Robert L. Cloud and Associates, Inc.

RLCA

Interim Technical Report

DIABLO CANYON UNIT 1
INDEPENDENT DESIGN VERIFICATION PROGRAM
SHAKE TABLE TEST MOUNTING
CLASS 1E ELECTRICAL EQUIPMENT
ITR #44
REVISION 0

Docket No. 50-275
License No. DPR-76

4/15/83
Project Engineer/Date
Technical Review

Edward Denison 4/15/83
Project Manager/Date
Approved P 105-4-839-044

PROGRAM MANAGER'S PREFACE

DIABLO CANYON NUCLEAR POWER PLANT - UNIT 1
INDEPENDENT DESIGN VERIFICATION PROGRAM

INTERIM TECHNICAL REPORT

SHAKE TABLE MOUNTING OF CLASS 1E ELECTRICAL EQUIPMENT

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

This report provides the review results and conclusions of the IDVP with respect to the initial sample for shake table test mounting of Class 1E electrical equipment. A previous report, ITR-4, provided the results of an evaluation of the seismic shake table testing aspects of Class 1E electrical equipment. This ITR contains the follow-on review to determine if the mounting on the shake table accurately represented the in-service mounting. All EOI files initiated in this review have been closed.

As IDVP Program Manager, Teledyne Engineering Services has approved this ITR-44, including the conclusions presented. The methodology followed by TES in performing this review and evaluation is described in Appendix C to this report.

ITR Reviewed and Approved
IDVP Program Manager
Teledyne Engineering Services

R. Wray

R. Wray
Assistant Project Manager

SHAKE TABLE TEST MOUNTING OF CLASS 1E
ELECTRICAL EQUIPMENT

Contents

		Page No.
	Program Manager's Preface	i
1.0	Introduction	1
	Purpose and Scope	1
	Summary	2
2.0	IDVP Methods	3
	2.1 Procedures	3
	2.2 Licensing Criteria	3
3.0	IDVP Review of Shake Table Test Mountings	4
	3.1 Methods	4
	3.2 Results	6
	3.3 Error and Open Item Reports Issued	8
4.0	Evaluation	9
5.0	Conclusions	10
6.0	References	11

Appendix A - EOI Status - Shake Table Test Mountings

Appendix B - Key Term Definitions

Appendix C - Program Manager's Assessment

1.0 INTRODUCTION

Purpose and Scope

This interim technical report summarizes the review by the Independent Design Verification Program (IDVP) of the initial sample of seismic shake table test mountings of Class 1E electrical equipment for the Diablo Canyon Nuclear Power Plant, Unit 1 (DCNPP-1). Class 1E electrical equipment consists of safety-related electrical equipment and systems. To demonstrate seismic qualification, this equipment was tested by mounting it to a table which simulated the seismic loading on the equipment during the postulated earthquake. The purpose of the IDVP review was to determine if the mountings on the shake table accurately represented the in-service (as-built) mountings.

This interim technical report (ITR) addresses the test mountings of Class 1E electrical equipment by PGandE and their seismic service-related contractor, Wyle Laboratories. These test mountings were not included in the scope of ITR #4, Shake Table Testing. The equipment sample reviewed is the same as that noted in ITR #4 (Reference 1).

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 (Reference 2), as discussed at the June 10, 1982 Nuclear Regulatory Commission (NRC) meeting in Waltham, Massachusetts. This report presents the IDVP evaluation of cited mountings and serves as a vehicle for NRC review. It will also be referenced in the Phase I Final Report.

Summary

Robert L. Cloud and Associates (RLCA) performed a review of electrical equipment mountings used in shake table testing for the postulated Hosgri event. Discrepancies were noted for the mountings of two items of electrical equipment. Four other items of equipment were not reviewed because they had been retested or replaced with newer equipment. These four items will be reviewed as part of the IDVP verification of DCP activities.

The test mountings for all but these four items of equipment were found to meet the testing requirements. No additional verification is required, as the reviewed equipment includes all the electrical equipment qualified by shake table testing for the postulated Hosgri event by PGandE and/or its seismic service-related contractor.

2.0 IDVP METHODS

2.1 PROCEDURES

The IDVP used the following procedures for the independent design verification of electrical equipment shake table test mountings.

First, the IDVP field verified the in-service mounting configurations of the electrical equipment. Next, test mounting configurations were determined from test reports and test procedures.

The IDVP reviewed the documented test mounting configurations and compared them with the field verified in-service mounting configurations. Any differences between the mounting configurations were noted. The ability of each test mounting to predict the structural soundness of its in-service counterpart was evaluated. The IDVP also evaluated the ability of the test mountings to duplicate the seismic loading transmitted through the in-service mountings for the postulated Hosgri earthquake.

2.2 LICENSING CRITERIA

The IDVP verified the seismic shake table test mounting of electrical equipment using the Diablo Canyon Nuclear Power Plant licensing criteria. This licensing criteria is specified in the Final Safety Analysis Report (FSAR) and the Hosgri Report (References 3 and 4).

The Hosgri Report stipulates that the electrical equipment be evaluated according to the guidelines given in the IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations (IEEE Standard 344-1975, Reference 5).

The Hosgri Report also specifies that the shake table testing be performed according to the methods specified in Nuclear Regulatory Guide 1.100 (Reference 6). This regulatory guide also cites Nuclear Regulatory Guide 1.89, which in turn cites IEEE Standard 323-1974 (References 7 and 8).

3.0 IDVP REVIEW OF SHAKE TABLE TEST MOUNTINGS

3.1 METHODS

The IDVP first field verified the in-service mounting conditions. The IDVP then reviewed the sample of equipment shake table test mountings for adequacy in simulating the configurations of in-service mountings and their behavior with respect to dynamic force and structural soundness (Reference 9).

During shake table testing, test specimens were removed from their in-service installations and mounted onto the test machine shake table. The test mountings were intended to simulate the in-service mountings. Often, the in-service mountings were identical to those used for the tests; for example, the equipment would be bolted to the machine with the same bolts and through the same bolt holes.

However, for testing convenience, some equipment was mounted to the shake table through an interposing fixture. This fixture was intended to simulate the dynamic and structural characteristics of the in-service mounting. One application of this approach would be in testing a sub-panel in a large cabinet, when an interposing fixture would be used to simulate the dynamic and structural characteristics of the entire cabinet.

Test procedures and test reports (References 10, 11, 12, 13, and 14) were examined to determine the mounting configurations and fixtures (if any) used for the test of each item of equipment. The test condition was compared with the field verified in-service condition. Where the test mountings were identical to the in-service mountings, they were judged to meet criteria.

For equipment with test mountings not identical to in-service configurations, each test mounting was evaluated to determine if it adequately represented the dynamic and structural behavior of the in-service configuration. Two key considerations were:

1) Did the test mounted equipment show the same responses to the vibration of the shake table as would the in-service mounting?

2) Could the test mounting predict the structural adequacy of the in-service mounting for the test vibrational input?

To satisfy the first consideration, if the in-service mounting was rigid (natural frequency greater than 33 hertz), the test mounting should also be rigid. Similarly, if the in-service mounting was not rigid (natural frequency less than 33 hertz), the test mounting should duplicate its natural frequencies.

The second consideration was met if the in-service mounting configuration was of equal or greater strength than the test mounting.

3.2 RESULTS

Results of the IDVP review of testing are presented below. The verification of four equipment mountings was deferred to the verification of DCP activities as a result of retesting or replacement of equipment.

Of the 31 electrical equipment items tested, 25 were found to meet criteria, 4 will be evaluated as part of the verification of DCP activities, 1 was classified as an error, and 1 was excluded from review as being non-Class 1E.

Items Meeting Criteria

Safeguard relay board
4.16 KV switchgear
Emergency light system
Diesel generator control cabinet
Diesel generator excitation cubicle
Ventilation system relay sub-panel
Ventilation system logic panel
Ventilation system power supply
Power transfer panel
Printed circuit boards
Constant voltage transformer
Power transformer
Logic panel power supply
AC and DC input relays
DC to AC inverter
Fire pump controller cabinet
Local starter LPF-37
Fan cooler starter
Fisher controller
Local starter LPG-66
100-amp breaker and starter
Auxiliary relay panel
Local starter LPF-36
Switch and ammeter
480-volt vital load center cabinet

Items Deferred to Verification of DCP Activities

	Reason
Main annunciator typewriter Battery cells	Equipment is being replaced. Verification of mountings will be included within the scope of the verification of DCP activities.
Battery charger cabinet	Equipment is being retested, or has been retested, as a result of revised floor response spectra. Verification of mountings will be included within the scope of the verification of DCP activities.
Snap-lock limit switch	Snap-lock limit switches have been retested with other instrumentation. Verification of mountings will be included within the scope of the verification of DCP activities.

Items Classified as Errors	Reason
DC distribution panel	See EOI 1119

Equipment Excluded from Review	Reason
Turbine lube oil starter	Non-Class 1E

3.3 ERROR AND OPEN ITEM REPORTS ISSUED

The IDVP issued two Error and Open Item (EOI) reports concerning the mounting of shake table-tested electrical equipment. Appendix A shows the EOI number, revision, date, and status.

EOI 1118 was issued because the 480-volt vital load center cabinet was tested including only the wall attachment and floor anchorage at elevation 100 feet. However, the in-service configuration includes a support connecting the top of the cabinet to the ceiling slab at elevation 115 feet. The IDVP determined that the support attachment to the ceiling was capable of transmitting forces and imparting response in the East-West direction. However, the test response spectra envelops the required response spectra for both the floor and ceiling slabs. Therefore, EOI 1118 was resolved as a Deviation.

EOI 1119 was issued because the test for the DC distribution panel was not identical to the in-service mounting. The test report does not state that the test condition approximates the in-service condition, and the description of the test mounting was not sufficient to evaluate its structural adequacy against that of the in-service mounting.

The DCP subsequently evaluated stresses in the in-service mounting and found them to be within allowables. Because the documentation of the test mounting configuration was not sufficient to allow an evaluation of the in-service mounting's structural adequacy, EOI 1119 was resolved as a Class C Error.

4.0 EVALUATION

As a result of the IDVP review, 25 of 31 items were found to meet criteria. One item was found to be Class II not Class I and therefore was excluded from review.

Concerns were noted for the DC distribution panel. The mounting of this panel was evaluated as an error because documentation of the test mounting configurations was not sufficient to demonstrate the structural adequacy of the in-service mounting. However, subsequent DCP calculations have shown the in-service mounting stresses to be within allowables, and therefore this equipment and its mounting meets the criteria.

Mountings of the main annunciator typewriter, battery cells, battery charger cabinet, and the snap-lock limit switch were not reviewed. These items have been retested by the DCP. The verification of these mountings will be included in the IDVP verification of DCP activities.

5.0 CONCLUSIONS

The reviewed mountings have met the test requirements except for four items which have been retested. The IDVP will consider this equipment in their verification of DCP activities.

One error has been noted for the equipment mountings (see Section 3.3). However, because the review includes all Class 1E electrical equipment shake table-tested for the Hosgri qualification, no additional verification or sampling is required.

6.0 REFERENCES

Reference No.	Title	RLCA File No.
1	Interim Technical Report, Diablo Canyon Unit 1, Independent Design Verification Program, Shake Table Testing, Revision 0.	P105-4-839-004
2	DCNPP Independent Design Verification Program, Phase I, Revision 1, July 6, 1982 (Revision 0, March 29, 1982).	
3	Diablo Canyon Site Units 1 and 2 Final Safety Analysis Report, USAEC Docket Nos. 50-275 and 50-323.	P105-4-200-005
4	Seismic Evaluation for Postulated 7.5M Hosgri Earthquake, USNRC Docket Nos. 50-275 and 50-323.	P105-4-200-001
5	IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations, Standard 344-1975, The Institute of Electrical and Electronics Engineers, Inc.	
6	Regulatory Guide 1.100, "Seismic Qualification of Electrical Equipment for Nuclear Power Plants," U. S. Atomic Energy Commission, August, 1977.	
7	Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants," U. S. Atomic Energy Commission, November, 1974.	

Reference No.	Title	RLCA File No.
8	IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations, Standard 323-1974, The Institute of Electrical and Electronics Engineers, Inc.	
9	RLCA Analysis Review and Evaluation Mountings for Seismic Shake Table Tested Electrical Equipment, Revision 0.	P105-4-570-013
10	Wyle Test Report No. 58255, "Seismic Testing of Safety-Related Electrical Equipment for Pacific Gas and Electric Company," April, 1978.	P105-4-447-003
11	Wyle Test Report No. 58255-1, "Seismic Testing of Safety-Related Electrical Equipment for Pacific Gas and Electric Company," August, 1978.	P105-4-447-007
12	Admendment 1 to Report No. 58255-1, "Seismic Testing of Safety-Related Electrical Equipment for Pacific Gas and Electric Company," August, 1978.	P105-4-447-006
13	Wyle Test Report 58255, Addendum 1, "Seismic Testing of Safety-Related Electric Equipment for Pacific Gas and Electric Company," November, 1978.	P105-4-447-018
14	Wyle Test Report No. 58378, Addendum 2, "Seismic Testing of Safety-Related Electrical Equipment for Diablo Canyon for Pacific Gas and Electric Company," February, 1979.	P105-4-447-013
15	Independent Design Verification Program, Program Procedure, Preparation of Open Item Reports, Error Reports, Program Resolution Reports, and IDVP Completion Reports, DCNPP-IDVP-PP-003, Revision 1, June 18, 1982.	

Appendix A

EOI Status - Shake Table Test Mountings

(1 page)

Appendix A

EOI Status - Shake Table Test Mountings

EOI File No.	Subject	Rev.	Date	By	Type	Action Required	Physical Mod.
1118	480-Volt Load Center	0	3/19/83	RLCA	OIR	RLCA	
		1	3/19/83	RLCA	PPRR/OIP	PGandE	
		2	3/19/83	TES	PRR/OIP	PGandE	
		3	4/7/83	TES	OIR	RLCA	
		4	4/11/83	RLCA	PER	TES	
		5	4/15/83	TES	PRR/DEV	TES	
		6	4/15/83	TES	CR	None	No
1119	DC Distribution Panel, test documentation not sufficient to demonstrate strength of in-service mounting	0	3/19/83	RLCA	OIR	RLCA	
		1	3/19/83	RLCA	PER/C	TES	
		2	3/23/83	TES	ER/C	TES	
		3	4/15/83	TES	CR	None	No

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

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

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

Appendix B
Key Term Definitions
(9 pages)

Appendix B

KEY TERM DEFINITIONS

(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.)

Additional Sampling

- Additional sampling is performed when either:

  (a) Significant QA deficiencies are identified with respect to an organization which is not participant in the design chain applicable to the initial sample systems.

  (b) The reasons for the discrepancies found during the design process verification are not clear and additional information is required.

  As stated in the additional verification definition, the evaluation of an identified generic concern on additional safety-related analyses, structures, or components, whether or not they are within the initial sample system, is not considered to be additional sampling as the term is used here. The purpose of additional sampling is the performance of a broad-based investigation subject to the acceptance criteria applicable to the initial sample.

  The selection of additional samples and the establishment of acceptance criteria in addition to those included in DCNPP-IDVP-PP-001 is subject to approval by Program Manager (Reference 2).

Additional Verification

- Additional verifications are performed if deficiencies are found with respect to the safety-related analyses, structures, or components within the initial sample systems by means of either the QA evaluations or the engineering design verification process. The requirement that additional verification be performed does not necessarily imply an additional sample.

  The selection of techniques for additional verification is the responsibility of the assigned IDVP participant, but will be monitored by the Program Manager. Based on the results of this additional verification, the assigned IDVP participant will submit either a Potential Program Resolution Report or a Potential Error Report to the Program Manager for approval. The Potential Program Resolution Report may include a recommendation for additional sample.

  Of specific interest and concern in performing an additional verification is the identification of generic concerns. Should such concerns be identified, specific steps will be identified in a Potential Program Resolution Report or a Potential Error Report. These steps include the evaluation of the generic concern on structures and components previously within the initial sample systems other than those structures and components previously considered, or may include evaluation of the generic concern for structures and components in other systems. Either is considered to be additional verification, not additional sampling (Reference 2).

Allowable Criteria

- Maximum stress or load provided by the licensing criteria.

As-Built

- Present configuration of DCNPP-1 as shown by IDVP field verification; same as in-service.

Class 1E

- The safety classification of the electrical equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or otherwise are essential in preventing significant release of radioactive mateiral to the environment.

Closed Item

- A form of program resolution of an Open Item which indicates that the report aspect is neither an Error nor a Deviation. No further IDVP action is required (Reference 15).

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 or a Class D Error (from Reference 15).

DCNPP-1

- Diablo Canyon Nuclear Power Plant, Unit 1.

DCP

- Diablo Canyon Project: PGandE and Bechtel Power Corporation.

EOI

- Error and Open Item Report.

Error Report

- An Error is a form of 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.

  Each Error shall be classified as one of the following:

  o Class A: An Error is considered Class A if the 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 the 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.

  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 (Reference 15).

Field Verification

- The process of verifying actual configuration of equipment, buildings, and components at the installation site against PGandE isometric drawings.

FSAR

- PGandE's Final Safety Analysis Report.

Generic

- Relating to or characteristic of a whole group or class; general.

Hertz

- Unit of frequency; also known as cycles per second (cps).

Hosgri Criteria

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

Hosgri Event

- Postulated earthquake along the Hosgri Fault.

Hosgri Fault

- Geological fault off the coast of California.

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 7.5M Earthquake

- Maximum intensity earthquake for which the plant is designed to remain functional.

Hot Shutdown

- A nuclear reactor condition in which initial heat is removed by releasing steam to the atmosphere. Residual heat remains and the coolant temperature stays at or above 350 degrees Fahrenheit with pressure at or above 425 pounds per square inch.

IDVP

- Independent Design Verification Program undertaken by R. L. Cloud Associates, Teledyne Engineering Services, Stone & Webster Engineering Corporation and R. F. Reedy to evaluate Diablo Canyon Nuclear Power Plant for compliance with the licensing criteria.

IEEE

- The Institute of Electrical and Electronics Engineers, Inc.

In-Service

- See As-Built.

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 conclusions. 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 (Reference 2).

Internal Technical Program

- Combined Pacific Gas and Electric Company and Bechtel Power Corporation project formed for Diablo Canyon completion.

Licensing Criteria

- Contained in PGandE licensing documents; includes allowable criteria (see Hosgri Report).

NRC

- Nuclear Regulatory Commission (formerly the AEC).

NRC Order Suspending License CLI-81-30

- The order dated November 19, 1981 that suspended the license to load fuel and operate DCNPP-1 at power levels up to 5% of full power. It also specified the programs that must be completed prior to lifting the suspension.

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 (Reference 15).

PGandE

- Pacific Gas and Electric Company.

PGandE Design Class I

- PGandE engineering classification for structures, systems and components which corresponds to NRC Regulatory Guide 1.29 Seismic Category I classification.

PGandE Technical Program

- Verification program undertaken by PGandE to evaluate DCNPP for compliance with licensing criteria.

Phase I Program

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

Potential Program Resolution Report
and Potential Error Report

- Forms used for communication within the 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 15).

Qualification

- The final step in the process of evaluating plant buildings, systems and components, and confirming that they comply with the plant licensing criteria.

Required Response Spectra

- The spectra specified by the licensing criteria that the test spectra must envelop.

Response Spectra

- A plot, for all periods of vibration, of the maximum acceleration experienced by single degree of freedom vibration bodies during a particular earthquake; used in seismic analysis. Types of spectra comprise both vertical and horizontal. Vertical spectra consist of translational effects only. Horizontal spectra include East-West and North-South translation, and East-West and North-South torsion.

RLCA

- Robert L. Cloud and Associates, Incorporated.

Sample

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

Sample Space

- All buildings, equipment and components evaluated for the postulated Hosgri 7.5M earthquake by PGandE and their service-related contractors prior to June, 1978.

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.

Seismic

- Refers to earthquake data.

Shake Table Testing

- A method for seismic qualification of components; items are tested to simulated seismic activity.

SSE

- Safe Shutdown Earthquake: Maximum earthquake for which the plant is designed to remain functional.

SWEC

- Stone & Webster Engineering Corporation.

TES

- Teledyne Engineering Services.

Test Machine Table

- A testing device used to simulate seismic activity.

Test Response Spectra/Test Spectra

- The response spectra measured during the test.

Verification Analysis

- Work performed by RLCA as part of the IDVP.

Appendix C
Program Manager's Assessment
(1 page)

APPENDIX C

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(h) of the Phase I Program Management Plan (Rev. 1). The assigned team leader for the area, Equipment Qualified by Testing, included in this Interim Technical Report, has personally discussed the procedures, approach, field trip files, analyses, criteria, etc., with RLCA personnel. 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. Further, the TES Team Leader has reviewed the appropriate reports of other vendors, particularly those of the Seismic Testing Facility.

Based on this review and evaluation process to date, the Team Leader, along with the TES Program Manager Team, has studied and has concurred with the Evaluation outlined in Section 4.0 of this report and with the Conclusions presented in Section 5.0.

APPENDIX C

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(h) of the Phase I Program Management Plan (Rev. 1). The assigned team leader for the area, Equipment Qualified by Testing, included in this Interim Technical Report, has personally discussed the procedures, approach, field trip files, analyses, criteria, etc., with RLCA personnel. 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. Further, the TES Team Leader has reviewed the appropriate reports of other vendors, particularly those of the Seismic Testing Facility.

Based on this review and evaluation process to date, the Team Leader, along with the TES Program Manager Team, has studied and has concurred with the Evaluation outlined in Section 4.0 of this report and with the Conclusions presented in Section 5.0.