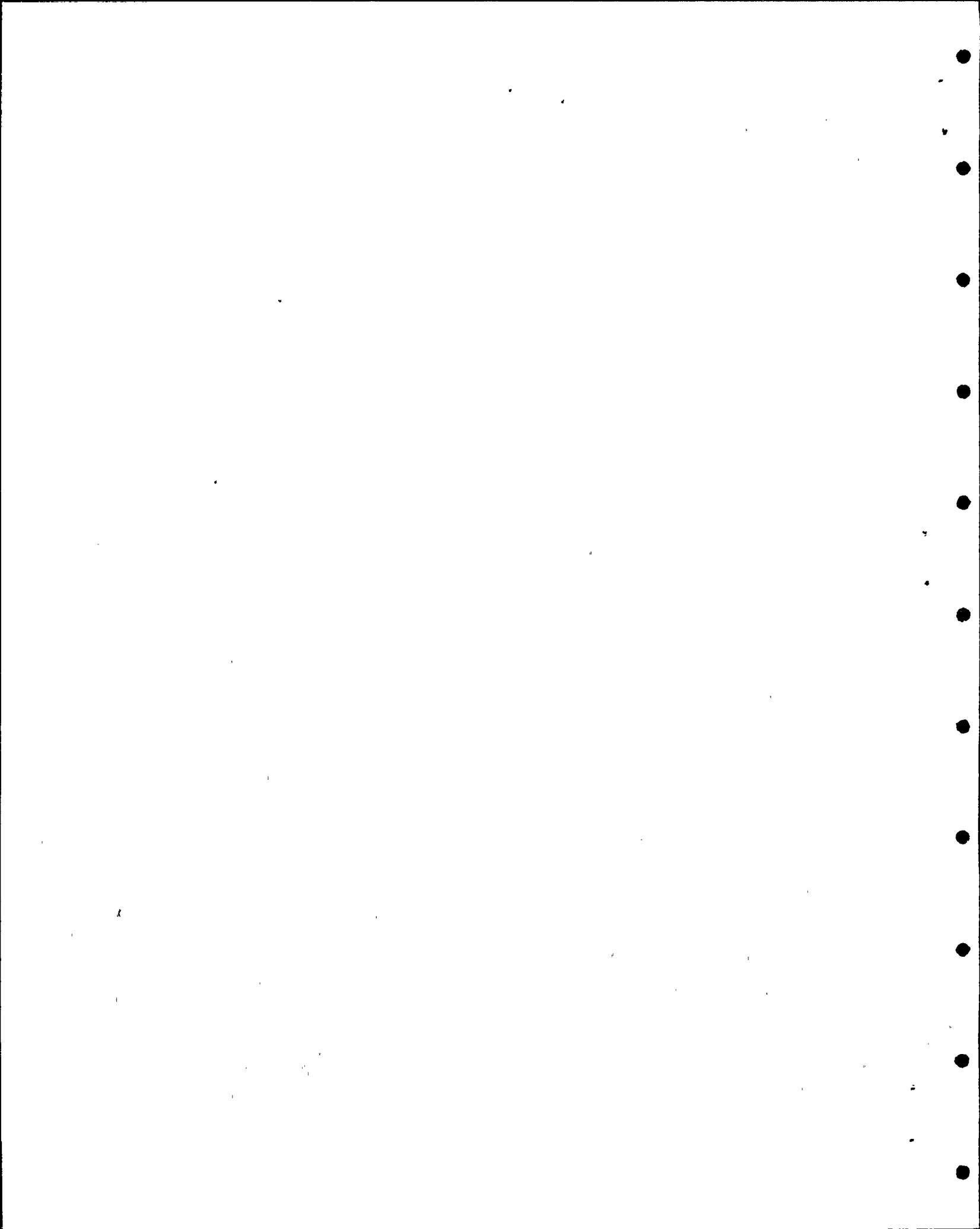
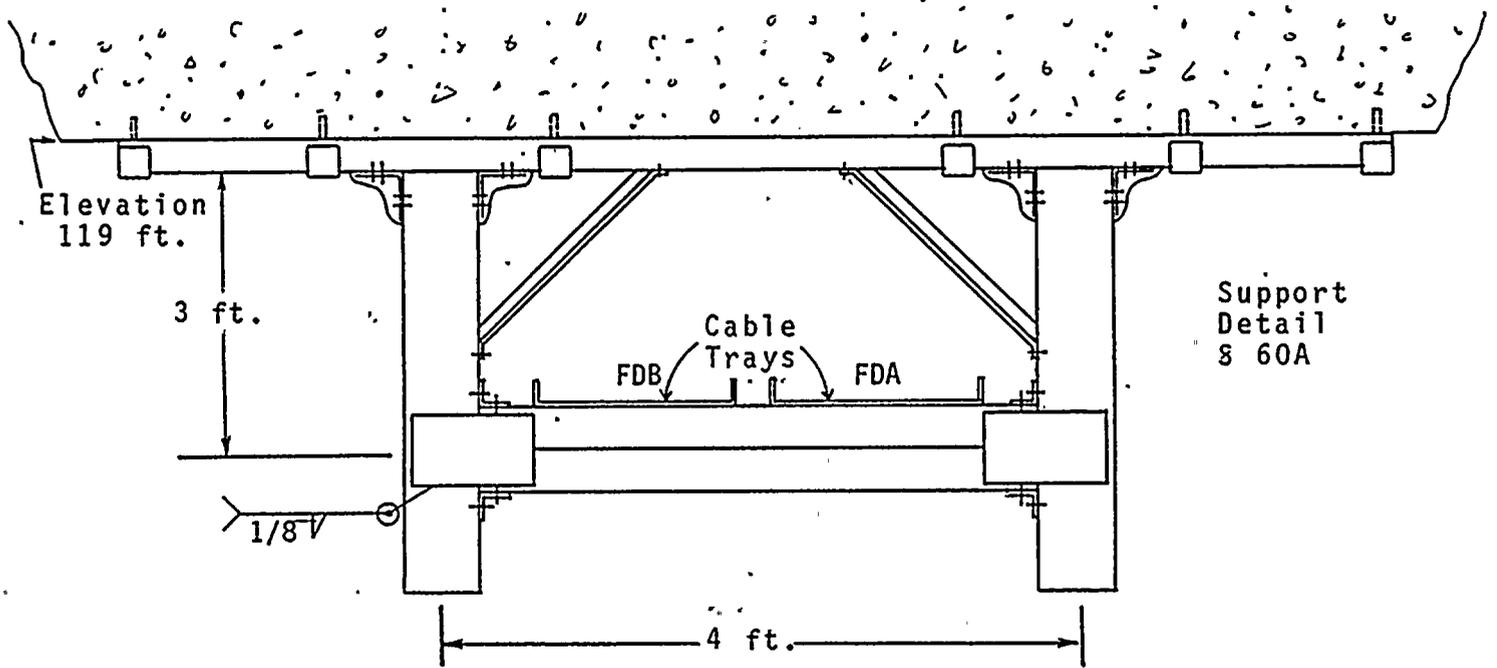


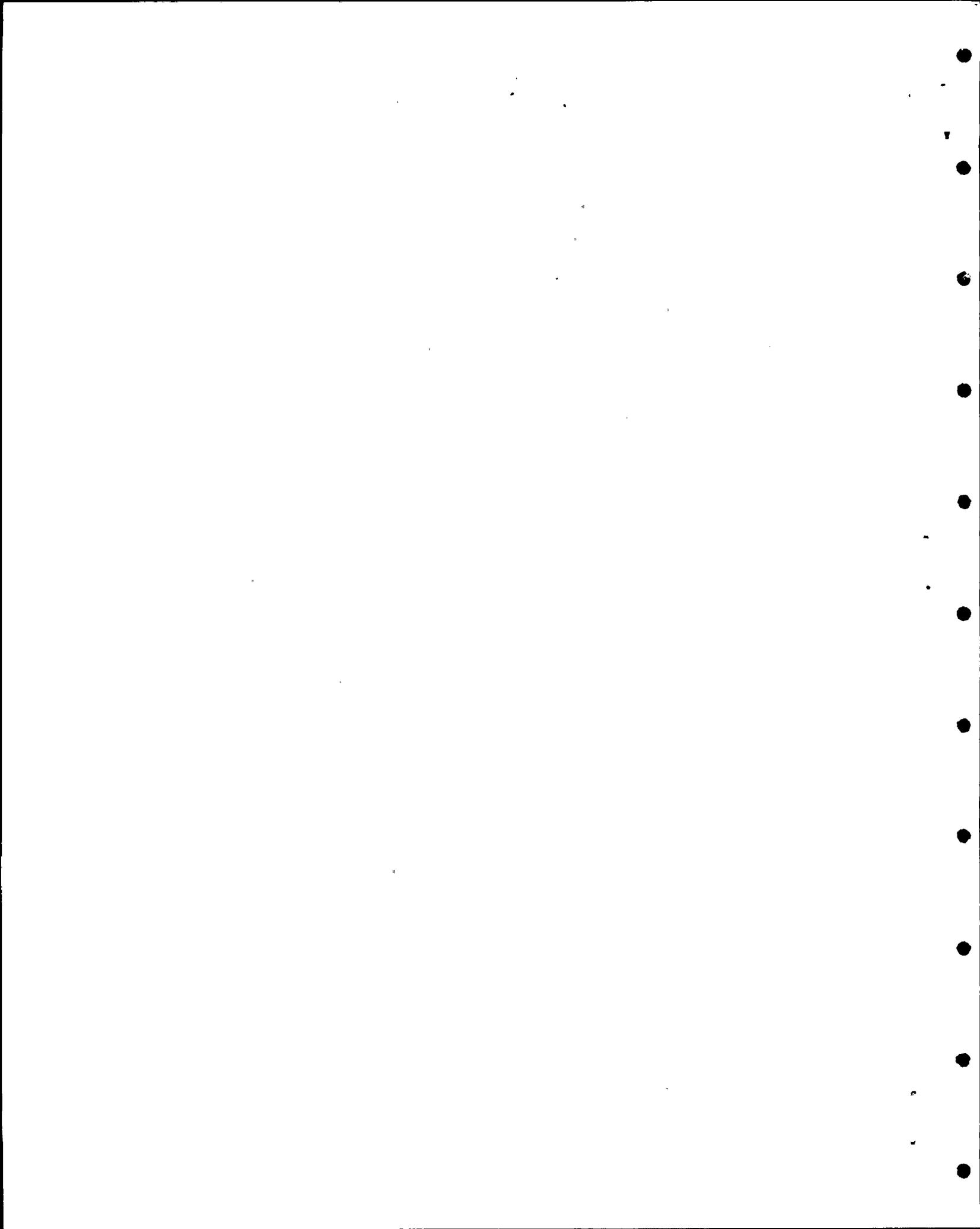
Figure 1
Electrical Raceway Support
with Cantilever Arm
Sample 5





Elevation View

Figure 2
 Electrical Raceway Support
 with Trapeze Type Frame
 Sample 9



4.2 FIELD VERIFICATION

RLCA field verified the sample of twenty electrical raceway supports. Actual support dimensions, loadings, configurations and location were compared against PGandE installation drawings 050029 Revision 41 and 050030 Revision 29. The maximum spans between the sample supports and the adjacent supports were verified. Finally, the PGandE field raceway weight information was verified.

4.2.1 Installation Discrepancies

RLCA determined that four of the twenty electrical raceway supports in their sample were at variance with the PGandE installation drawings.

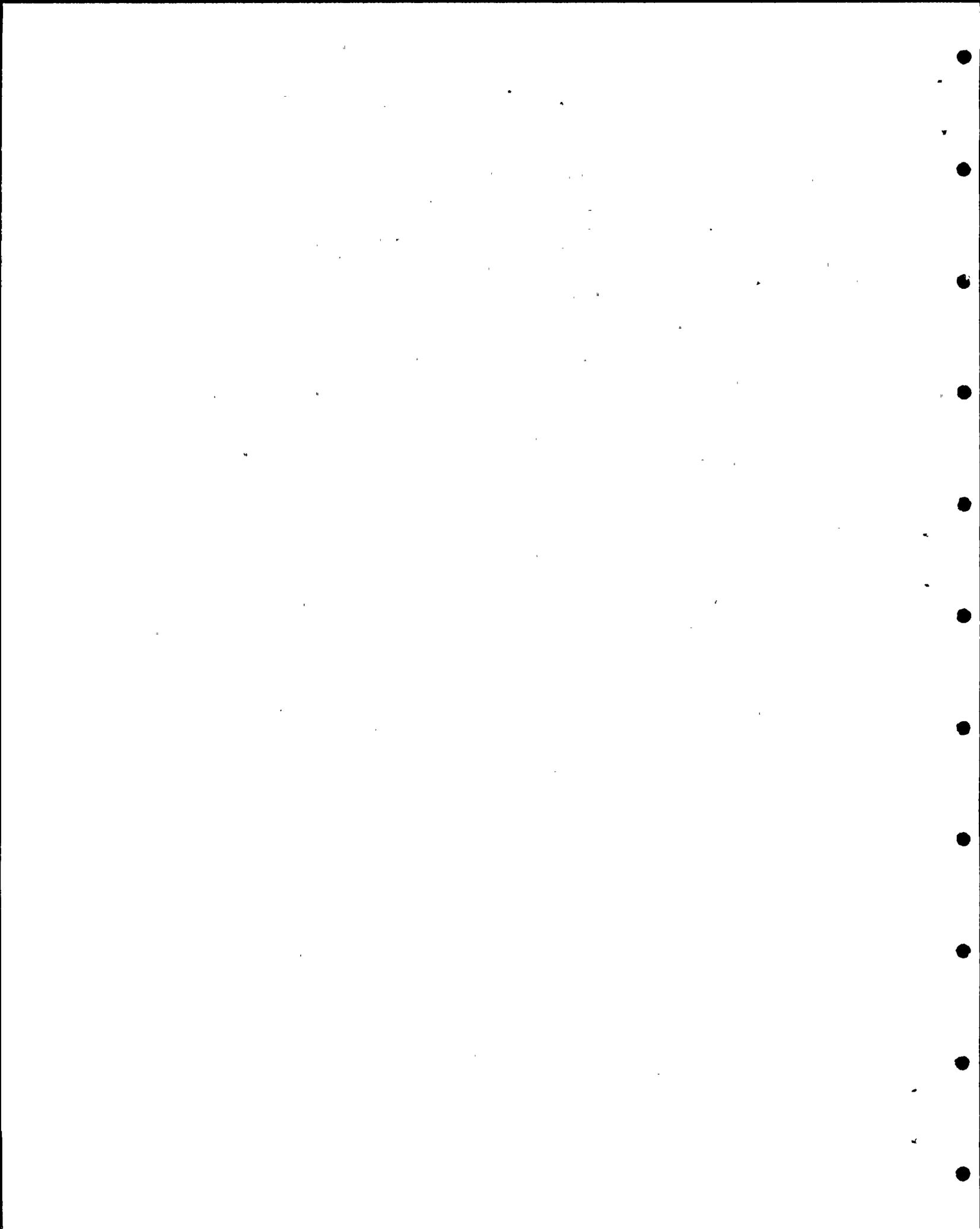
Sample 3 - was installed with larger members than were specified in the design drawings.

Sample 4 - had an additional one inch conduit attached to the support which exceeded the specified maximum loading.

Sample 15 - had two anchor bolts attached to the wall that were at variance with the design drawing, which specified four anchor bolts and an angle clip.

Sample 20 - was installed in Area K, elevation 126 feet, which was not specified in the design drawing.

The significance of these four variances on the design calculations has not been assessed. RLCA notes a concern with field installation as discussed in Section 6.0.



4.2.2 Maximum Support Spans

RLCA measured the maximum spans between the electrical raceway support sample and adjacent supports. The spans were found to be less than 9 feet. RLCA determined that these measurements were in agreement with the design installation drawings.

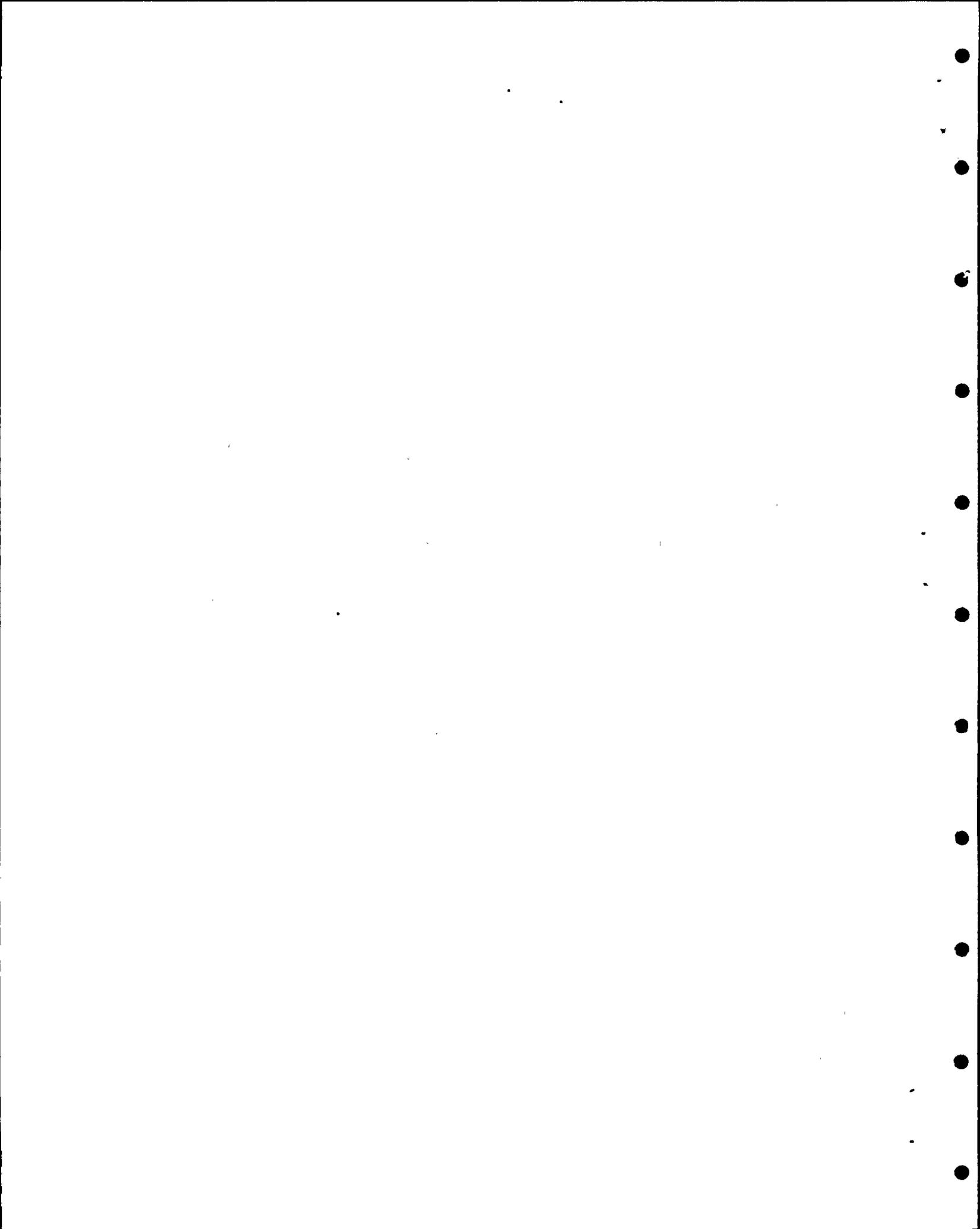
4.2.3 Conduit Weights

RLCA verified the PGandE field raceway weight information which served as the basis for the revised PGandE design weights (Reference 6). The revised design weights were issued in November, 1981 and replaced the incorrect conduit weights noted on the PGandE installation drawings.

RLCA verified the revised raceway weights by comparing conduit and cable tray sizes to the field information. In addition, raceways were opened and cable sizes verified. All raceways that were examined were found to have weights correctly noted on the PGandE field raceway information lists.

4.2.4 Hosgri Spectra

RLCA reviewed the Hosgri Report for applicable response spectra at the locations where the sample raceway supports were attached. Spectra was not available for higher elevations in the turbine, containment and auxiliary buildings.



5.0 EOIs ISSUED

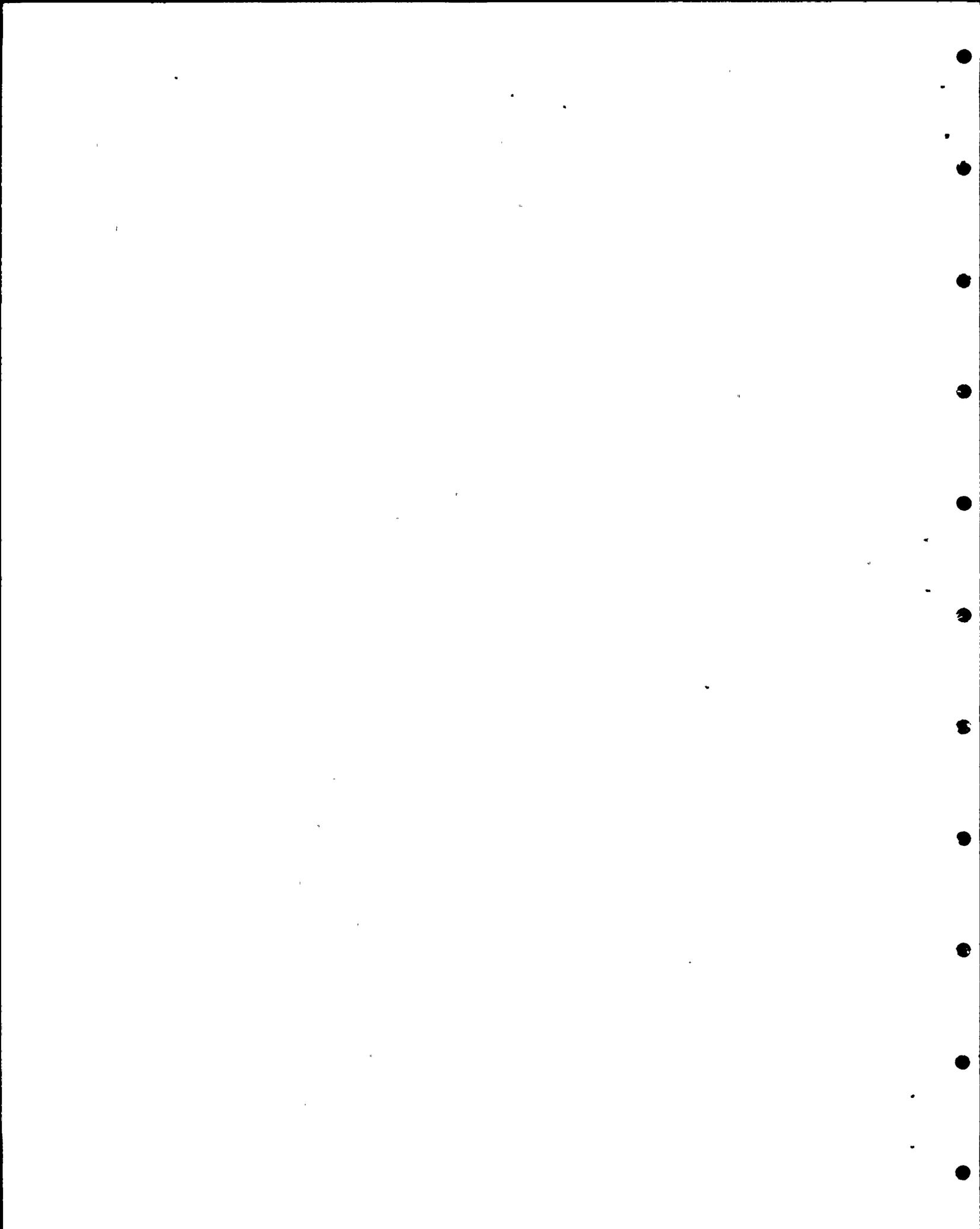
RLCA issued seven EOI reports for Class IE electrical raceway supports. Appendix A shows the EOI file number, revision, date and status.

EOI 910 reports four raceway supports which were installed at variance with the PGandE installation criteria. These supports comprise Samples 3, 4, 15 and 20 as described in section 4.2.1. The concerns described in EOI 910 were combined with those in EOI 983 which is defined as a Class A Error. Therefore, EOI 910 was closed.

EOI 930 was issued as a result of the RLCA evaluation of PGandE design criteria. EOI 930 notes five concerns with regard to PGandE design methods and criteria. These concerns, listed below, may have resulted in an unconservative design for the electrical raceway supports (See Section 3.0):

1. Longitudinal support for conduits is not specified in any installation drawings and was not checked by PGandE in the qualification analysis.
2. Raceway stresses calculated for the largest design span may exceed allowable.
3. Joint fatigue and local joint flexibility may result in more flexible supports that are characterized by higher seismic accelerations.
4. Flexibility of adjacent supports may change the effective load distribution of the support being examined. This may result in higher seismic accelerations.
5. The design methodology does not consider the coupling of support and raceway in determining frequency. This may result in lower frequencies and higher seismic loadings.

The concerns described in EOI 930 were combined with those in EOI 983 which is defined as a Class A Error. Therefore EOI 930 was closed.



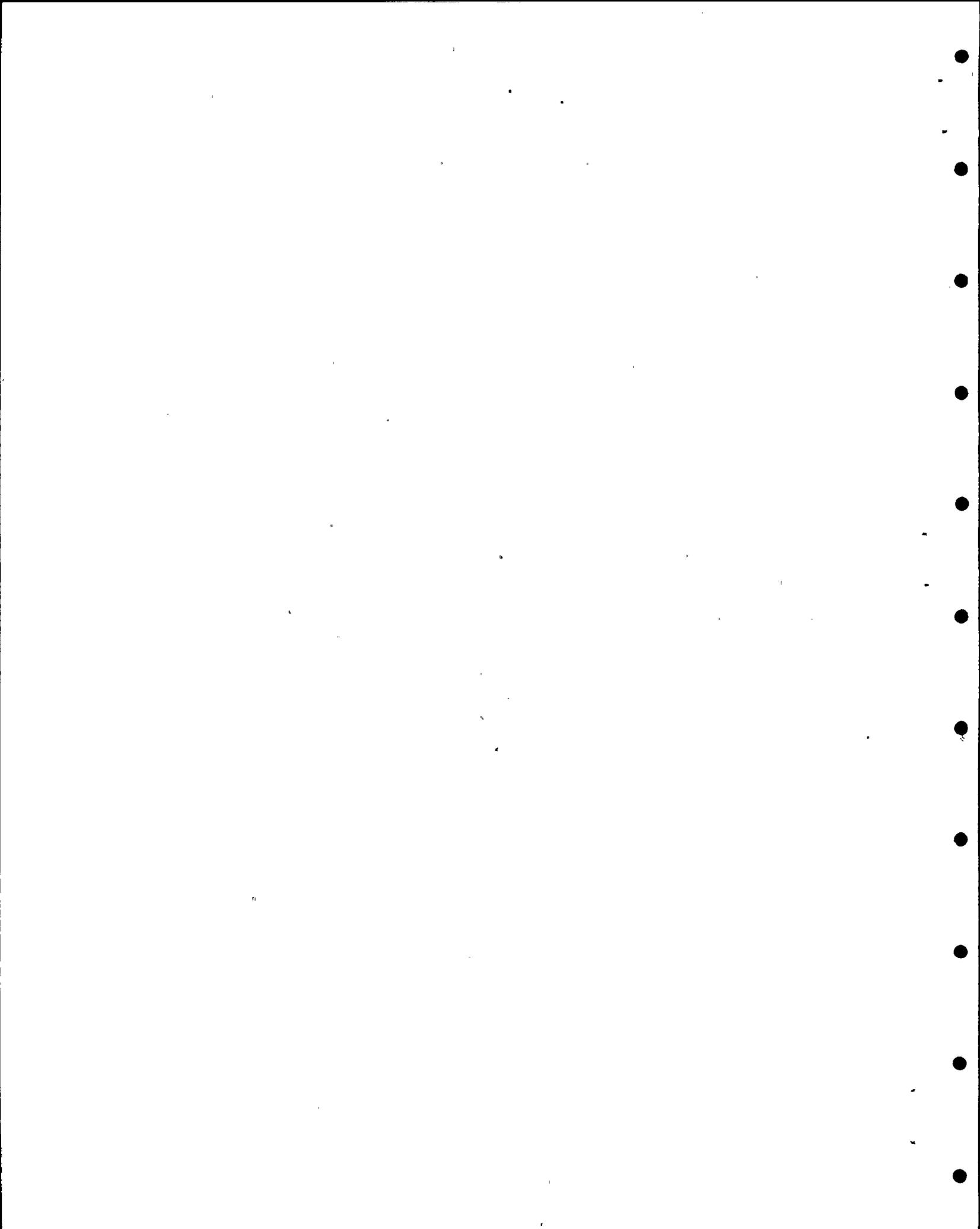
EOI 983 reports that PGandE calculations for nine of the twenty electrical raceway supports in the RLCA random sample used inapplicable response spectra. These nine supports were cited in the RLCA preliminary report, dated November 12, 1981. EOI 983 combines with EOIs 910 and 930 and is defined as an Error Class A.

EOI 1010 was issued because response spectra used to determine applicable seismic loadings were not available for the 165 foot elevation level in the turbine building where RLCA raceway support sample 8 is attached. EOI 1010 combines with EOI 1026 as an Error Class A or B. Therefore, EOI 1010 was closed.

EOI 1026 noted areas in the turbine building for which spectra were not available in the Hosgri Report (Reference 1). This Open Item combines with EOI 1010 as an Error Class A or B and remains unresolved pending the PGandE turbine building reanalysis.

EOI 1093 noted areas in the auxiliary building for which spectra was not available in the Hosgri report (Reference 1). Class IE electrical raceways are contained in these areas. Therefore, the qualification of these supports in the absence of applicable spectra is a concern. EOI 1093 was combined with EOI 1097 as an Error Class A or B. Therefore, EOI 1093 was closed.

EOI 1097 noted that Hosgri response spectra was not available for the fan/machine room in the auxiliary building above 163 feet. EOI 1097 is combined with various other EOIs, including EOI 1093, as an Error Class A or B. RLCA will resolve this concern when the PGandE auxiliary building review is completed.



6.0 EVALUATION OF ELECTRICAL RACEWAY SUPPORTS

6.1 INTERPRETATION

RLCA examined seismic inputs for twenty electrical raceway supports. Next, PGandE methods and criteria were evaluated. Last, RLCA field verified the electrical raceway supports as installed against the design drawings. As a result, RLCA identified three concerns:

1. Design criteria deficiencies existed which could result in unconservative design.
2. Seismic information used in the design analysis was not identical to that in the Hosgri Report. In addition, response spectra was not available for higher elevations where raceways are supported.
3. Certain raceway supports were at variance with design installation criteria.

6.2 RECOMMENDATION

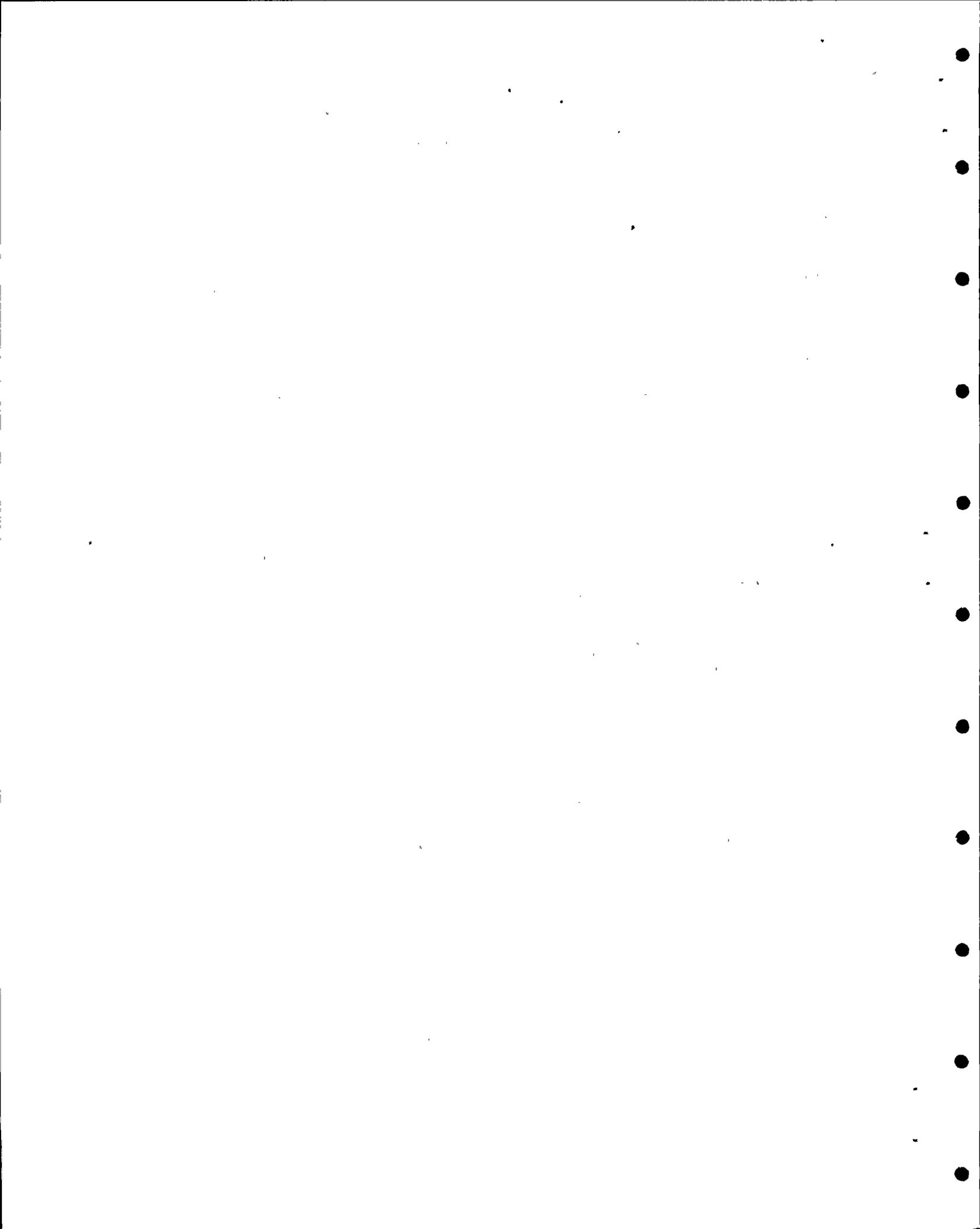
RLCA made the following recommendations to address the concerns described above.

1. Modify design criteria and methodology used to seismically verify electrical raceway supports.
2. Examine Hosgri response spectra inputs, for all electrical raceway supports.
3. Establish and implement a program to insure that raceway supports conform to design installation criteria.

PGandE has established an Internal Technical Program to address concerns regarding criteria deficiencies, inapplicable spectra and field variances.

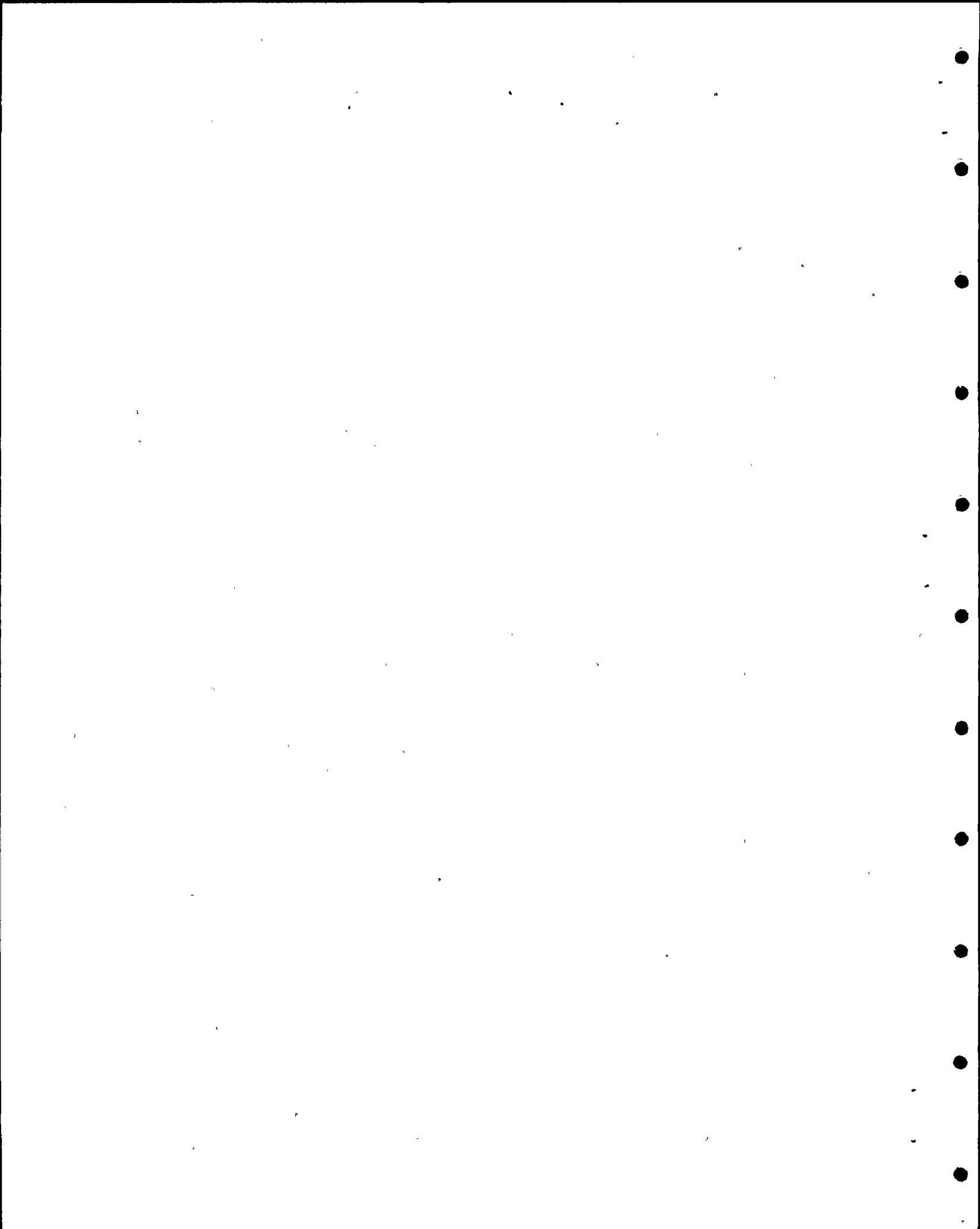
For each of the three recommendations, RLCA would selectively verify the corrective action.

In addition, RLCA will review a sample of design raceway analyses once the PGandE Internal Technical Program is completed.



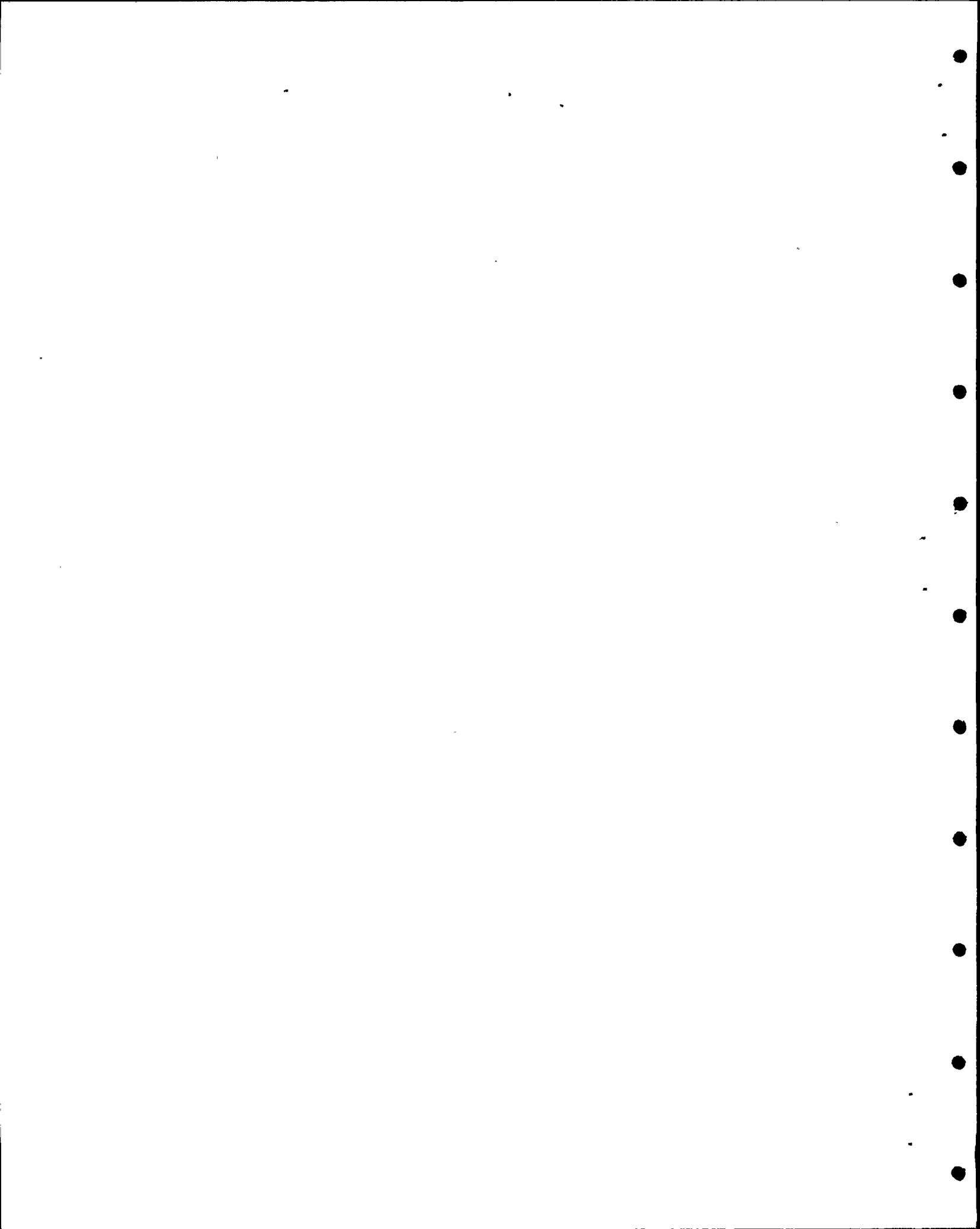
7.0 CONCLUSION OF ELECTRICAL RACEWAY REVIEW

The adequacy of the electrical raceway supports can not be evaluated until RLCA has reviewed the methodology, installation program and analyses in progress in the PGandE Internal Technical Program.



8.0 REFERENCES

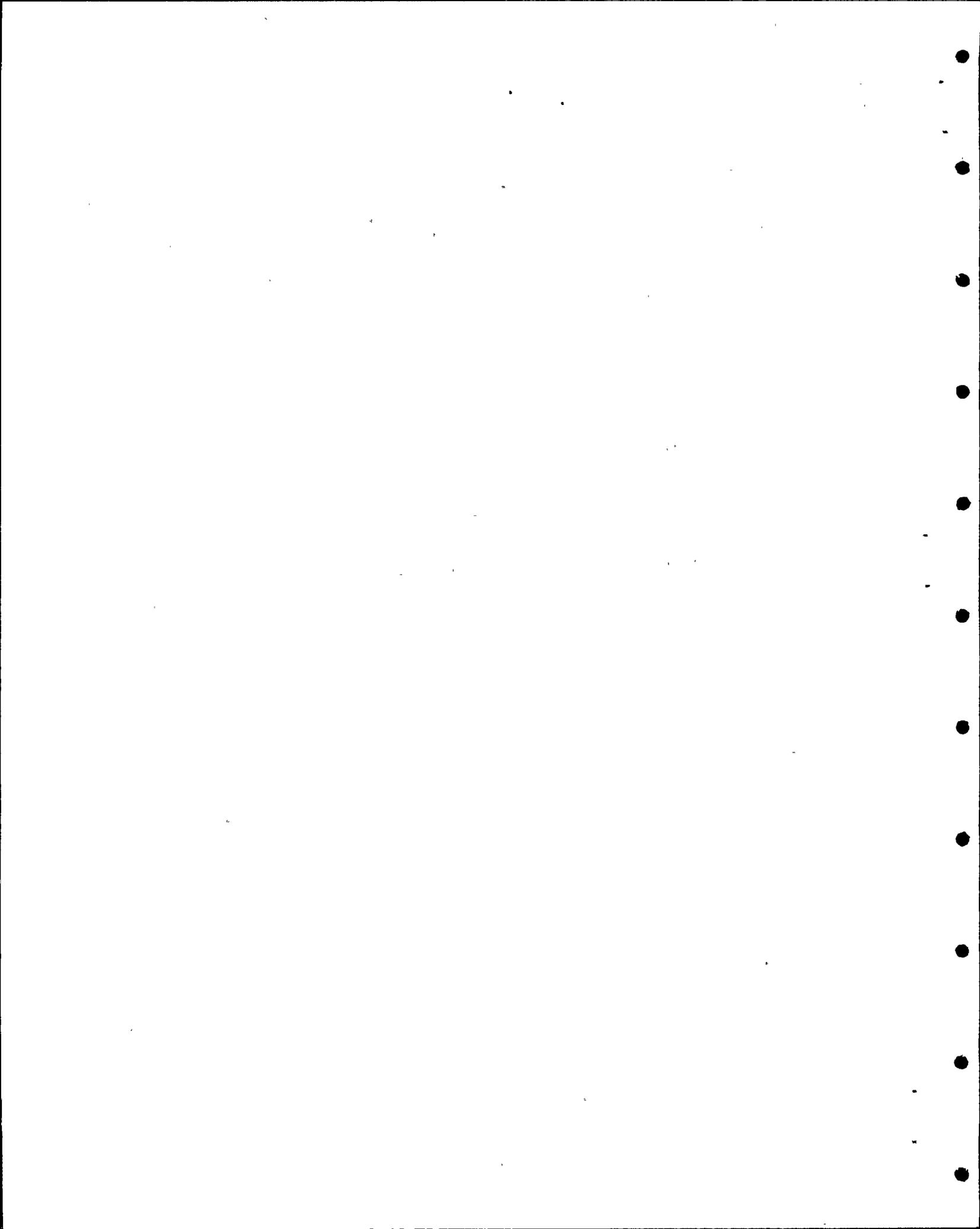
<u>Reference No.</u>	<u>Title</u>	<u>RLCA File No.</u>
1	PGandE Report: Seismic Evaluation for Postulated 7.5M Hosgri Earthquake	P105-4-200-001
2	Design Criteria for Review of Class 1E Electrical Raceway Supports at Diablo Canyon Nuclear Power Plant for Hosgri 7.5M Earthquake (Superseded)	P105-4-434-029
3	PGandE Installation Drawing 050029, Rev 41	P105-4-456-193
4	PGandE Installation Drawing 050030, Rev. 29	P105-4-456-198
5	PGandE Revised PGandE Design Weights	P105-4-591.5-143
6	DCNPP Independent Design Verification Program Procedure, Preparation of Open Item Reports, Error Reports, Program Resolution Reports, Revision 0, March 31, 1982.	P105-4-810-021
7	DCNPP Independent Design Verification Program, Program Management Plan, Phase I, Revision 0, March 29, 1982.	P105-4-810-021
8	RLCA Field Notes	P105-4-591.5-142
9	Sample 2, Resolution Material	P105-4-592.5-145



Robert L. Cloud and Associates, Inc.



Appendix A
EOI Reports
(2 pages)



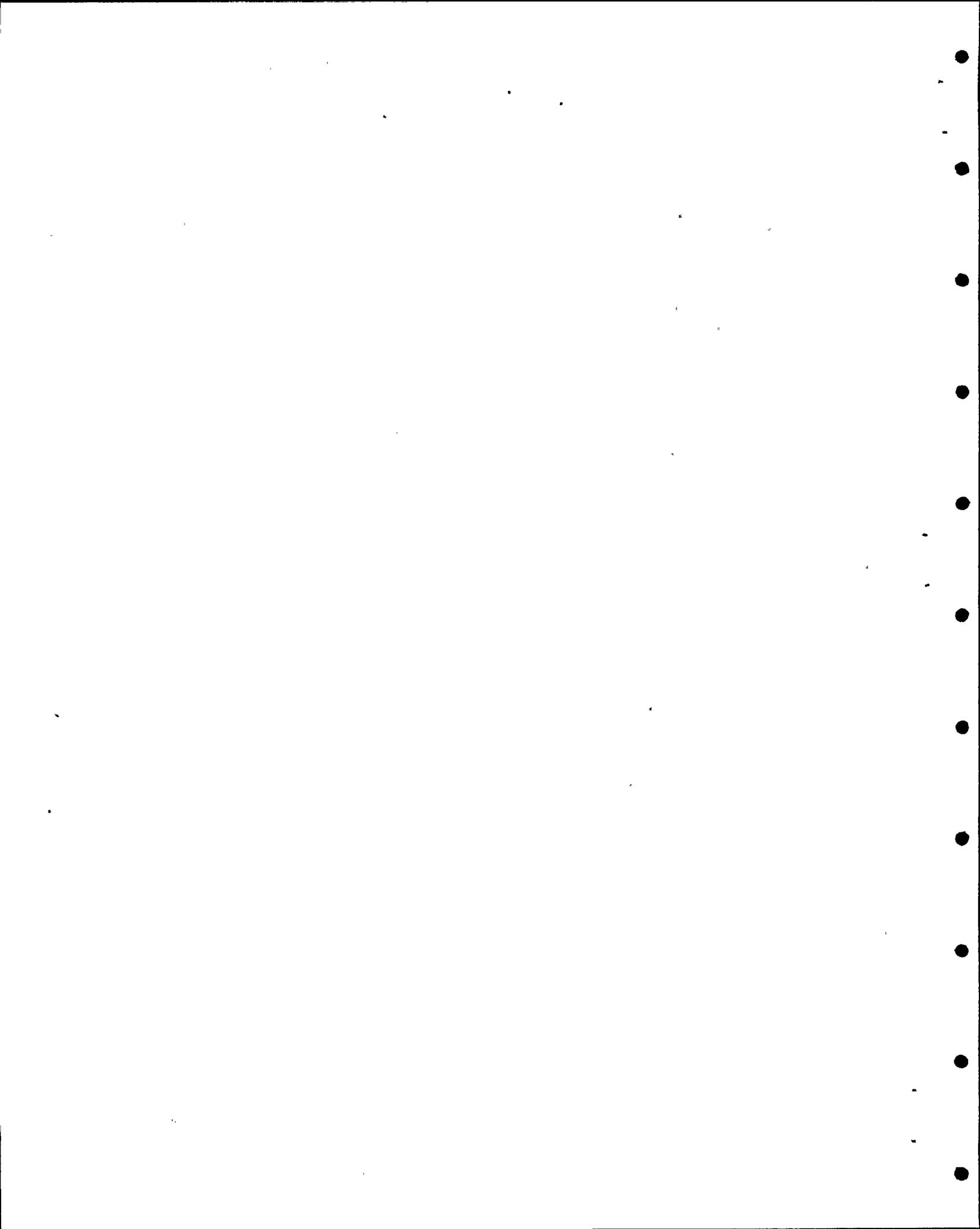
APPENDIX A
ERROR AND OPEN ITEM REPORTS
ELECTRICAL RACEWAY SUPPORTS

EOI File No.	Subject	Rev.	Date	By	Type	Action Required	Physical Mod.
910	Field Variances	0	1/6/82	RLCA	OIR	RLCA	No
		1	4/6/82	RLCA	OIR	RLCA	
		2	4/30/82	RLCA	PPRR/OIP	TES	
		3	5/11/82	TES	PRR/OIP	PGandE	
		4	7/21/82	TES	OIR	RLCA	
		5	7/22/82	RLCA	PPRR/CI	TES	
		6	7/23/82	TES	PRR/CI	TES	
930	Criteria Deficiencies	0	1/6/82	RLCA	OIR	RLCA	No
		1	4/30/82	RLCA	PPRR/OIP	TES	
		2	5/11/82	TES	PRR/OIP	PGandE	
		3	7/21/82	TES	OIR	RLCA	
		4	7/22/82	RLCA	PPRR/CI	TES	
		5	7/23/82	TES	PRR/CI	TES	
		6	7/23/82	TES	CR	None	
983	Inapplicable Raceway Spectra	0	2/6/82	RLCA	PER/A	TES	No
		1	4/21/82	TES	ER/A	PGandE	
1010	Turbine Building Spectra Above 140 Feet	2	9/10/82	TES	ER/A	PGandE	No
		0	2/9/82	RLCA	OIR	RLCA	
		1	3/22/82	RLCA	PPRR/DEV	TES	
		2	4/17/82	TES	PRR/OIP	PGandE	
		3	7/20/82	TES	OIR	RLCA	
		4	7/21/82	RLCA	PPRR/CI	TES	
		5	7/23/82	TES	PRR/CI	TES	No
		6	7/23/82	TES	CR	None	

STATUS: Status is indicated by the type of classification of latest report received by PGandE:

OIR - Open Item Report	ER - Error Report	A - Class A Error
PPRR - Potential Program Resolution Report	CR - Completion Report	B - Class B Error
PRR - Program Resolution Report	CI - Closed Item	C - Class C Error
PER - Potential Error Report	DEV - Deviation	D - Class D Error
OIP - Open Item with future action by PGandE		

PHYSICAL MOD: Physical modification required to resolve the issue. Blank entry indicates that modification has not been determined.



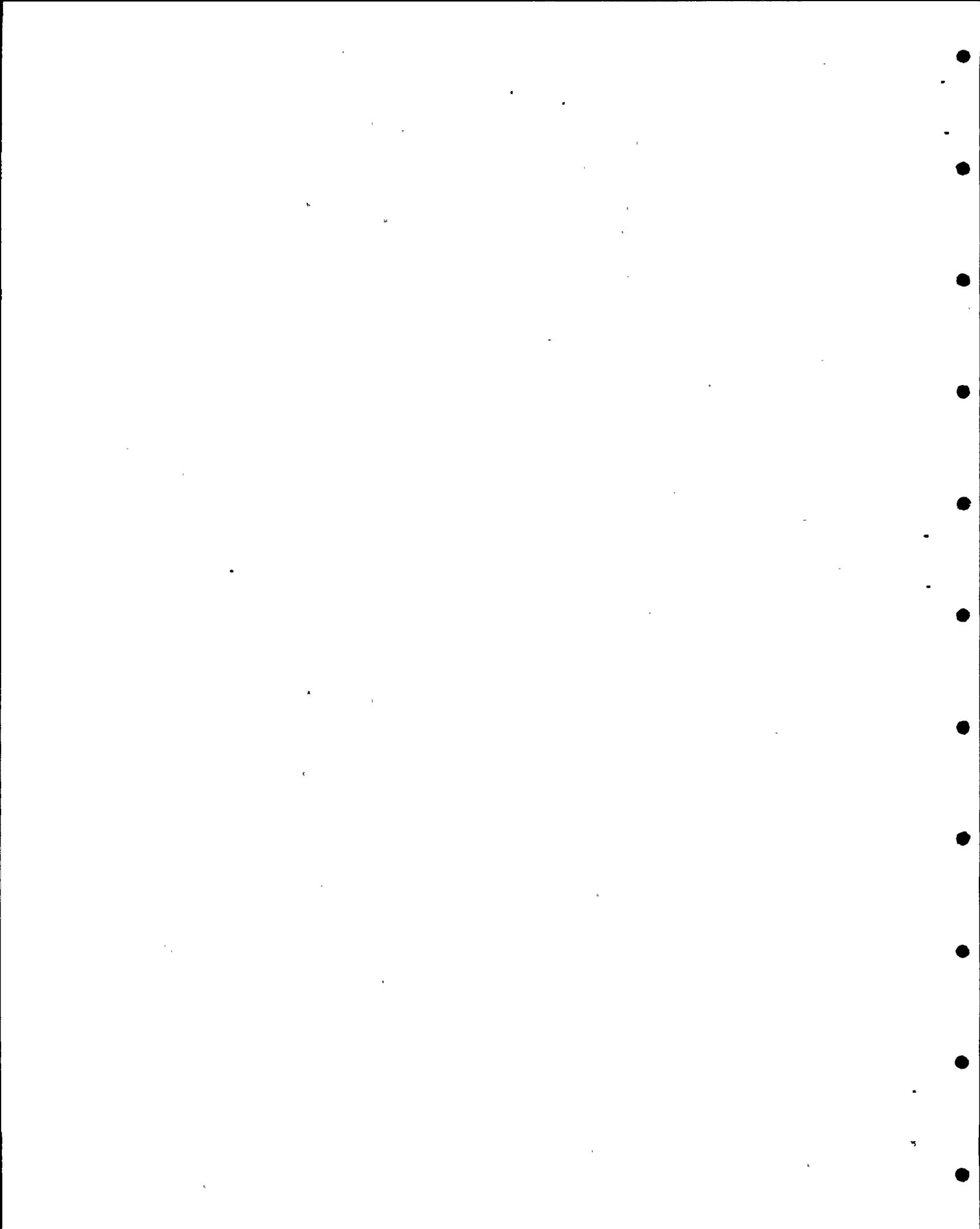
EOI File No.	Subject	Rev.	Date	By	Type	Action Required	Physical Mod.
1026	Turbine Building Spectra From the Blume Report is not in the Hosgri Report	0	2/20/82	RLCA	OIR	RLCA	
		1	3/19/82	RLCA	PPRR/DEV	TES	
		2	4/17/82	TES	PRR/OIP	PGandE	
		3	7/20/82	TES	OIR	RLCA	
		4	7/21/82	RLCA	PER/AB	TES	
1093	Auxiliary Building Areas Without Spectra	0	6/18/82	RLCA	OIR	RLCA	
		1	6/18/82	RLCA	PPRR/OIP	TES	
		2	6/29/82	TES	PRR/OIP	PGandE	
		3	7/20/82	TES	OIR	RLCA	
		4	7/21/82	RLCA	PPRR/CI	TES	
1097	Auxiliary Building Area Without Spectra	0	7/13/82	RLCA	CR	None	No
		1	7/14/82	RLCA	OIR	RLCA	
		2	7/20/82	TES	PPRR/OIP	TES	
		3	7/21/82	RLCA	OIR	RLCA	
		4	7/22/82	TES	PER/AB	TES	
					ER/AB	PGandE	

STATUS: Status is indicated by the type of classification of latest report received by PGandE:

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PER - Potential Error Report	DEV - Deviation	D - Class D Error

OIP - Open Item with future action by PGandE

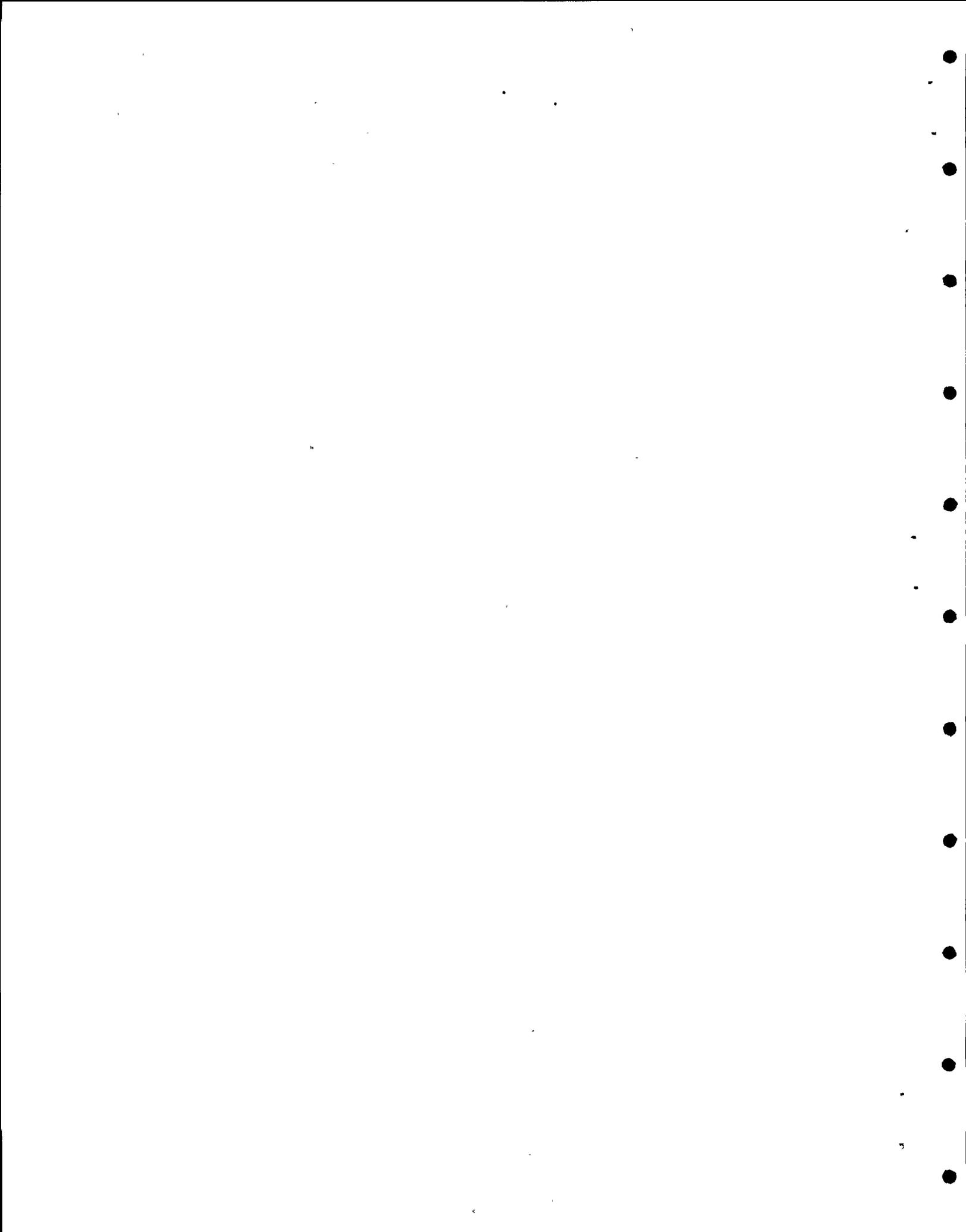
PHYSICAL MOD: Physical modification required to resolve the issue. Blank entry indicates that modification has not been determined.

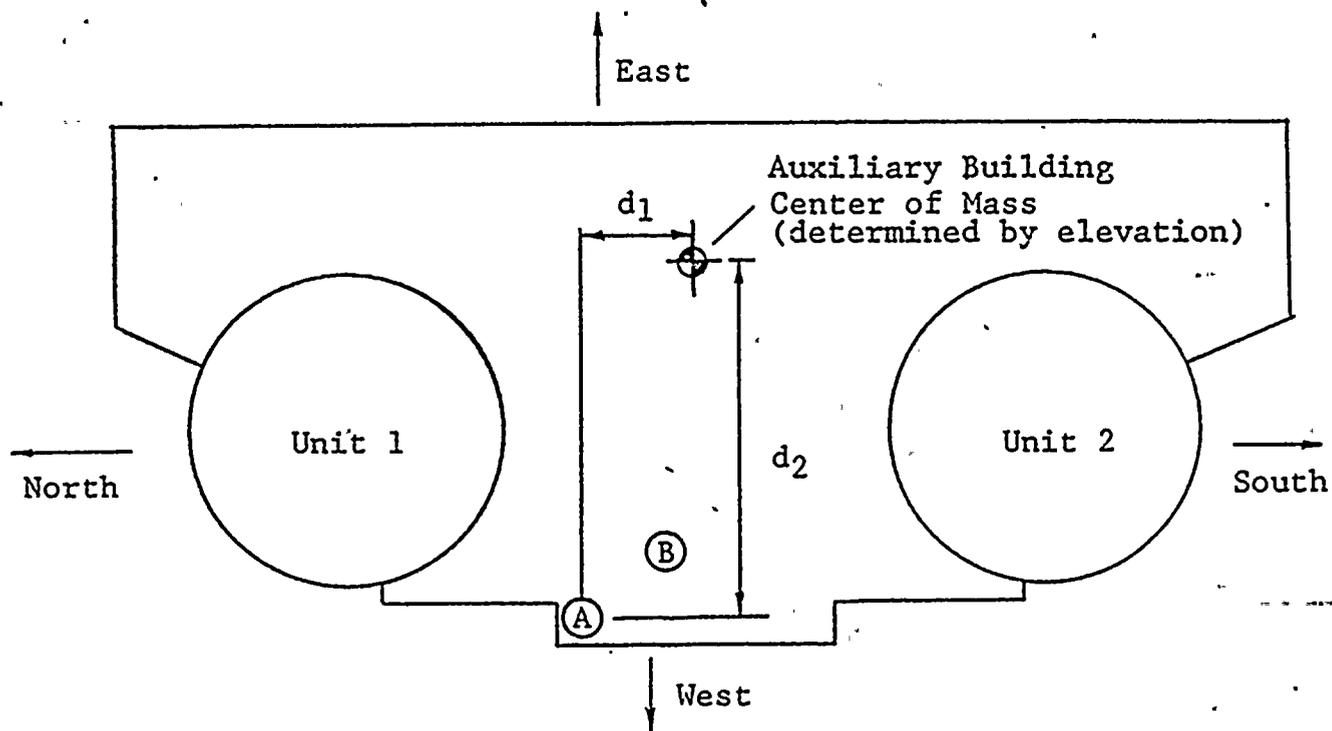


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Appendix B
Calculation of Torsion
(1 page)



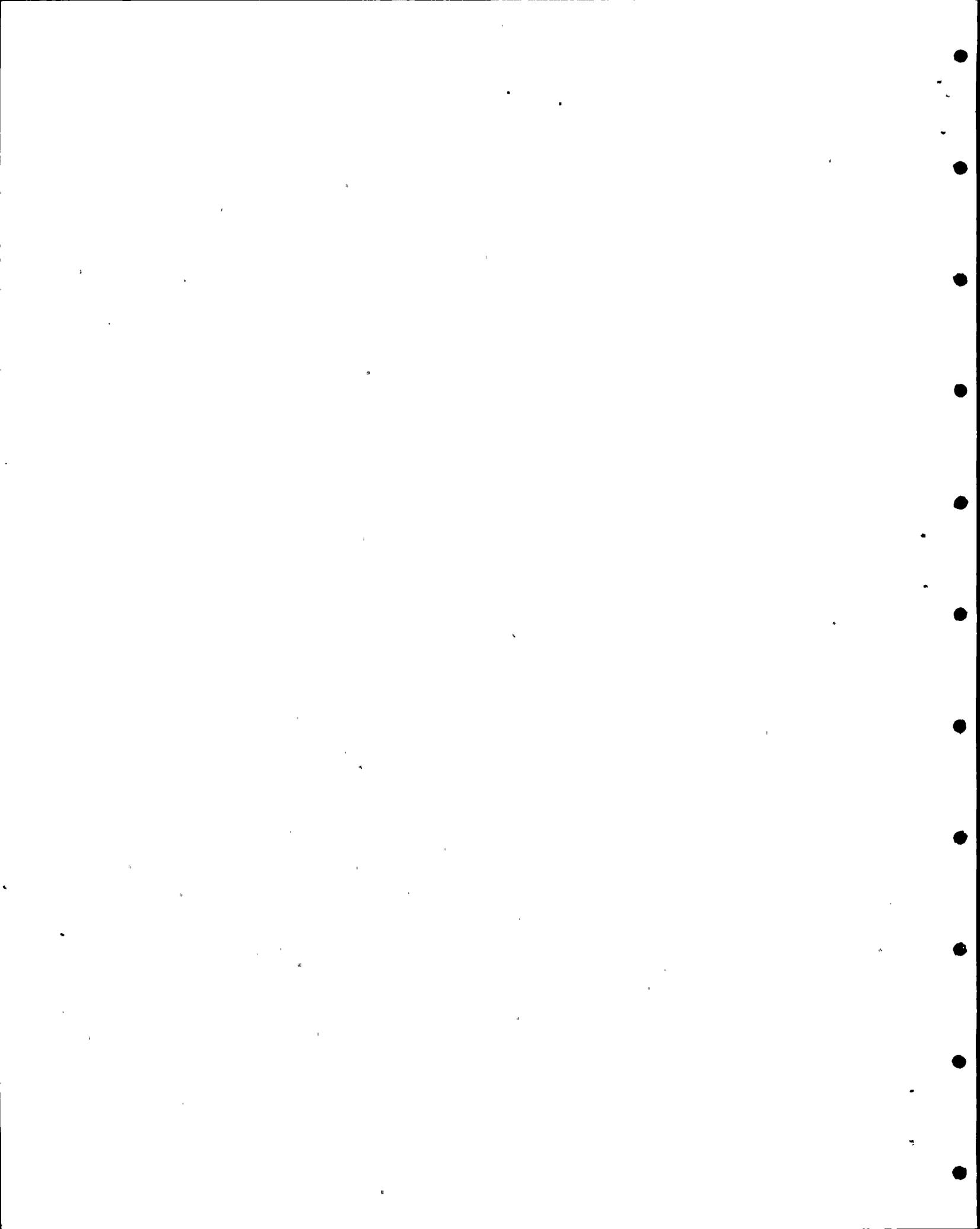


Plan View of DCNPP Units 1 and 2
Containment and Auxiliary Buildings

$$\text{Horizontal Response Spectra}(g) = \text{Translation}(g) + \left(\text{Torsion} \frac{\text{radians}}{\text{sec}^2} \right) \left(\frac{d_1}{g} \right)$$

- where:
- d_1 = largest torsion arm for E-W effects (ft)
 - d_2 = largest torsion arm for N-S effects (ft)
 - g = 32.2 ft/sec², acceleration of gravity

For equipment locations ⊙ (A) and ⊙ (B), location ⊙ (A) yields the largest torsion arm in both the North-South and East-West directions.



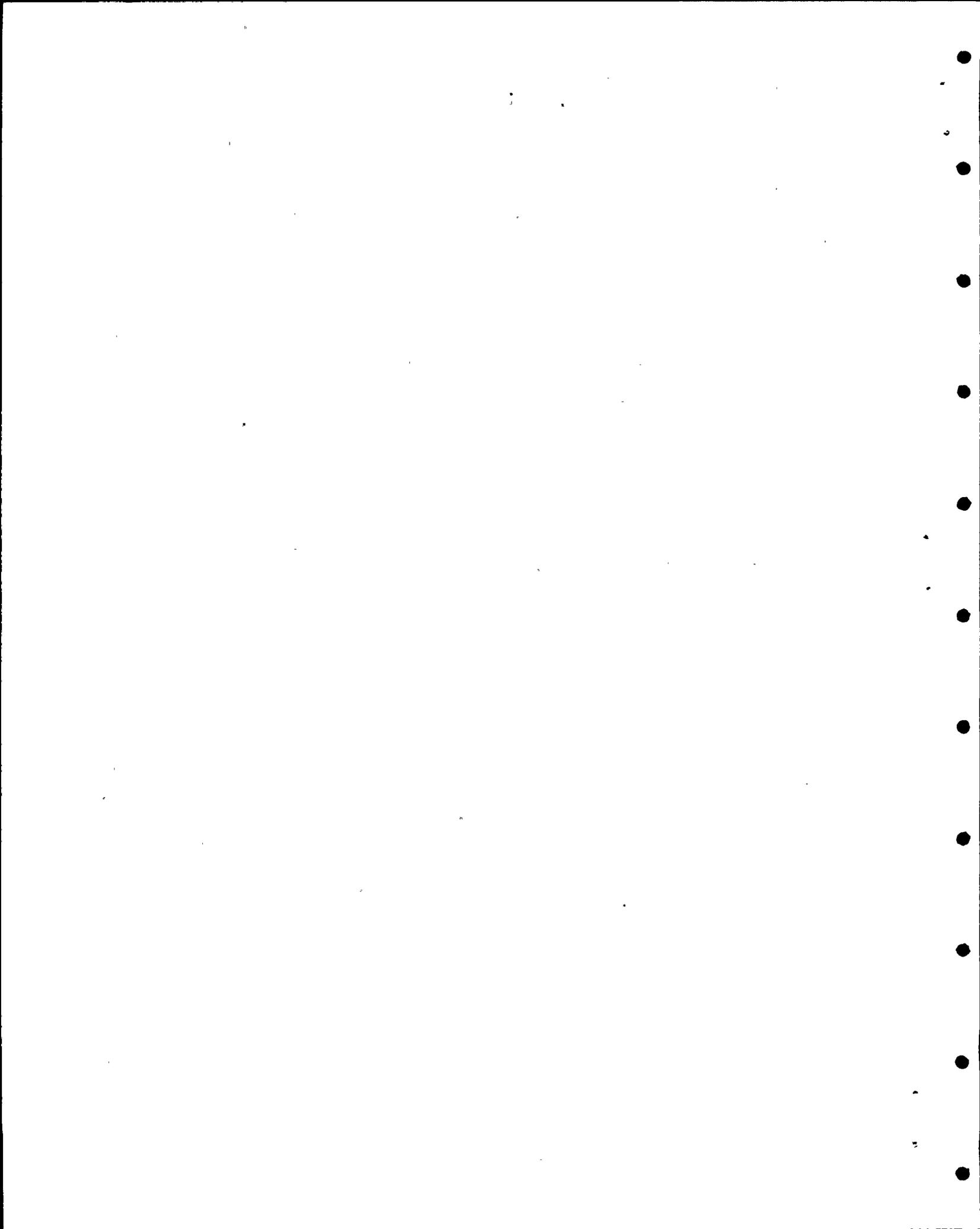
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Appendix C

Key Term Definitions

(6 pages)



KEY TERMS AND DEFINITIONS USED IN
THE ELECTRICAL RACEWAY SUPPORTS REPORT

(The definitions in this glossary establish the meanings of words in the context of their use in this document. These meanings in no way replace the specific legal and licensing definitions.)

Cables

- Strands of insulated electrical conductors laid together, usually around a central core, and wrapped in a heavy insulation.

Cable Trays

- Trays through which electrical circuits run.

Class 1E

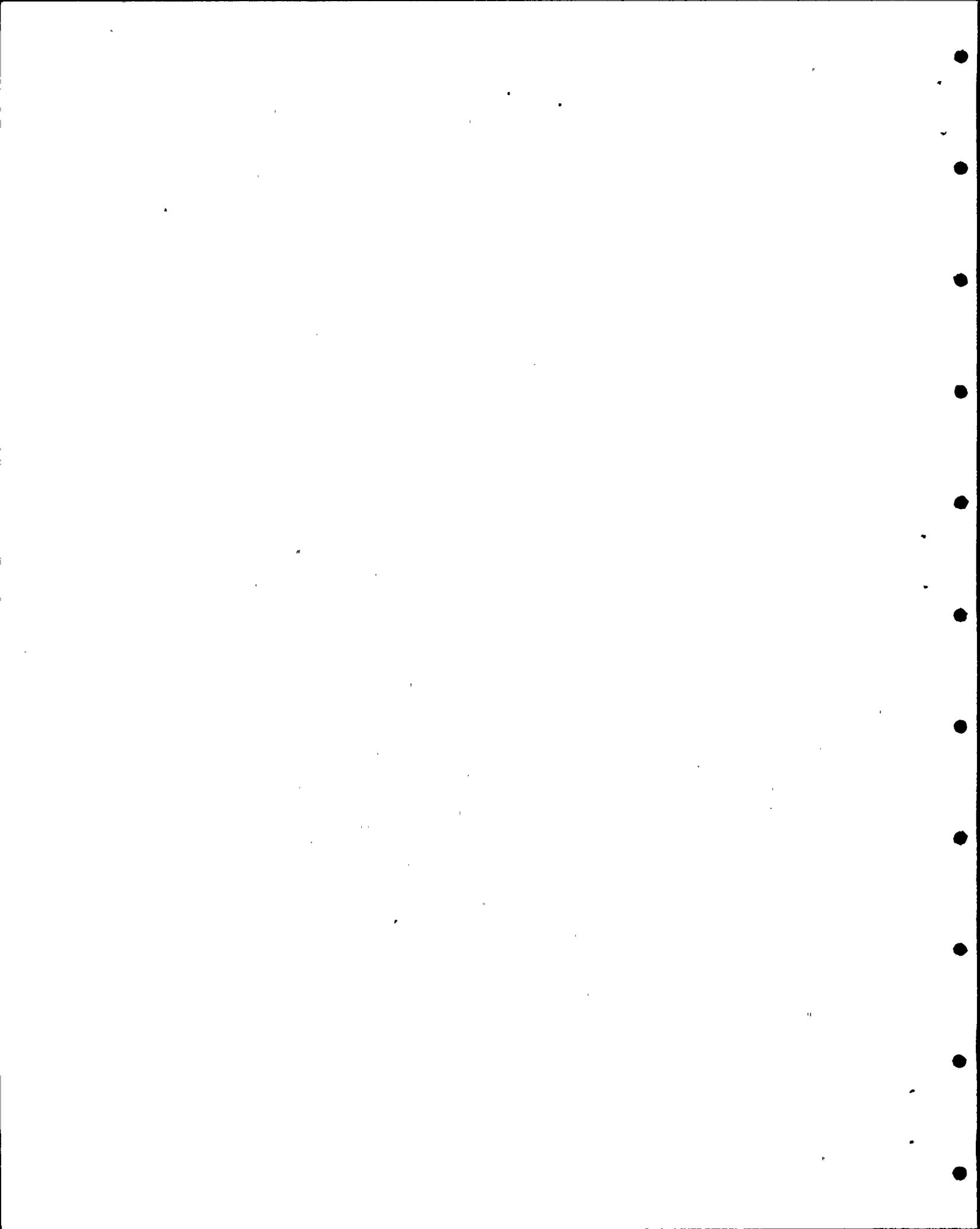
- The classification of electrical equipment and systems required for the seismic design of the plant.

Closed Item

- A form of program resolution of an Open Item which indicates that the reported aspect is neither an Error nor a Deviation. No further IDVP action is required (from Reference 7).

Completion Report

- Used to indicate that the IDVP effort related to the Open Item identified by the File Number is complete. It references either a Program Resolution Report which recategorized the item as a Closed Item or a PGandE document which states that no physical modification is to be applied in the case of a Deviation of a Class D Error (from Reference 7).



Conduit

- Metal tubing through which insulated electrical wires run.

DCNPP-1

- Diablo Canyon Nuclear Power Plant Unit 1.

Design Codes

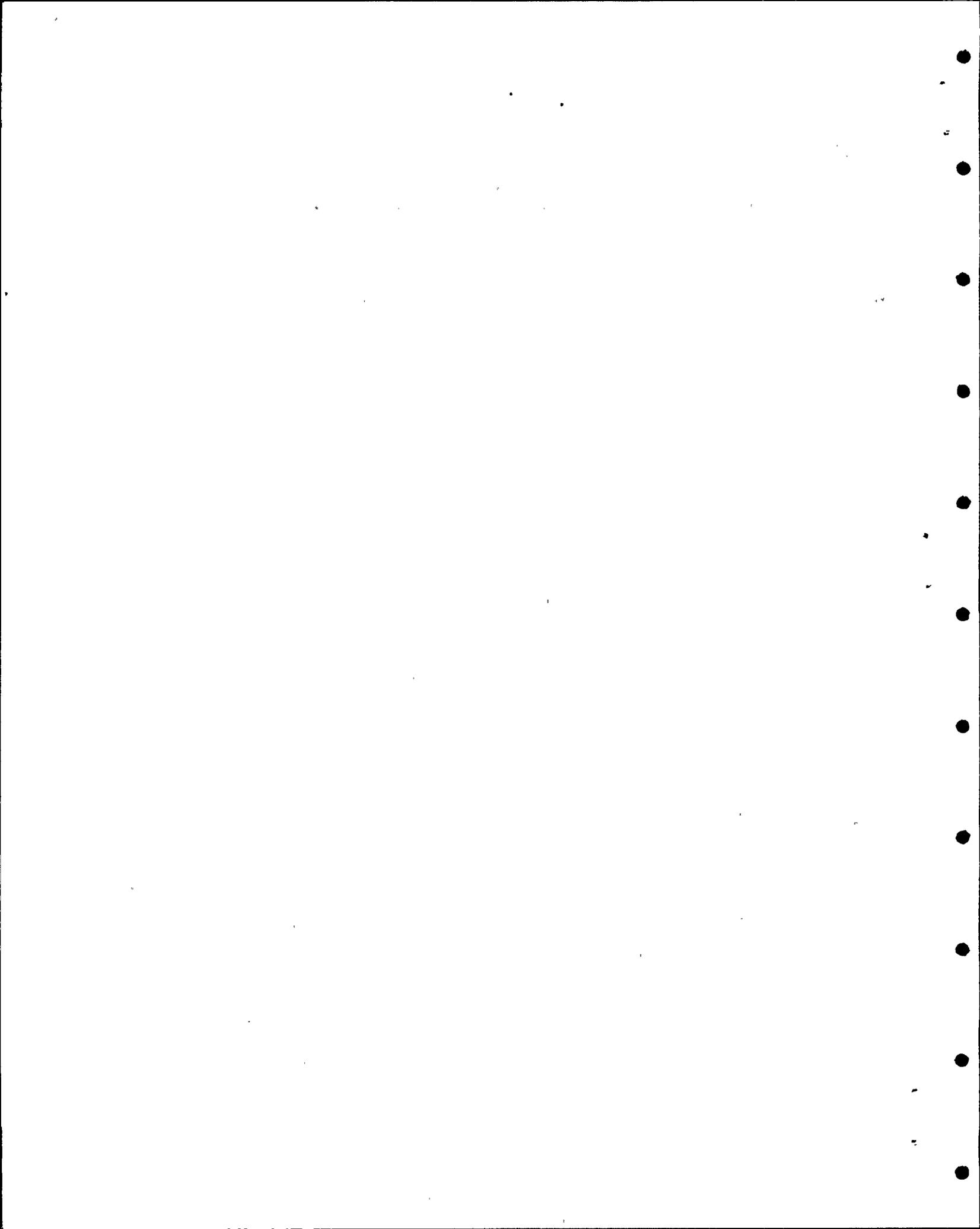
- Accepted industry standards for design (ex. AISC, AISI, ANSI, ASME, AWWA, IEEE).

EOI

- Error and Open Item Report.

Error Report

- An Error is a form of a program resolution of an Open Item indicating an incorrect result that has been verified as such. It may be due to a mathematical mistake, use of wrong analytical method, omission of data or use of inapplicable data.
- o Class A: An Error is considered Class A if design criteria or operating limits of safety related equipment are exceeded and, as a result, physical modifications or changes in operating procedures are required. Any PGandE corrective action is subject to verification by the IDVP.
- o Class B: An Error is considered Class B if design criteria or operating limits of safety related equipment are exceeded, but are resolvable by means of more realistic calculations or retesting. Any PGandE corrective action is subject to verification by the IDVP.
- o Class C: An Error is considered Class C if incorrect engineering or installation of safety related equipment is found, but no design criteria or operating limits are exceeded. No physical modifications are required, but if any are applied they are subject to verification by the IDVP (from Reference 7).



- o Class D: An Error is considered Class D if safety related equipment is not affected. No physical modifications are required, but if any are applied, they are subject to verification by the IDVP (from Reference 7).

FSAR

- PGandE's Final Safety Analysis Report.

Hosgri Criteria

- Licensing criteria referring specifically to the postulated 7.5M Hosgri earthquake.

Hosgri Report

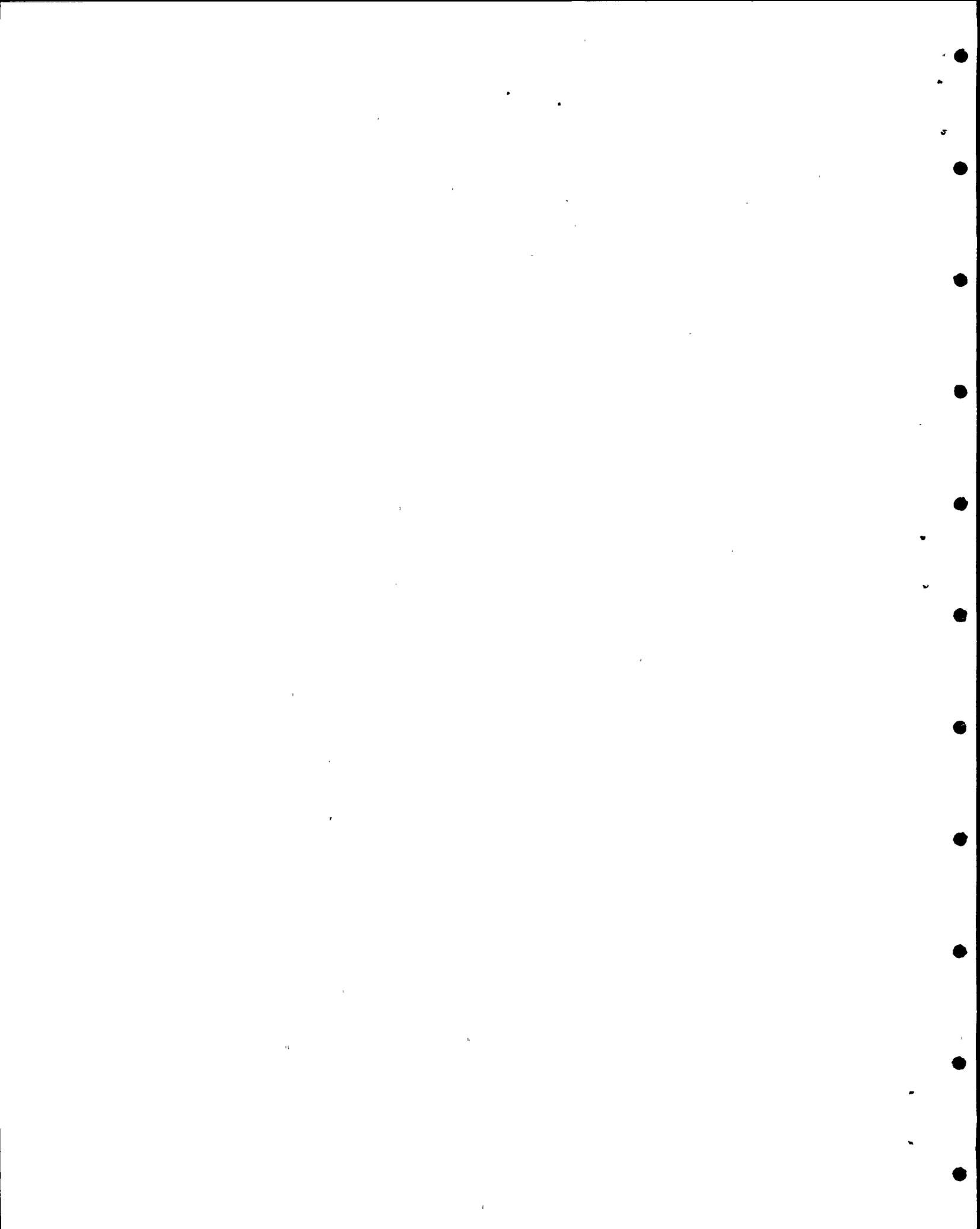
- A report issued by PGandE that summarizes their evaluation of the DCNPP-1 for the postulated Hosgri 7.5M earthquake. Includes seismic licensing criteria.

Hosgri 7.5 Earthquake

- Maximum intensity earthquake for which the plant is designed to remain functional. Same as Safe Shutdown Earthquake (SSE).

Interim Technical Report

- Interim technical reports are prepared when a program participant has completed an aspect of their assigned effort in order to provide the completed analysis and conclusion. These may be in support of an Error, Open Item or Program Resolution Report or in support of a portion of the work which verifies acceptability. Since such a report is a conclusion of the program, it is subject to the review of the Program Manager. The report will be transmitted simultaneously to PGandE and to the NRC (from Reference 8).



Licensing Criteria

- Contained in PGandE Licensing Documents, includes allowable criteria (See Hosgri Report definition).

NRC

- Nuclear Regulatory Commission

NRC Ordering Suspending License CLI-81-30

- The order dated November 19, 1981 that suspended the license to load fuel and operate DCNPP-1 at power level up to 5% of full power

Open Item

- A concern that has not been verified, fully understood and its significance assessed. The forms of program resolution of an Open Item are recategorized as an Error, Deviation, or a Closed Item (from Reference 7).

PGandE

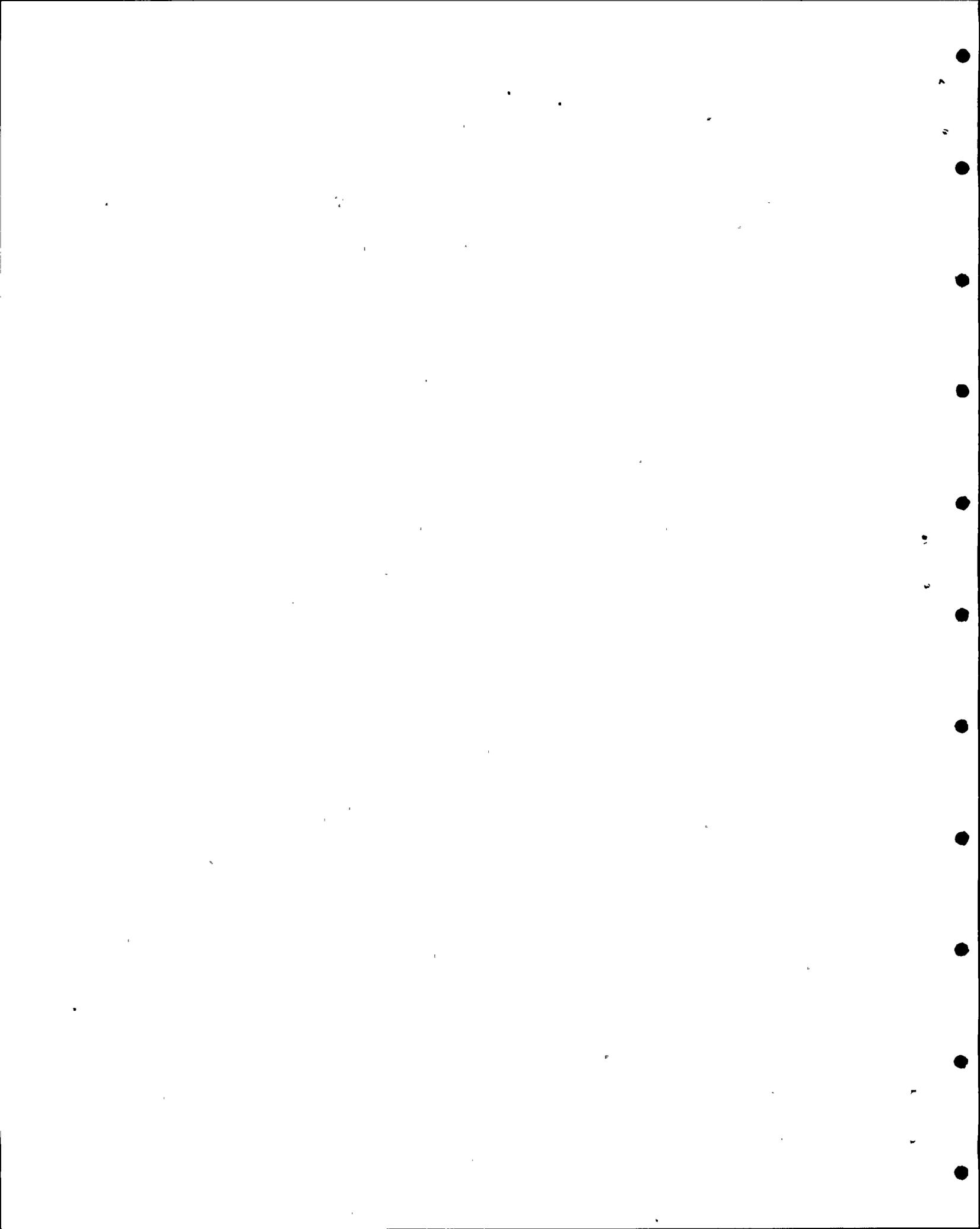
- Pacific Gas and Electric Company

Phase I Program

- Review performed by RLCA, RFR, and TES restricted to verifying work performed prior to June 1978 related to the Hosgri re-evaluation design activities of PGandE and their service-related contractors.

Potential Program Resolution Report and Potential Error Report

- Forms used for communication within IDVP.



Program Resolution Report

- Used to indicate that the specific item is no longer active in the IDVP. It indicates whether the resolution is a Closed Item, a Deviation, or that responsibility for an Open Item has been transferred to the PGandE Technical Program. Further IDVP action is required upon completion of the associated PGandE Technical Program Task if the IDVP transfers an Open Item to PGandE or if physical modifications are applied with respect to a deviation (Reference 7).

Raceways

- Conduits and cable trays used to protect and support insulated wires and cables.

Response

- The motion resulting from an excitation of a device or system under specified conditions.

Response Spectra

- Graph showing relationship between acceleration and frequency. Used in seismic analysis.

RLCA

- Robert L. Cloud and Associates, Inc.

RFR

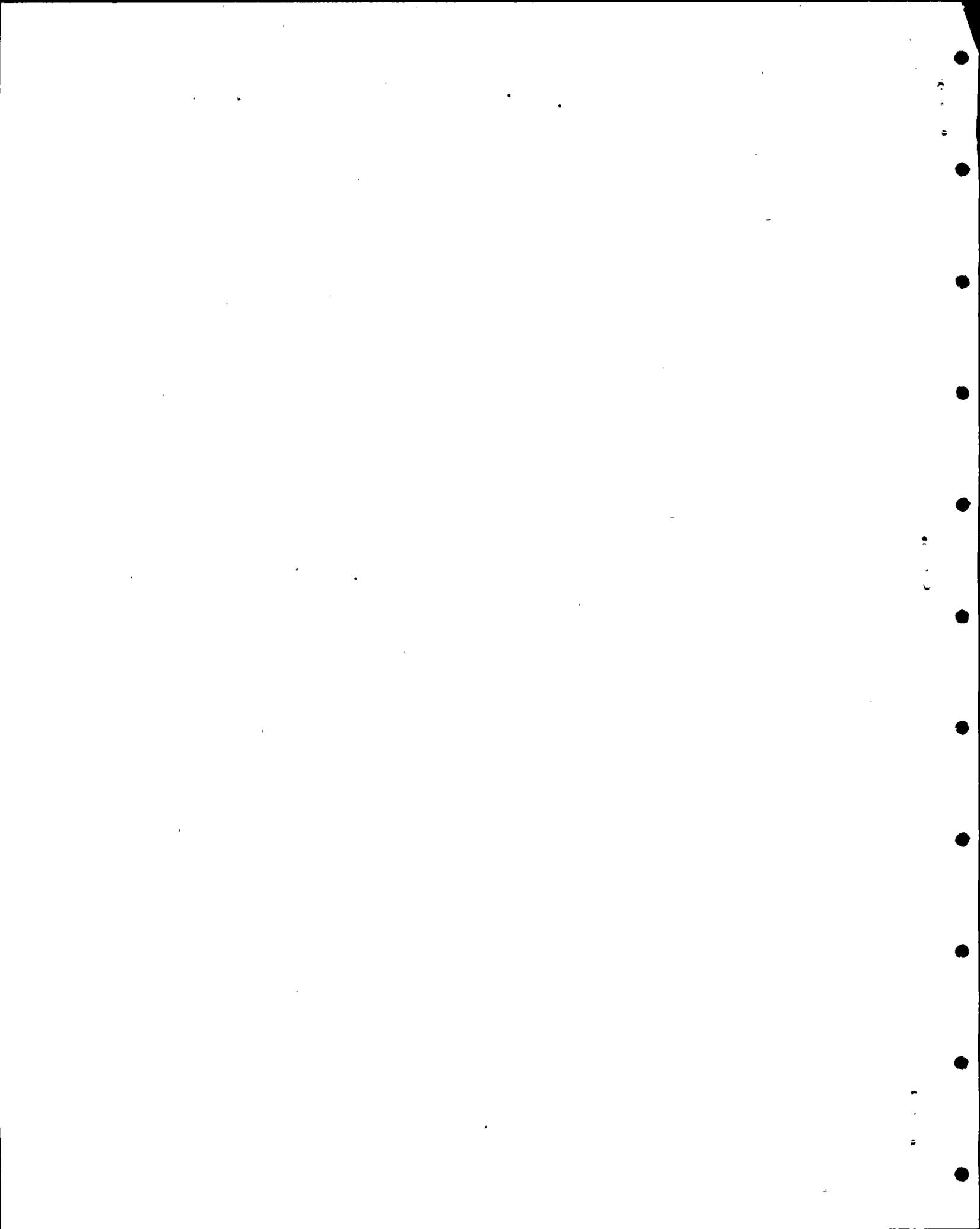
- Roger F. Reedy, Inc.

Sample

- Initial Sample stipulated in Phase I Program of equipment, components, and buildings to be design verified by independent analysis.

Sampling Approach

- Method used by the IDVP to determine the initial sample (buildings, piping, equipment and components) for analysis and to provide for sample expansion when required.



SSE

- Safe Shutdown Earthquake: Maximum intensity earthquake for which the plant is designed to remain functional (Hosgri 7.5M).

Seismic

- Refers to earthquake data.

SWEC

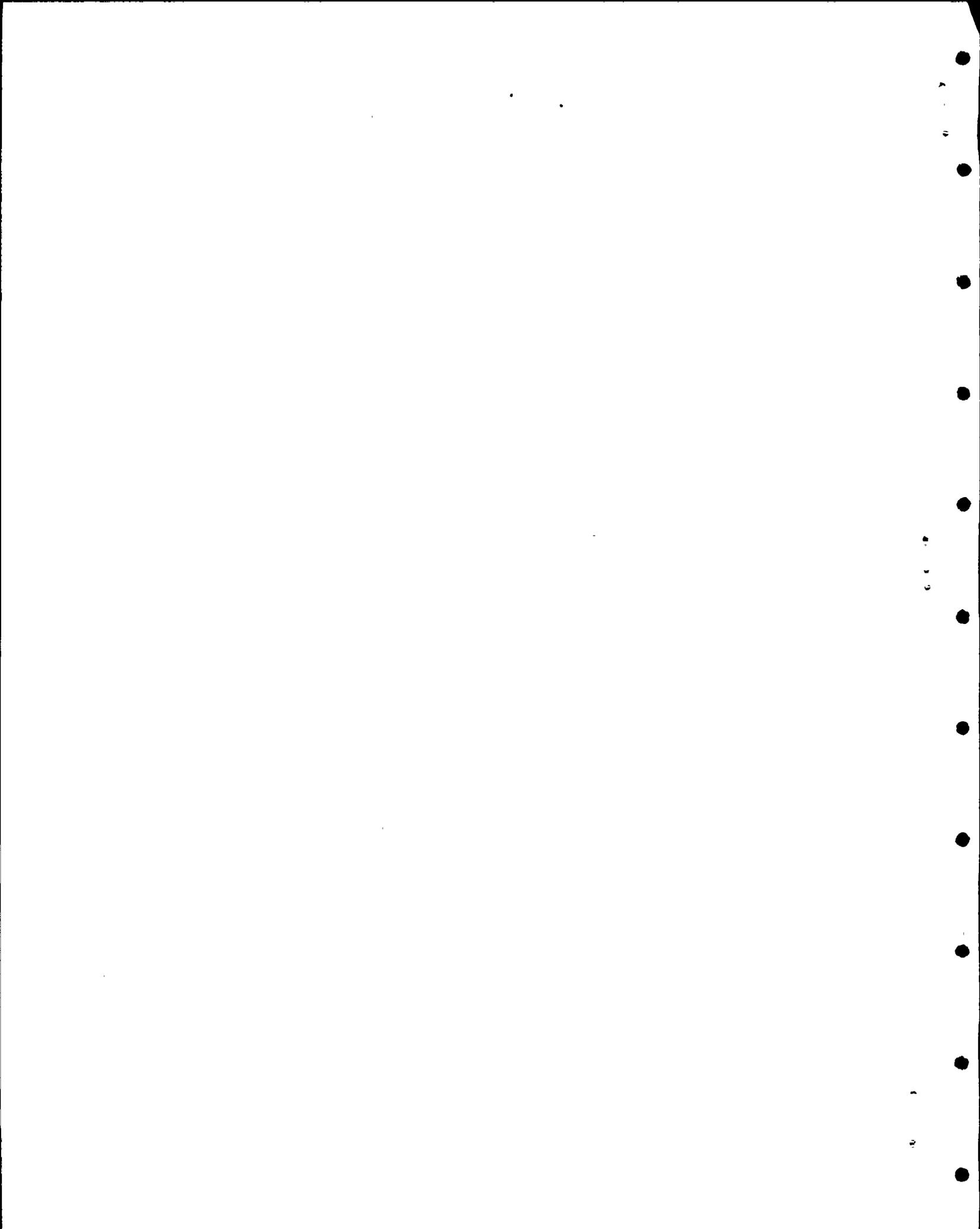
- Stone & Webster Engineering Corporation

TES

Teledyne Engineering Services

Verification Program

- Undertaken by the IDVP to evaluate Diablo Canyon Nuclear Power Plant for compliance with the licensing criteria.





Appendix D
Program Manager's Assessment
(1 page)

APPENDIX D

PROGRAM MANAGERS ASSESSMENT

As IDVP Program Manager, TELEDYNE ENGINEERING SERVICES (TES) has established a Review and Evaluation Team, headed by a qualified team leader, as described in Section 7.4(c) of the Phase I Program Management Plan (Rev. I). The assigned team leader for the area, Electrical Raceway Supports, included in this interim Technical Report, has personally discussed the procedures, approach, field trip files, analyses, calculations, etc. with RLCA. In addition, the TES Team Leader has reviewed the Open Item Files pertaining to this area of responsibility and, in particular, those files for which RLCA has issued Potential Program Resolution Reports or Potential Error Reports, and on the basis of this evaluation, has recommended appropriate resolutions to the IDVP Program Manager.

Based on this review and evaluation process to date, the Team Leader, along with the TES Program Management Team, has studied and has concurred with the Interpretation and Recommendations outlined in Section 7.0 of this report.

1 5 2 7

6 0 0 7

6 1 0 7