PLG SUBCONTRACTOR
QUALITY ASSURANCE AUDIT PLAN

Subcontractor:	EQE Engineering Consultants	Audit Report No.:	1594-3
Address:	18101 Von Karman Ave. #400	Audit Dates:	9/21 and 26/95
	Irvine, CA 92715-1032		
QA Contact:	Thomas R. Roche		
Telephone No. for QA Contact:	(714)833-3303		
Plan Prepared By:	Ben Shimizu	Date:	9/19/95
Approved By:	W. C. Tekler	Date:	9/19/95

AUDIT FOR WORK PERFORMED UNDER .

Purchase Order: NB- 1705 Revision: 1 Date: 8/24/95

It is understood that any corrective actions taken by the subcontractor, based on findings of the audit conducted by PLG, Inc., are within the requirements of the above Purchase Order.

Observations made during the audit are not corrective actions requested of the subcontractor; however, they are listed either as recommendations for improvements in the subcontractor's Quality Assurance Program, or required actions that have to be taken prior the completion of the Purchase Order.

The following provisions in the subcontractor's Quality Assurance Program will form the basis of the PLG audit. During the PLG audit, the subcontractor is required to produce a sampling of objective evidences that are intended to be in compliance with each of these provisions. Note that comments and questions, shown as such in parentheses ( ) or [ ], are not a part of the Quality Assurance Program.

2. Quality Assurance Program

2.2 Program Control

The QA Program shall be periodically reviewed by the QA manager. The QA manager shall report on the adequacy and effectiveness of the EQE QA Program to the president. As a minimum, such report shall be performed on an annual basis. Revision to the QA Program shall be initiated by the QA manager and approved by the president. (Does the president review such reports and/or order changes to the QA Program?)

Acceptable: Irvine Regional Office Audit; Audit Report No. 94-46, dated 12/20/94 (attachment A). Finding No. 01: Provide clarification of responsibilities of EC Division Director vs those of President. Corrective Action: EQE Memo dated 6/20/95 (attachment B), states that the position of President has been replaced by that of EC Division Director.

The revision level and date of revision shall be indicated on the updated page and appropriate entry made on the Table of Revisions.

Acceptable: QA Manual, Revision 2, 11/15/91, total pages 39. Table of Revision, Revision 2, 11/15/91, page 3.

2.4 Indoctrination

Formal training shall be documented by the individual who leads the indoctrination and training session, or a designee. The record shall include names of personnel trained and a description of the material covered. (Provide most recent training records including dates.)

Acceptable: Training Sessions Records, 12312-01/Training(1/92), (attachment C). Name/Date: David Nakaki, 5/23/93; Hassan Hadidi-Tamjed, 5/25/93; Gregory Hardy, 5/25/93; and Don Wesley, 5/26/93. Material covered: AP-10Q, Rev. 1.

3. Organization

3.1 The EQE organization is illustrated in Figure 3-1, and a typical project organization, including the relationship between technical and quality activities, is shown in Figure 3-2. (Provide names of current personnel. No mention of contracting personnel. Who handles contracting matters?)

Acceptable: EQE Organization Chart, June 20, 1995 (attachment B)

President - Douglas Fraizier

Chief Financial Officer - George Reitter (handles contracts)

EQE Engineering Consultants Division Director - Gregory Hardy

Division QA Manager - Steven Harris

Regional, technical, or administrative managers may be delegated quality assurance responsibilities by the president on a project-specific basis. (Provide names of current personnel on PLG projects.)

Acceptable: Overlay, dated 9/26/95, on QA Manual, Page 14, (attachments B & D).

Los Angeles Regional Manager - Robert Campbell

Project Manager - Don Wesley

Project Auditor - Thomas Roche

Project Engineers - Dave Nakaki and Hassan Hadidi-Tamjed

Project Administrator - Jennifer Freiholtz

4. Design Control

4.3 Calculations

The calculations shall be prepared by qualified personnel under supervision of the project engineer. They shall be checked for accuracy, adequacy, and compliance to the requirements of the applicable parts of project criteria by qualified personnel who did not originate the work.

Observation: Calc. No. 52340.02-C-002, Rev. No. 0, 49 pages total.

Project: EDF Containment Overpressure. Calc. Title: Containment Shell

Membrane Capabilities. Sht No. 2, dated 6/2/95. Awaiting checking per

TP-10Q, Revision 2, 2/14/95, Page 16 of 18, Checking Guidelines,

(attachment E).

4.4 Computer Programs

All active EQE computer programs are identified by a program name, revision number, level number, and revision release date.

N/A: No computer programs are required on the current Purchase Order.

Sampling of other computer codes are provided on Log for Irvine Controlled Verified Computer Codes, 2HD298nb/14036-3.1 (attachment F).

Modification to any EQE programs are performed by qualified personnel and are validated after each major modification.

(see 4.4 Computer Program above)

4.5 Design Review

Design reviews are performed by qualified personnel, other than those who performed the original work, to provide an overview of the project results and to verify the reasonableness of results and conclusions.

N/A: Only calculations are performed under this Purchase Order. (see 4.3 Calculations)

4.7 Interface Control

All technical or contractual correspondences to the client shall be signed by the project manager. or designee. Work may be performed by consultants under the EQE QA Program. All work performed by consultants for the project is reviewed and audited along with calculations and drawings prepared by EQE engineers.

Observations: Under the new Revision No. 2 to this Purchase Order, the Project Manager will establish, implement, and maintain Interface Control in accordance with AP-200Q, using Master File Index, similar to that for PLG/EDF Overpressure, No. 52340, X:WRF\52340MF (attachment G). (PLG Job No. 1540) Consultants are not used under this Purchase Order.

4.8 Engineering Drawings

Each drawing shall receive an independent check by a qualified engineer.

N/A: No engineering drawings are prepared for under this Purchase Order.

4.9 Reports

The project manager shall establish project report requirements and shall assign qualified personnel to prepare reports in accordance with established EQE quality procedures. The project manager shall assign qualified personnel to review reports for technical content and shall be responsible for approving the report.

N/A: No project reports have been prepared to date under this Purchase Order.

5. Procurement Control

5.1 The purchase order shall be reviewed by the QA manager and the project manager to ensure that applicable technical criteria, design bases, and quality assurance requirements of EQE's clients are passed to the subcontractors.

N/A: No subcontractors are required on this Purchase Order.

6. Instructions, Procedures, and Drawings

These EQE quality procedures and instructions are prepared by appropriate technical staff and are approved by the responsible technical or QA manager. Descriptions of these documents and their control are contained in other sections of this manual.

Acceptable: Sampling of approved procedures shown are as follows:

Calculation Procedure, TP-10Q

Reporting of Defects and Noncompliance, AP-110Q

Interface Control, AP-200Q

7. Document Control

7.2 Records Turnover

Project quality records generated by EQE during the course of a project may be turned over to the client during or at the completion of the project work. Such records shall be reviewed for legibility and completeness prior to the turnover to the client. EQE shall not retain records for client without specific agreement, and therefore, does not classify quality-related records as "Lifetime" or "Nonpermanent."

Observation: PLG Project Manager shall either (1) accept the original EQE calculations for storage, or (2) specify for EQE storage in the new Revision 3 to this Purchase Order under Quality Assurance requirements.

7.3 Document Storage

Copies of quality-related records generated by EQE shall be forwarded to the client or stored in separate locations when specified by client quality assurance requirements.

Observation: See item 7.2 above. When specified for EQE storage by the client's QA requirements, they are stored as follows:

1 set in storage at San Francisco.

1 set in storage locally at NBR.

9. Control of Nonconformances/Corrective Action

9.2 Responsibilities

Any employee of EQE who discovers a nonconformance to technical or quality requirements in a document controlled by this program shall identify the nonconformance and notify the QA manager who shall make final determination of whether or not a nonconformance exists.

Acceptable: No nonconformance reported under this Purchase Order. Sampling shown was for NCR No. 94-01, dated 9/13/94, on Project No. 52244.02 in Irvine Office. Finding was "QA requirements for the project unknown." Resolved, closed out and accepted on 6/23/95 (attachment H).

9.4 10CFR21 Reportability

The president is responsible for notifying the NRC of defects or noncompliances as defined and required by 10CRF21. (Posting requirements?)

Observation: 10CFR21.6, Posting Requirements, is not totally complied with; (1) 10CFR Part 21, dated 1/1/93 [posted but outdated], (2) Section 206 [posted], and (3) Notice 15000-35/AP-110Q [posted]. Since this Purchase Order is for a project under a foreign client, the finding is classified as "observation."

The methods for conducting a preliminary safety evaluation, documenting the occurrence of defects or noncompliances, and notifying the client and the NRC are specified in EQE quality procedures.

Acceptable: EQE notification procedure is AP-110Q. To date no reporting has been initiated.

10. Quality Assurance Records

10.4 Storage

Records shall be filed in cabinets, with controlled access as directed by the QA manager. (How is access physically controlled?)

Acceptable: Building entry during office hours is controlled by the receptionist. After hours, it is controlled by card-key entry. For monitoring entry into QA files by QA Administrator, see next item.

Each file location shall have provisions for sign-out of records by authorized personnel, showing who removed record, and when they were returned. (Does "authorized personnel" mean the person who authorizes the removal of records by unauthorized personnel, or any person who is preauthorized to remove the records?)

Acceptable: Access to all EQE Project files is permitted to all EQE project personnel. All non-EQE project personnel may gain access to EQE project files only through authorization of the Project Administrator or designee. Form "File Access," is displayed on the face of each file drawer (attachment I).

11. Audits

11.1 Project Audits

The QA manager shall be responsible for selection and assignment of qualified personnel to perform internal audits. An audit team shall consist of a lead auditor, and may have qualified members from the engineering staff who are not directly working on the project. [(1) Use words, instead, such as "who are not directly involved in the work being audited, (2) how is "Lead Auditor" qualified, and (3) provide sampling of QA audit reports.]

Acceptable: Thomas R. Roche, Lead Auditor qualification is extended for one year, memo from QA Manager dated 2/13/95 (attachment J).

Finding: Douglas Freeland, Record of Lead Auditor Qualification, dated 9/23/94. (attachment K).

(1) No entries for "Examination," "Passed," and "Date."

(2) No signature/date for "Auditor Qualification Certified By" and "Date Certified."

(3) However, the form is signed/dated 9/23/94 in space for "Annual Evaluation."

Acceptable: No QA audit required to date under this Purchase Order. See item 11.2 below. Internal audits are performed every 6 months or at job closeout, whichever is sooner. Sampling of audit report observed is as follows:

QA Audit Report (Project); Audit No. 95-02; No. of Pages, 12.

Project: Robinson USI A-46 and IPEEE; Client, Carolina Power & Light Co.

Project No. 52212; Audit Date 6/19/95; Lead Auditor, Doug Freeland;

Corrective Action Required, No; Reportable under 10CFR21, No; Sign-off,

Lead Auditor 6/20/95, Project Manager 6/20/95, and QA Manager 6/23/95.

11.2 Schedules

A schedule of audits shall be maintained by the QA manager. (Provide sampling of recent audit schedule.)

Acceptable: Audit Schedule, July 1995, issued by Steven Harris, QA Manager.

Internal audits are performed every 6 months or at job closeout, whichever is sooner.

Observation: Under the new Revision No. 2 to this Purchase Order, closeout audit will be scheduled and performed by EQE.

11.3 Subcontractor Audits

Subcontractor audits EQE shall be performed on a selective basis or as requested by the client to ensure compliance to the quality assurance requirements designated in the subcontractor procurement documents.

N/A: No EQE subcontractors are required on the current Purchase Order.

Lead Auditor: _____ Date: 10/12/95

QA Manager: _____ Date: 10/12/95

Project Manager: _____ Date: 10/23/95

Orig: Document Clerk

cc: Corporate Officer
Sr VP Finance & Adm.
VP Nuclear
QA Manager
Project Manager
Contract Administrator
Lead Auditor
TJMikschl
WLAlbertson
KRDeremer

ATTENDANCE LIST

INITIAL INTERVIEW Date: _____ Time: _____

Name _____ Title _____ Affiliation _____

EXIT INTERVIEW Date: _____ Time: _____

Name _____ Title _____ Affiliation _____

ATTENDANCE LIST

INITIAL INTERVIEW Date: 9/21/95 Time: 1 PM.

Name	Title	Affiliation
W. C. Gehler	QA Manager	PLG Inc.
BEN SHIMIZU	LEAD AUDITOR	PLG
Tom Roche	Regional QA	EG&E
Brandy Stout	Quality Assurance Admin.	EG&E.

EXIT INTERVIEW Date: _____ Time: _____

Name	Title	Affiliation

ATTENDANCE LIST

INITIAL INTERVIEW Date: 9/26/95 Time: 9 AM.

Name	Title	Affiliation
DAVID NAKAKI	PRINCIPAL ENGINEER	EQE
Tom Roche	QA coordinator	EQE
Brandy Stout	QA admin.	EQE
Jennifer Freiholtz	QA Admin	EQE
W.C. Gekler	QA Mgr	PLG
BEN SHIMIZU	QA Lead Auditor	PLG

EXIT INTERVIEW Date: 9/26/95 Time: 10:30 AM

Name	Title	Affiliation
Greg Hardy	Senior Vice President	EQE
Tom Roche	EQE Coordinator	EQE
Brandy Stout	QA admin.	EQE
Steve P Haris	QA M	EQE (Telecom)
Jennifer Freiholtz	QA Admin	EQE
W.C. Gekler	QA Mgr	PLG
BEN SHIMIZU	QA Lead Auditor	PLG

PLG
ENGINEERS
APPLIED SCIENTISTS
MANAGEMENT CONSULTANTS
(A Member of
The Failure Group, Inc.)

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November 16, 1995
EDF-1540-PLG-40
NOK-1594-PLG-61

BJGarrick
HFPerla
TUMarston
EMWard
RKDeremer
WCGekler
SBhimizu
WLAlbertson
Client Files

Mr. Thomas R. Roche, P.E.
Technical Manager
EQE International
Lakeshore Tower
18101 Von Karman Avenue, Suite 400
Irvine, CA 92715-1032

Reference: PLG letter dated October 12, 1995, Audit Finding Reports and Observations

Dear Tom:

EXTENSION OF AUDIT FINDING REPORTS RESPONSE DATE

Change Order No. 2 to the PLG Purchase Order No. NB-1705 has been issued to Mr. George W. Reitter in your San Francisco Office on November 14, 1995. We hereby extend the subject response date within 30 days of your receipt of our change order.

Please respond by completing items 8 through 11 in the enclosed two (2) Audit Finding Reports also referred to in the above-referenced letter.

Please comply with the "Scheduled Corrective Actions Completion Date" so that we may verify your corrective actions as soon as practicable.

Very truly yours,

W. C. Gekler

Willard C. Gekler
Quality Assurance Manager

BShimizu/bkf
E154040.WCG

Enclosures

1. AUDIT FINDING REPORT NO. 1 2 AUDIT REPORT NO. 1594-3

3. REQUIREMENT: PLG Purchase Order No. NB-1705, Revision 0, Date 3/23/95, under QUALITY ASSURANCE, it is stated, "The work to be performed under this Purchase Order shall be in compliance with PLG QA Program, PLG-0223, in accordance with 10CFR50, Appendix B, including reporting requirements of 10CFR and 10CFR50.55(e)."

4. DESCRIPTION OF FINDING: For documentation, QA forms referenced in PLG-0223 have been substituted by equivalent EQE forms as referenced in EQE QA Manual, Revision 2, dated 11/15/91.

5. SUGGESTED CORRECTIVE ACTION: PLG will issue revision to the PLG Purchase Order NB-1705, Quality Assurance, stating as follows:
"The work to be performed under this Purchase Order shall be in compliance with EQE QA Manual, Revision 2, November 15, 1991, in accordance with 10CFR50, Appendix B."

EQE shall establish, implement, and maintain the QA Program under this Purchase Order retroactive to the original date of March 23, 1995, all in accordance with EQE QA Manual, Revision 2, dated 11/15/91.

6. _____ 10/10/95 7. _____ 10/12/95
INITIATED BY DATE QA MANAGER DATE

TO BE COMPLETED BY SUBCONTRACTOR

8. PROBABLE CAUSE:

9. CORRECTIVE ACTIONS:

10. SCHEDULED CORRECTIVE ACTIONS COMPLETION DATE: _____

11. _____ _____ _____
APPROVED BY TITLE DATE

TO BE COMPLETED BY PLG

12. RESPONSE EVALUATED AND ACCEPTED BY: _____ DATE: _____

13. CORRECTIVE ACTIONS VERIFIED:

14. _____ _____ 15. _____ _____
VERIFIED BY DATE QA MANAGER DATE

1. AUDIT FINDING REPORT NO. 2 2. AUDIT REPORT NO. 1594-3

3. REQUIREMENT: Section 11.1 Project Audits
The QA manager shall be responsible for selection and assignment of qualified personnel to perform internal audits. An audit team shall consist of a lead auditor, and may have qualified members from the engineering staff who are not directly working on the project.
[(1) Use words, instead, such as "who are not directly involved in the work being audited," and (2) how is "Lead Auditor" qualified?]

4. DESCRIPTION OF FINDING: Douglas Freeland, Record of Lead Auditor Qualification, Dated 9/23/94.
(1) No entries for "Examination," "Passed," and "Date."
(2) No signature/date for "Auditor Qualification Certified By" and "Date Certified."
(3) However, the form is signed/dated 9/23/94 in space allocated for "Annual Evaluation."

5. SUGGESTED CORRECTIVE ACTION:
Make proper entries for the missing data and responsible person to certify lead auditor qualification and make annual evaluation for Douglas Freeland.

6. _____ 10/12/95 7. _____ 10/12/95
INITIATED BY DATE QA MANAGER DATE

TO BE COMPLETED BY SUBCONTRACTOR

8. PROBABLE CAUSE:

9. CORRECTIVE ACTIONS:

10. SCHEDULED CORRECTIVE ACTIONS COMPLETION DATE: _____

11. _____ _____ _____
APPROVED BY TITLE DATE

TO BE COMPLETED BY PLG

12. RESPONSE EVALUATED AND ACCEPTED BY: _____ DATE: _____

13. CORRECTIVE ACTIONS VERIFIED:

14. _____ _____ 15. _____ _____
VERIFIED BY DATE QA MANAGER DATE

PLG-0223, QUALITY ASSURANCE PROGRAM
QA TRAINING RECORD

Updated: 12-05-95

Name	QA Training Completed	Completed Score	1991 QA Retraining Completed	1992-94 QA Retraining Completed	1995-96 QA Retraining Completed	DCPRA Project QA Training Completed
W.L. Albertson	07-05-95	81	(N/R)(2)	11-22-91	11-20-95	(N/R)
M.S. Arjonilla	10-15-91	88	07-23-91	11-22-91		(N/R)
M.J. Abrams(B)	01-23-87	72	08-14-91	01-28-92		N/R)
R. Berger(PG&E)	(N/R)(2)		(N/R)(2)	(N/R)(2)		08-15-85
V.M. Bier(Ac)	10-22-85	91	04-04-91	02-02-92		07-29-86
*S.T. Celi(B)	10-03-95	80	(N/R)(2)	(N/R)(2)		(N/R)
*T.J. Celi(B)	10-10-95	96	(N/R)(2)	(N/R)(2)		(N/R)
D.L. Dato-On	02-09-95	86	(N/R)(2)	(N/R)(2)		(N/R)
R.K. Deremer(E)	10-22-85	100	08-14-91	12-20-91		(N/R)
A.A. Dykes	11-12-86	97	06-06-91	11-22-91		(N/R)
R.A. Dykes	09-28-90	83	09-05-91	01-20-92		(N/R)
M.A. Emerson(Albuq)	01-04-89	93	05-09-91	01-26-92		11-21-91
S.P. Fogarty	04-04-95	76	(N/R)(2)	(N/R)(2)	11-20-95	(N/R)
W.R. Fuller	10-22-85	96	04-04-91	12-20-91	11-20-95	(N/R)
J.F. Gabor(GK&Ac)	04-07-92	94	(N/R)(2)	07-10-92		(N/R)
B.J. Garrick	10-28-85	100	09-09-91	12-20-91	11-20-95	12-08-86
F. Gee(PG&E)	06-20-86	100	(N/R)(2)	(N/R)(2)		07-02-86
W.C. Gekler	10-29-85	99	04-04-91	(N/R)!1)	(N/R)(1)	01-30-86
T.D. Godkin(B)	08-22-95	79	(N/R)(2)	(N/R)(2)		(N/R)
D.H. Johnson	10-22-85	95	05-09-91	11-22-91	11-20-95	06-12-86

Quarterly Distribution:

W.C. Gekler — 12/12/95

QA Manager — Date

Legends:
(*) - New Person
(Ac) - Associate
(B) - Bethesda Office
(E) - Encinitas Office
(N/R) - Not required
(N/R)(1) - Not required (Instructor)
(N/R)(2) - Not required (Client, or prior to employment)

Orig: Document Clerk
cc: Corporate Officer, QA Manager, EMWard, SRMedhekar, TUMarston, WRFuller, WTLoh, KWoodard, DHJohnson, MAEmerson, DJWakefield, TGBoyle, BShimizu

Name	QA Training Completed	Completed Score	QA Retraining Completed	QA Retraining Completed	QA Retraining Completed	DCPRA Project Completed
S. Kaplan(Ac)	10-22-85	92	04-04-91	12-20-91		01-07-87
M. Kenton(GK&Ac)	04-07-92	88	(N/R)(2)	10-19-92		(N/R)
J.P. Kindinger	01-12-87	94	05-09-91	11-22-91	11-20-95	01-09-87
W.M. Lardner	12-02-93	73	(N/R)(2)	10-11-94	11-20-95	(N/R)
*J. Lautz(B)	09-19-95	79	(N/R)(2)	(N/R)(2)		(N/R)
J. Lewis(B)	03-03-83	86	06-06-91	01-28-92		(N/R)
J.K. Liming	01-05-95	90	(N/R)(2)	(N/R)(2)	11-20-95	(N/R)
J.C. Lin	10-22-85	96	04-04-91	11-22-91	11-20-95	04-30-86
W.T. Loh	10-22-85	85	04-04-91	11-22-91	11-20-95	05-23-86
T.U. Marston	09-08-95	82	(N/R)(2)	(N/R)(2)		(N/R)
S.I. Mckinney	02-22-90	78	06-06-91	11-22-91		02-24-89
S.R. Medhekar	09-28-90	80	04-04-91	12-20-91	11-20-95	12-05-91
S.R. Melvin	04-07-92	85	(N/R)(2)	09-03-92	11-20-95	(N/R)
T.J. Mikschl(E)	10-22-85	89	11-07-91	12-20-91	11-20-95	08-12-85
J.H. Moody(Ac)	03-07-91	92	04-04-91	02-05-92		(N/R)
M.B. Murray(GK&Ac)	04-07-92	78	(N/R)(2)	07-10-92		(N/R)
K.M. Naassan(Albuq)	04-24-92	82	(N/R)(2)	08-01-92		(N/R)
D.E. Naff(PG&E)	02-24-87	92	(N/R)(2)	(N/R)(2)		02-24-87
K.W. Naylor	10-22-85	78	04-04-91	11-22-91	11-20-95	(N/R)
K.R. Paxton(Ac)	06-09-94	73	(N/R)(2)	(N/R)(2)		(N/R)
H.F. Perla	10-22-85	96	04-04-91	11-22-91		08-15-85
*M. Pettipaw(B)	10-03-95	87	(N/R)(2)	(N/R)(2)		(N/R)
*M.J. Pine(B)	10-03-95	88	(N/R)(2)	(N/R)(2)		(N/R)
S.B. Rao	10-22-85	82	04-04-91	11-22-91		10-12-85
S.S. Rodgers	03-07-91	77	09-09-91	02-11-92		(N/R)
C.M. Roy	11-23-94	88	(N/R)(2)	(N/R)(2)		(N/R)
A. Sharon(GK&Ac)	04-07-92	70	(N/R)(2)	10-20-92		(N/R)
B. Shimizu(Ac)	10-15-86	100	(N/R)(1)	11-22-91	11-20-95	10-15-86
J.W. Stetkar	01-07-86	100	07-23-91	11-22-91		01-07-87
G.J. Stevenson(Ac)	05-08-87	88	04-04-91	01-13-92		(N/R)
M.K. Sun(ROCAEC)	05-03-89	89	(N/R)(2)	(N/R)(2)		(N/R)
R. Thierry(PG&E)	06-20-86	97	(N/R)(2)	(N/R)(2)		06-20-86
W.A. Thomas(GK&Ac)	04-07-92	91	(N/R)(2)	10-16-92		(N/R)
G.A. Tinsley	10-22-85	98	05-09-91	11-22-91	11-20-95	12-23-85
D. Vanover(GK&Ac)	04-07-92	90	(N/R)(2)	10-16-92		(N/R)
D.J. Wakefield(E)	10-22-85	97	04-04-91	12-20-91		08-12-85
E.M. Ward	10-28-85	92	08-14-91	11-22-91	11-20-95	(N/R)
L.L. Warren	03-04-94	79	(N/R)(2)	10-21-94	11-20-95	(N/R)
K. Woodard(B)	10-22-85	81	04-04-91	01-28-92		(N/R)
L. Xing	07-19-93	83	(N/R)(2)	11-26-94	11-20-95	(N/R)

NUCLEAR PROCUREMENT ISSUES COMMITTEE
AUDIT CHECKLIST
SUMMARY SHEET

Revision 6

SUPPLIER INFORMATION					AUDIT SCOPE
SUPPLIER: PLG, Incorporated					ANSI N45.2 ( )
ADDRESS: 4590 MacArthur Blvd., Suite 400					ANSI N45.2.2 ( )
CITY, STATE AND ZIP CODE: Newport Beach, CA 92660-2027					ANSI N45.2.6 ( )
TELEPHONE NO.: (714) 863-3504		FAX NO. (714) 833-2085			ANSI N45.2.9 ( )
PRODUCT/SERVICE: Plant Risk Model Development and Analysis Services					ANSI N45.2.11 ( )
					ANSI N45.2.12 (X)
CODE STAMP AND AUTHORIZATIONS: None					ANSI N45.2.13 (X)
					ANSI N45.2.23 ( )
SUPPLIER CONTACTS					ANSI N101.4 ( )
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					IEEE 323 ( )
AUDIT INFORMATION					IEEE 344 ( )
LEAD UTILITY: Houston Lighting & Power					IEEE 383 ( )
AUDIT ID NO: 95-073 (VA)		AUDIT DATES: 09/11-14/95			ASME NCA 3800 ( )
					ASME NCA 4000 ( )
AUDIT TEAM INFORMATION					ASME SECT XI ( )

AUDIT TEAM	UTILITY	NAME	TITLE	TELEPHONE NO	ANSI/ASME NQA-1 (X)
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Audit Team Leader J E Adkins Date 10-2-95

NUPIC Representative J E Adkins Date 10-2-95

Revision 6

NUPIC
AUDIT CHECKLIST
SUMMARY SHEET

SUPPLIER: PLG, Incorporated

AUDIT NO: 95-073 (VA)

Vendor QA Manual Quality Assurance Plan (PLG-0223) Revision 23 Date 06/06/95

AUDIT SECTION	SECTION DESCRIPTION	C	E	QA PROGRAM REFERENCE	IMPLEMENTATION STATUS	COMMENTS/ FINDING
I	ORDER ENTRY	✓	✓	QA Plan 2.2.2 & 2.2.4	S	
II	DESIGN		✓	QA Plan 3.1	S	
III	SOFTWARE QUALITY ASSURANCE	✓	✓	See Sup'l SQA Ckl	S	
IV	PROCUREMENT	✓	✓	QA Plan 3.2 & 3.5	U	See VDR 95-019
V	MATERIAL CONTROL/HANDLING, STORAGE & SHIPPING	✓		Not Applicable	Not Applicable	
VI	FABRICATION/ASSEMBLY/SPECIAL PROCESSES			Not Applicable	Not Applicable	
VII	TEST/INSPECTION			Not Applicable	Not Applicable	
VIII	CALIBRATION	✓		Not Applicable	Not Applicable	
IX	DOCUMENT CONTROL/ADEQUACY	✓	✓	QA Plan 3.3 & 3.4	S	
X-A	ORGANIZATION/PROGRAM	✓	✓	QA Plan 2.1 & 2.2	S	
X-B	NONCONFORMING ITEMS/PART 21	✓	✓	QA Plan 4.	S	Nonconforming Items N/A to PLG, Inc.
X-C	INTERNAL AUDIT	✓	✓	QA Plan 7.	S	
X-D	EXTERNAL AUDIT	✓	✓	QA Plan 3.5 & 7	U	See VDR 95-019
X-E	CORRECTIVE ACTION	✓	✓	QA Plan 5.	S	
X-F	TRAINING/CERTIFICATION	✓	✓	QA Plan 3.6 & 7	U	See VDR 95-020
X-G	RECORDS	✓	✓	QA Plan 6.	S	

IMPLEMENTATION KEY

S = SATISFACTORY U = UNSATISFACTORY N/A = NOT APPLICABLE

C = Recommended Calibration Supplier Checklist
E = Recommended Engineering Services Checklist

SECTION I - ORDER ENTRY

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
1.1 Record the procedures/instructions and/or drawings used to verify implementation in this area. (Document O.E. on Figure 10)		
1.2 Verify that Utility Purchase Order (PO) technical and quality requirements are correctly interpreted and translated on supplier's control documents (i.e. travelers, shop work orders, work tracking document including item description and part numbers). (Document O.E. on Figure 1) NOTE: Required testing to be verified in Section VII Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 4S-1 Vendor Program Ref: QA Plan, Sections 2.2.2 & 2.2.4	Order entry activities are performed by the Contract Administrator as required by Section 2, of the PLG QA Plan. The Contract Administrator initiates a "Job Master Detail" which identifies contract information including a Yes/No block to indicate if QA requirements are applicable. This document is also assigned an internal PLG Job/Task Number for tracking purposes. Additionally, a Project QA Startup Checklist is generated in accordance with PLG Procedure 101, Document Control System, Revision 12, dated 05/31/95. The Project QA Startup Checklist is prepared for the base contract and subsequent change orders. Customer quality requirements are transcribed into the Project QA Startup Checklist which is approved by the QA Manager, Software Development Manager, Project Manager, and the Contract Administrator. One instance was noted where PLG had not transcribed the requirement to supply a certificate of conformance. The certification was issued during the audit. As this was an isolated case, the audit team determined that no further action was required. Order entry was determined to be adequate and satisfactorily implemented.	S
1.3 Assure that the utility purchase order requirements which will not/cannot be met by supplier are promptly communicated back to the utility. This includes notification to utility of design deviations. Appendix B/ANSI N45.2 Ref: (3/4) ASME Sec. III NQA-1 Supplement 4S-1, 7S-1 Vendor Program Ref: QA Plan, Sections 2.2.2 & 2.2.4	Any concerns related to the contract/order are promptly communicated back to the the customer. Verified by review of Fax PLG to PGE dated 09-07-94, requesting clarification of Change Order 6, to Contract Z78-0013-90, and requesting a copy of PGE Procedure NRS CF2.NR1, which was invoked by this change. Also reviewed Fax PLG to Gosgen dated 04/25/94, regarding methodology/approach for performing analysis. This amendment number 5, was against (KKG) Gosgen Switzerland original contract (no number) dated 10-20-90. No other examples were readily available for review during the audit. This area was determined to be adequate and effectively implemented.	S

TEAM MEMBER: J. E. Adkins DATE: 09/11/95

(FIGURE 1)

CONTROL OF TECHNICAL/QUALITY REQUIREMENTS			
UTILITY P.O./TECH/QA REQUIREMENTS IMPOSED *1.2	UTILITY ITEM DESCRIPTION AND PART NUMBER *1.2	TRANSLATED TO SUPPLIER DOCUMENTS *1.2	CUSTOMER REQUIREMENTS TRANSLATED *1.2 YES/NO
YAE P. O. 16548, dated 05/22/95. No QA Requirements imposed. No indication as to whether the order was SR or NSR.	Service-Tailor Riskman to YAE Specification Version 1.0, Revision 1, dated 04/11/95.	Job Master Detail, Job #1609 dated 05/22/95. Project QA Startup Checklist, Job #1609, dated 08/30/95.	Yes
SNC P. O. SN950008, dated 01/11/95, Safety Related, invoked standard QA requirements per SNC Master Agreement SNP-0069, dated 07/01/94.	Service-Fire Analysis for Plant Hatch, Unit 2.	Job Master Detail, Job #1604 dated 05/22/95. Project QA Startup Checklist, Job #1604, dated 07/20/95.	Yes
HL&P P. O. ST-400258, Sup. #47, dated 03/29/95, Safety Related, standard QA requirements.	Service-Emergency Transformer Analysis for integration into PRA.	Job Master Detail, Job #1593, dated 02/22/95. Project QA Startup Checklist, Job #1593, dated 05/17/95.	Yes
(KKG) Gosgen Switzerland Original Contract (no number) dated 10/20/90, Contract Amendment #5, dated 04/27/95, invoked PLG QA Plan PLG-0223.	Service-Update Gosgen PSA Models to Riskman 6.0.	Job Master Detail, Job #1598, dated 04/06/95. Project QA Startup Checklist, Job #1598, dated 07/05/95.	Yes
SNC P. O. 70168990000, dated 01/05/94, With change 2, dated 02/02/95, Safety Related, 10CFR21, standard QA requirements, PLG QA Plan PLG-0223.	Service-IPEEE Fire Analysis for Plant Vogtle.	Job Master Detail, Job #1523, dated 01/20/94. Project QA Startup Checklist, Job #1523, dated 02/24/95.	Yes
PGE P. O. Z78-0013-90, Change Order #5, dated 09/04/93, SR, 10CFR21, 10CFR50, No Subcontracting. Change Order #6, dated 10/05/94, extended term of service and invoked PG&E's NRS Procedure NRS CF2.NR1 revision 0, Computer Programs.	Service-(1), Risk analysis and Riskman updates as requested. (2), PRA and IPEEE-Non-Safety.	Job Master Detail, Job #1525, dated 01/01/94. Project QA Startup Checklist dated 09/12/95, Job #1525.	Yes

* Refers to applicable question.

TEAM MEMBER: J. E. Adkins DATE: 09/14/95

SECTION II - DESIGN

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
2.1 Record the procedures/instructions and/or drawings used to verify implementation in this area. (Document O.E. on Figure 10)		
2.2 Verify that measures to control the translation of design requirements into design documents are implemented. a) Review engineering/production documents for inclusion of applicable technical and quality requirements. b) Verify inclusion of contractually identified design bases, (regulatory requirements, Code Requirements, codes, standards, EQ/Seismic Report Numbers, Analyses etc.) in design/quality documents. c) For suppliers with design responsibility/authority, verify that the design is supported by engineering/test data (i.e., calculations, performance test, etc.). NOTE: Evidence reviewed to be used in Sections III & VI. (Document O.E. on Figure 2) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	PLG does not perform design activities per se, nor do they produce design documents. Therefore, this question is not applicable when applied strictly to design attributes of systems, structures, and components. When applied to software design, however, these checklist items are applicable and for the most part are addressed in the Supplemental Checklist for Software Development Section III. A brief comment about each subsection of this checklist item when applied to software design is given below. a) No new production codes have been developed at PLG since the last NUPIC audit. The PLG job listed in Figure 2 and Problem Reports listed in Figure 4 of the supplemental section III checklist were reviewed for proper incorporation of design requirements. PLG adequately included applicable technical and quality requirements when processing work packages and/or PRs to production codes for (RISKMAN). b) Work packages reviewed adequately included contractually identified requirements. Design specifications for production code development and revisions thereto are provided for in Procedure 105. For code revisions (PRs), design specifications were adequately incorporated by PLG. c) PLG's software QA program provides adequate assurance that software design is fully documented and supported by a sound technical background. These attributes, as they relate to activities performed by PLG are adequate and are being effectively implemented.	S
2.3 Verify that measures are established and implemented for the selection and review for suitability of application, of materials, parts, equipment and processes that are essential to the safety related function of the product. If the supplier's safety-related components have parts classified as non-safety related, the following items should be considered: a. Is the process controlled? b. Is a functional evaluation approach used? c. Has the evaluation included analysis of failure modes to assure the parts failure would not prevent the component from performing its safety related function? Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: Not Applicable	Not Applicable to PLG, Incorporated. Scope of work is for services and does not include hardware.	N/A

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION II - DESIGN

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
2.4 Verify that measures are established and implemented for the identification and control of design interfaces. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	The PLG QA Plan establishes adequate measures for the identification and control of design interfaces. Since PLG is a small company, design interfaces are limited to memos, letters, phone calls, etc. between specified technical contacts and/or the client.	S
2.5 Verify that measures are established and implemented for the verification of design adequacy. a) Assure the verification method used is identified (design review, alternate calculations or test) and that the verification is performed by individuals or groups other than those who performed the original design, but who may be from the same organization. b) When the verification method used is qualification test, verify that a prototype unit is tested under the most adverse design conditions. (Document O.E. on Figure 2) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	a) All verifications performed are by independent technical reviews which are documented on a Technical Review Report (TRR). Verified by review of the work package identified on Figure 2. See Section III Supplemental Checklist Item 4 and Figure 4 for assessment of software verification. b) This attribute is not applicable to PLG activities. PLG does not produce hardware and/or perform qualification testing.	S

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION II - DESIGN

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
2.6 Verify that measures are established and implemented to control design changes including changes for spare/replacement parts. (Document O.E. on Figure 2) a) Review revised design documents, (e.g. calculations, drawings, stress reports), to verify that design changes are made using design control measures equal to those of the original design. b) Ensure that design changes have been adequately evaluated to assure that the impact of the change is carefully considered (i.e. performance, interchangeability and qualification). c) Review design changes to verify that they were reviewed and approved by the same organization as originally reviewed and approved, or by other knowledgeable, qualified and designated organization. d) Verify that utility approval of design changes is obtained if required by the utility procurement document. (Document O.E. on Figure 2) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	a, b, c) See Section III Supplemental Checklist Item 8 for assessment of PLG's measures for revision to production codes. d) Not applicable. Procurement documents reviewed did not require approval by the customer.	S
2.7 For equipment qualified by prior testing, verify that when material substitutions or modifications (including changes for spare parts) are made the following are considered: 1) Prior qualification tests are reviewed to determine the effect on the item qualification. 2) Evaluations to indicate whether or not new qualification tests are required. 3) Justifications for not having to perform new qualification tests are documented. (Document O.E. on Figure 2) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: Not Applicable	Not Applicable to PLG, Incorporated. Scope of work is for services and does not include equipment, material, or spare replacement parts.	N/A

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION II - DESIGN

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
2.8 Verify and assess the suppliers controls for dedication of manufactured/purchased Commercial Grade Items (CGI) such that critical characteristics are determined. Determine adequacy of identified critical characteristics. (Control of Procurement accomplished in Section IV). (Inspection/testing for acceptance/dedication reviewed in Section VII). (Document O.E. on Figure 3) NOTE: This question applies to CGI's dedicated by the supplier for utility procurement as basic components (this does not address items sold by suppliers as CGI which require utility dedication). Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 7S-1 Vendor Program Ref: Not Applicable	Not applicable to PLG, Incorporated. See Checklist Item 2.7.	N/A

TEAM MEMBER: A. M. Richards/J. E. Adkins

DATE: 09/13/95

SECTION II - DESIGN

(FIGURE 2)

DESIGN DOCUMENT	BASES	SUPPORTED BY ENG/TEST DATA	METHOD OF DESIGN VERIFICATION	DESIGN CHANGE CONTROL AND REV/DATE	UTILITY APPROVAL DOCUMENTATION
*2.2	*2.2	*2.2	*2.5	*2.6 2.7	*2.6
PLG Job #1523, IPEEE-SNC Vogtle	SNC P. O. 70168990000-IPEEE Fire Analysis for Plant Vogtle, Project QA Startup Checklist Job #1523	TRR-1523-TRR-03	Hand Calculations	N/A In-process	N/A-Not Required

* Refers to applicable question.

MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION II - DESIGN

(FIGURE 3)

COMMERCIAL GRADE ITEMS		
ITEM DESCRIPTION (P/N, S/N/Model No., etc.) *2.8	CRITICAL CHARACTERISTICS *2.8	METHOD(S) OF DEDICATION *2.8
Not applicable to PLG, Incorporated. See Checklist Item 2.7.		
* Refers to applicable question.		

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
1. Record Procedures, Instructions & Drawings used to verify implementation in this area. (Document O.E. on Figure 10).		
2. Verify that measures are established and implemented to assure that the software QA program consists of a systematic life cycle process including phases such as development of a plan for software QA, requirements, design, testing of the code, operation and maintenance. NOTE: The life cycle phases should proceed in a traceable, planned, and orderly manner. The number of phases and relative emphasis placed on each phase will depend on the nature and complexity of the software. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.6, 2.2.7, 2.2.8, & 3.1	Procedure 105, "Production Code Quality Assurance" establishes the quality assurance responsibilities and certification requirements for production codes used by PLG. Responsibilities are delineated for the following positions: Project Manager Software Development Manager Production Code Specifier Production Code Programmer Production Code Verifier Code Verification Reviewer Production Code User Computer Operations Manager Software Librarian Quality Assurance Manager Software QA Coordinator Programs are established for production code development, verification, certification, and revision. Project deliverables are also discussed, while delivery procedures are outlined in Procedure 107, "Documents and Software Review, Approval, and Transmittal." PLG satisfactorily fulfills the requirements of a software QA program consisting of a systematic life cycle process. (Continued)	S
3. Verify that measures are established and implemented to assure that the software QA program provides for the review and approval by appropriate personnel, at defined steps in the software development life cycle. Assure that the reviewer(s) are independent of those who developed the software. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.6, 2.2.7, 2.2.8, & 3.1	Procedure 105 outlines the review and approval process throughout the software development life cycle for production codes. Requirements for various reviewers ensure that they are independent of the software developers. Therefore, PLG's software QA program provides sufficient review and approval by independent reviewers of production codes. Review of analyst programs is discussed in Procedure 104 which states that "[o]rdinarily, independent reviewers shall be persons other than those directly performing the work being reviewed." See Figure 4 for documents reviewed.	S

TEAM MEMBER: A. M. Richards/J.E. Adkins DATE: 09/13/95

SECTION III
SUPPLEMENTAL
CHECKLIST
FOR
SOFTWARE DEVELOPMENT

CONTINUATION PAGE

Section III item 2 (Continued)
Analyst codes are discussed in Section 3.1 of the QA Plan. Independent technical review of analyst programs are performed per Procedure 104, "Independent Technical Reviews." Since analyst program are usually relatively simple macros or programs, a formal detailed life cycle phase is not delineated. Typically, an analyst code is developed based on a programmer's needs, and before it is used in safety-related work, an independent technical review is performed. See Figure 4 for documents reviewed.
TEAM MEMBER: A.M. Richards/J.E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
4. Verify that measures are established and implemented to assure that software verification is performed at defined steps in the development life cycle. A verification plan should be written and approved prior to implementation. The verification shall ensure the products of a given cycle phase fulfill the requirements of the previous phase or phases. Assure the verification activities are performed by individuals other than those who designed the software and that the results are documented. (Document O.E. on Figure 1) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.6, 2.2.7, 2.2.8, & 3.1	The concepts of verification and validation are so closely related that in many instances they can be discussed together. According to PLG Procedure 105, a Production Code Verifier is assigned by the Project Manager and Software Development Manager. Per procedure, this verifier cannot be the Production Code Programmer. The Verifier: 1) develops a test plan (both for new production codes and revisions to production codes); 2) checks that the code meets the specification requirements; 3) reviews the User Manual for completeness and accuracy; 4) designs and runs sample problems; 5) checks the Programmer's sample problems; 6) documents hand calculations; 7) document the verification process; and 8) prepares a Verification Package. The Software Development Manager and Software QA Coordinator review the verification and the Software Librarian reproduces the code and enters it into the master software library. (Continued)	S
5. Verify that measures are established and implemented to assure that software validation is performed to ensure that the software satisfies the requirements. A validation plan should be written and approved prior to implementation. Assure the results of the validation activities are evaluated by individuals other than those who designed the software and that the results are documented. (Document O.E. on Figure 1) Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.6, 2.2.7, 2.2.8, & 3.1	See checklist item 4 above and continuation page.	S
6. Verify that measures are established and implemented to assure that configuration baselining is defined at the completion of each major phase of the development life cycle. Assure approved changes created subsequent to a baseline are added to the baseline. Verify the baseline defines the most recent approved software configuration. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.6, 2.2.7, 2.2.8, & 3.1	Configuration baselining is controlled by the Project Manager. He makes the decisions concerning which problem reports will be included in the next revision to the code. He also determines whether an update is major (e.g., 5.x to 6.0) or minor(e.g., 5.x to 5.x+1). Although this process is not formally proceduralized, PLG is such a small organization that there would be no confusion concerning which problem reports or changes are encompassed in production code updates. Also, the Software Librarian maintains a database showing the status of all problem reports. Upon completion of a new version of a production code, the database is updated to show which Problem Reports were closed or completed in that version. PLG adequately and effectively implements baseline configuration requirements. See Figure 4 for documents reviewed.	S

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION III
SUPPLEMENTAL
CHECKLIST
FOR
SOFTWARE DEVELOPMENT

CONTINUATION PAGE

Section III item 4 (Continued)
A Verification/Validation plan for production codes is not written and approved prior to implementation. However, the Verification/Validation plan is reviewed for satisfactory completion by an independent reviewer prior to certification of the Production Code/Revision. Verification and validation of analyst programs is discussed in Procedure 104. The independent review which is performed is sufficient for the certification of analyst programs. PLG adequately meets the requirement of Verification and Validation through their verification and certification processes. See Figure 4 for documents reviewed.

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
7. Verify that measures are established and implemented to assure that the software and documentation baselines are uniquely labeled to identify changes to the configuration by revision (e.g., version #). Labeling shall provide the ability to reconstruct the configuration of the software for any date during which the software was qualified for use. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Sections 2.2.7 & 3.1	As stated in Checklist Item 6, production code software is logically labeled, and each version or revision is stored in a master software library on Bernoulli Disk. Therefore, labeling requirements are adequate and being effectively implemented by PLG. Verified by visual observation of Bernouli disk through version 6.01, dated 07/18/95 which are maintained in the Software Library.	S
8. Verify that measures are established and implemented to assure that the changes to software are formally documented, evaluated and approved by the organization responsible for the original software development. Verify the changes are controlled commensurate with those applied to the original software development. Assure the change is appropriately reflected in software documentation and traceability is maintained. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	Procedure 105 states in Section 2.4 that "[m]ajor code revisions shall be prepared in accordance with the production code specification ... using the normal code verification and certification procedure described in Sections 2.1 through 2.3." Sections 2.1 through 2.3 of Procedure 105 cover Code Development, Code Verification and Verification Review, and Production Code Certification. Therefore, by processing changes to Production Codes to the same standards as the original development, PLG ensures that changes to software are adequately and effectively documented, evaluated, approved, verified and validated. Verified by review of the PRs identified in Figure 4.	S
9. Verify that measures are established and implemented to assure that software verification and validation activities are performed as necessary for the change. These measures shall assure the change does not impact the software's intended function. Note: Hardware (platform dependence) is an integral part of the verification and validation process and should be considered when components must be changed. Appendix B/ANSI N45.2 Ref: (3/4) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	As stated in item 8 above, Procedure 105 states in Section 2.4 that "[m]ajor code revisions shall be prepared in accordance with the production code specification ... using the normal code verification and certification procedure described in Sections 2.1 through 2.3." Sections 2.1 through 2.3 of Procedure 105 cover Code Development, Code Verification and Verification Review, and Production Code Certification. Therefore, by processing changes to Production Codes to the same standards as the original development, PLG ensures that changes to software are adequately and effectively documented, evaluated, approved, verified and validated. Verified by review of the PRs identified in Figure 4. Note: PLG, Incorporated does not produce hardware.	S

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10. Verify that measures are established and implemented to assure that the software errors and failures from both internal and external sources are identified, documented, evaluated, and assessed for impact on past and present applications. Verify this problem reporting system assures methods of notification are identified and problems are promptly reported to affected organizations, including users. **Note:** Error notifications may be provided as part of a maintenance agreement. (Document O.E. on Figure 1) Appendix B/ANSI N45.2 Ref: (15/16,16/17) ASME Section III NQA-1 Basic Requirement 15,16 Vendor Program Ref: QA Plan, Sections 3.1 & 5.1	The Problem Report (Form 105-2a) is used by PLG to document and evaluate identified problems with RISKMAN. Although the end user (e.g., utilities) may fill out a Problem Report and forward it to PLG, a more likely scenario is that the end user contacts PLG by telephone or fax and describes the identified problem. Then, PLG would initiate the Problem Report and process it to completion. If an identified problem is deemed serious enough by the Project Manager, then, as a minimum, members of the RISKMAN Technology Group (RTG) would be notified of the problem and either a solution or a work-around would be provided. Generally, several non safety-related Problem Reports are completed, and at a time specified by the Project Manager, the corrected code is distributed to the affected users as a new revision to the code. There are currently no completed Problem Reports which have been processed to the latest revision of Procedure 105. However, the most recent Problem Reports which were completed and issued as RISKMAN Version 6.01 were reviewed and found to have been processed in a manner which adequately meets the requirements of this item. It should also be noted that since most, if not all, Problem Reports generated against production codes require a revision to the code, then the resolution of the Problems is processed as changes to the code. As stated in the assessment of Items 8 & 9 in this checklist, PLG adequately processes and reviews changes to software. See Figure 4 for PRs reviewed.	S
11. Verify that the released software program is utilized as intended by the originating software design organization. Appendix B/ANSI N45.2 Ref: (3,4/16,17) ASME Section III NQA-1 Supplement 3S-1 Vendor Program Ref: QA Plan, Section 3.1	In the development, revision, and testing/verification of Production Computer Codes, several commercial computer software products are used. Software products used in the development of RISKMAN include: QEMM (memory manager), DOS (operating system), AREV (database engine), and Easyflow (graphical fault tree interface). Although PLG has not verified these products separately, by verifying the individual modules of RISKMAN which contain or use these products, PLG has indirectly verified the performance of these commercial software products. It is the determination of the audit team that software used by PLG, is utilized as intended by the software designer.	S

TEAM MEMBER: A. H. Richards/J. E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
12. Verify that measures are established and implemented to assure that software procured as safety-related or commercial grade is capable of performing its intended function. (Document O.E. on Figure 1) a) When software is procured as safety related, verify adequate controls are in place (i.e. acceptable supplier qualification, procurement practices and receipt inspection) to ensure that the supplier is providing software that meets the specified technical and quality requirements. The purchaser's audit of the software supplier shall ensure that verification and validation is controlled, documented, and adequate when considering the intended function of the software. b) For software procured as a commercial grade item, assure that dedication activities such as verification and validation are performed and documented to ensure the software functions as intended. Appendix B/ANSI N45.2 Ref: (7/8) ASME Section III Vendor Program Ref: QA Plan, Sections 3.2 & 3.5	a) Per Computer Operations, no outside safety-related software packages have been procured by PLG since the last NUPIC audit (12/93). However, portions of the RISKMAN code have been contracted out. In such cases, the code is verified and tested under the PLG Software QA Program, thus meeting all applicable requirements. [Per RISKMAN 6.0 Problem Report No. 880 -- all applicable forms were PLG forms (Problem Report, Analyst Report, Maintenance Log, and Verification)]. b) Procedure 106, "Procurement of Engineering Services and Computer Software," Section 4, discusses requirements for purchased computer software. The requirements are to "[a]scertain that 'error reporting' is automatically included in the supplier's software warranty ... or [i]ncorporate PLG standard terms and conditions for 'error reporting' in the purchase order." Further clarification from Computer Operations, indicates that professional experience with the commercial titles is a factor in determining the handling of "error reporting" (i.e., whether formal PLG "error handling" is necessary). The verification and validation of commercial software products is discussed in the assessment of Checklist Item 11. PLG adequately assures that software purchased either as safety-related or commercial is capable of performing its intended function.	S
13. Verify documents such as: user manuals, theory manuals, verification manuals, programmers manuals are appropriately controlled, available to users of the software, and updated when impacted by software revisions. Appendix B/ANSI N45.2 Ref: (5,6/6,7) ASME Section III NQA-1 Supplement 6S-1 Vendor Program Ref: QA Plan, Sections 2.2.8, & 3.4	RISKMAN User Manuals are controlled and available to RISKMAN users. One of the responsibilities of the Production Code Programmer per Procedure 105, Section 1.4 is that he "[p]repares a production code user manual ... or, ... other guidelines acceptable to the client or appropriate for the code format and use. The accuracy and usefulness of the manual or guideline is verified concurrently with code verification. See checklist item 10.A.4	S
14. Describe the policies/practices that the supplier has instituted to control software viruses and prevent viruses from entering the supplier's system and, possibly, infecting customers. The process should be capable of being updated to assure new viruses will be detected.	PLG Administrative Procedures AP-33 and AP-34 discuss Virus Procedures and Virus Procedures for Software. These procedures ensure that PLG owned and operated computers (including laptops) are rebooted at least once a week, and virus software (controlled in the AUTOEXEC.BAT) is allowed to scan the boot sector and root directory of the local hard drives. Also, any diskette sent outside of PLG is scanned for viruses and verified clean by labeling and initialing the diskette. PLG Computer Operations Staff members are required to install virus information updates within 1 month of receipt on all machines. Also, writable volumes on a network server are scanned for viruses at least bimonthly.	

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY
15. Describe the suppliers controls over: • The mass duplication of codes, including labeling, revision control, media and checksums. (Are duplicated copies exact duplicates of production copy originals?) • Retirement of the software code; Does retirement of software codes include such items as information about storage location, labeling, media stability, restricted access.	Mass duplication of codes is performed from a master source copy on Bernoulli Disk to 3.5" floppy diskettes. Ordinary PC workstations are used to copy to the floppies either straight from the Bernoulli or via a subdirectory on a hard drive. For single distributions of a code, the floppy copies are tested on a PC. For mass distributions, spot checks are made on the floppy diskettes. As stated in the assessment of Checklist Item 14 above, each floppy diskette that leaves PLG is virus checked and labeled and initialed to indicate that it is clean. Duplicate copies of production copy originals are exact copies. Currently, there have been no retired production codes at PLG.

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SEC. III
SUPPLEMENTAL
CHECKLIST
FOR
SOFTWARE DEVELOPMENT

(FIGURE 4 SUPPLEMENTAL)

SOFTWARE PROGRAM (NAME. NO., REV./DATE)	PROGRAM END USE (E.G. DESIGN, PROD, CAL, ACCEPTANCE)	VERIFICATION	VALIDATION	ERROR NOTIFICATION DOCUMENT
		4,9	5,9	10
RISKMAN - Revision 6.01, dated 07/18/95.	Risk Analysis			
Problem Report #903		Hand Calculations	Hand Calculations and Test Run	Problem Report #903
Problem Report #910		Hand calculations	Hand Calculations and Test Run	Problem Report #910
Problem Report #911		Hand Calculations	Hand Calculations and Test Run	Problem Report #911
Problem Report #913		Hand Calculations	Hand Calculations and Test Run	Problem Report #913
Problem Report #914		Hand Calculations	Hand Calculations and Test Run	Problem Report #914
Problem Report #919		Hand Calculations	Hand Calculations and Test Run	Problem Report #919

* Refers to applicable question.

TEAM MEMBER: A. M. Richards/J. E. Adkins DATE: 09/13/95

SECTION IV - PROCUREMENT

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
4.1 Record the procedures/instructions and/or drawings used to verify implementation in this area. (Document O.E. on Figure 10)		
4.2 Verify that measures are established and implemented to assure that applicable requirements are included in documents for procurement of items including spare and replacement parts and services. Verify that Vendor's procurement documents, including changes, include provisions for the following, as applicable: a. Statement of the scope of work. b. Technical requirements by reference to specific drawings, codes, specifications. c. Requirement for a documented quality assurance program, implemented, and meeting applicable code/regulatory requirements. d. Requirement for right of access to plant facilities and records for source inspection/audit. e. Identification of documentation required. f. Requirement for reporting and approving disposition of nonconformances. g. Requirements for records availability, retention and disposition. h. Requirements for extending applicable requirements to lower tier suppliers. i. Applicability of 10CFR21. (Document O.E. on Figure 5) Appendix B/ANSI N45.2 Ref: (4/5) ASME Section III NQA-1 Supplement 4S-1 Vendor Program Ref: QA Plan, Section 3.2	Measures for control of procurement are addressed in Procedure 106, Procurement of Engineering Services and Computer Software, Revision 13, dated 05/31/95. These measures contain provisions for invoking the applicable requirements of items a. through i. PLG, Incorporated does not procure spare/replacement parts. No nuclear safety related orders were available for review during the audit. Interviews with PLG personnel indicated that no nuclear safety related engineering services or computer software for nuclear safety related application had been procured since the last NUPIC Audit. Two (2) purchase orders (identified on Figure 5) associated with work task for foreign utilities which are processed in a similar manner, were reviewed to verify satisfactory implementation of this activity. This review determined that PLG is adequately and effectively implementing the applicable requirements of Procedure 106 as it relates to the content of procurement documents.	S
4.3 Verify implementation of the system used to control and release procurement documents, including changes. Appendix B/ANSI N45.2 Ref: (6-7) ASME Section III NQA-1 Supplement 4S-1 Vendor Program Ref: QA Plan, Section 3.2	Procurement documents, including changes thereto are controlled and released in accordance with the requirements identified in Procedure 106, Procurement of Engineering Services and Computer Software, Revision 13, dated 05/13/95. No nuclear safety related orders were available for review during the audit. Interviews with PLG personnel indicated that no nuclear safety related engineering services or computer software for nuclear safety related application had been procured since the last NUPIC Audit. Two (2) purchase orders (identified on Figure 5) associated with work task for foreign utilities which are processed in a similar manner, were reviewed to verify satisfactory implementation of this activity. This review determined that PLG was adequately and effectively implementing the applicable requirements of Procedure 106 as it relates to the control and release of procurement documents or changes thereto.	S

TEAM MEMBER: J. E. Adkins DATE: 09/12/95

SECTION IV - PROCUREMENT

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
4.4 Verify that measures are established and implemented for the evaluation, selection and assessment of suppliers (including distributors and calibration, NDE, testing labs, heat treatment services suppliers) consistent with the importance, complexity and quality of the product or service. a. Verify evaluations are performed 1) prior to award of contract, 2) at the specified frequency, and 3) ensure only approved suppliers are used. b. Verify that the scope of approval of the sub-supplier is commensurate with the requirements of the procurement documents. (Document O.E. on Figure 5) Appendix B/ANSI N45.2 Ref: (7/8) ASME Section III NQA-1 Supplement 7S-1 Vendor Program Ref: QA Plan, Section 3.5	Procedure 106, Procurement of Engineering Services and Computer Software, Revision 13, dated 05/31/95 contains measures for meeting these requirements. No nuclear safety related orders were available for review during the audit. Interviews with PLG personnel indicated that no nuclear safety related engineering services or computer software for nuclear safety related application had been procured since the last NUPIC Audit. Two (2) purchase orders (identified on Figure 5) associated with work task for foreign utilities which are processed in a similar manner, were reviewed to verify implementation of this activity. However, this review determined that an audit of EQE International had not been conducted for PLG P.O. NB-1667, Job #1540, which has been in-process 2 - 3 months or longer. The PLG QA Program requires an audit of subcontractors work to be performed within thirty days of work start.	U VDR 95-019
4.5 Verify that measures are established and implemented to assure that purchased material, equipment and services conform to the procurement documents (i.e., receipt inspection) (Document O.E. on Figure 5) NOTE: Record M&TE observed or in use and inspection personnel on figure 5. Appendix B/ANSI N45.2 Ref: (7/8) ASME Section III NQA-1 Supplement 7S-1 Vendor Program Ref: QA Plan, Section 3.5	Measures are established in Procedure 106, which provides for acceptance by any or all of the following methods: Source slection based on onsite evaluation; Source evaluation and selection based on past performance; Technical verification of the data produced in accordance with PLG Procedures; Surveillance and/or audit of the contracted services; Review of objective evidence for conformance to PLG or subcontractor QA Program, as applicable. No nuclear safety related orders were available for review during the audit. Two (2) purchase orders (identified on Figure 5) associated with work task for foreign utilities which are processed in a similar manner, were reviewed to verify implementation of this activity. Both orders reviewed had the method of acceptance adequately identified in accordance with the above procedure. However, it should be noted that no deliverables have been provided as of the date of this audit.	S
4.6 Verify where acceptance of material from an ASME certificate holder is based on certification from Subsuppliers, that the Supplier validates the certification via surveillance, audit and/or independent tests. Appendix B/ANSI N45.2 Ref: (7/8) IE Notice 86-21 including supplements NQA-1 Supplement 7S-1 Vendor Program Ref: Not Applicable	Not applicable to PLG, Incorporated. Scope of work is for services and does not include the procurement or supply of ASME material.	N/A

TEAM MEMBER: J. E. Adkins DATE: 09/13/95

SECTION IV - PROCUREMENT
(FIGURE 5)

P.O. & DATE	SUPPLIER & LOCATION	ITEM DESCRIPTION (P/N, S/N,/ MODEL NO.)	METHOD & DATE OF SUPPLIER EVALUATION	SCOPE OF SUPPLIER APPROVAL & LIMITATIONS	ACCEPTANCE DOCUMENT	M&TE USED	INSPECTOR
*4.2	*4.2 (X.D)	*4.2	*4.4	*4.4	*4.5	*4.5	*4.5
NB-1667, dated 01/13/95, w/change order #1, dated 06/08/95, for Job #1540.	EQE International, San Francisco, CA (Corporate), work to be performed by office in Newport Beach, CA	N/A - Service, Structural Evaluation for EDF (France)	Past Perf., Work to be in accordance with PLG QA Plan, audit scheduled 09/21/95.	Work to be in accordance with PLG QA Plan, audit scheduled for 09/21/95.	Document review, and audit - task still in-process.	N/A	N/A
NB-1705, dated 03/23/95, w/change order #1, dated 08/24/95, for Job #1594.	Same as above	N/A - Service, develop seismic fragilities for NOK BEZNAU (Switzerland)	Same as above.	Same as above.	Same as above.	N/A	N/A

* Refers to applicable question.

TEAM MEMBER: J. E. Adkins DATE: 09/12/95

SECTION IX - DOCUMENT CONTROL/ADEQUACY

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
9.1 Verify that measures are established and implemented to control the issuance of documents (i.e., procedures, instructions, drawings, work orders, etc.) including changes. These measures shall assure that documents are: (Document O.E. on Figure 10) a) Reviewed for adequacy b) Approved by appropriate personnel c) Approved for release by authorized personnel d) Distributed to applicable work station, and include definitive quantitative/qualitative acceptance criteria as applicable Evidence to be obtained from Sections I-VIII & X shall be identified within this section. NOTE: Objective evidence is recorded by each auditor on Figure 10. The responsible team member completes the assessment/summary for question 9.1 based on input from auditors and/or as documented on Figure 10. Appendix B/ANSI N45.2 Ref: (5, 6/6, 7) ASME Section III NQA-1 Supplement 6S-1 Vendor Program Ref: QA Plan, Sections 3.3 & 3.4	In addition to the QA Plan, measures are established and implemented through Procedure 101, Document Control System, Revision 12, dated 05/31/95. These measures ensure that items a) through d), as applicable to PLG activities are complied with. Documents identified throughout the checklist in addition to those listed in Figure 10, were readily avaiable and verified to be the correct revision. In addition, the audit team verified by review of acknowledgements that the Encinitas, CA satellite office had received the current revision of the QA Plan and Procedures. The activities associated with Document Control were determined to be adequate and being effectively implemented.	S

TEAM MEMBER: J. E. Adkins, J. R. Harris, A. M. Richards DATE: 09/13/95

SECTION IX - PROCEDURE DATA SHEET
(FIGURE 10)

PROCEDURE/INSTR/DRWG/TITLE	REV/DATE	CORRECT REVISION (YES/NO)	CHECKLIST SECTION
Procedure 101, Document Control System	Revision 12, dated 05/31/95	Yes	I, IX, 10.G.1-.3
Project QA Startup Checklist #1609	Revision 0, dated 08/30/95	Yes	I
Project QA Startup Checklist #1604	Revision 0, dated 07/20/95	Yes	I
Project QA Startup Checklist #1593	Revision 0, dated 05/17/95	Yes	I
Project QA Startup Checklist #1598	Revision 0, dated 07/05/95	Yes	I
Project QA Startup Checklist #1523	Revision 0, dated 02/24/95	Yes	I
Project QA Startup Checklist #1525	Revision 1, dated 04/25/90	Yes	I
Procedure 106, Procurement of Engineering Services and Computer Software	Revision 13, dated 05/31/95	Yes	IV, 10.D
Project QA Startup Checklist #1594	Revision 1, dated 09/13/95	Yes	IV
Project QA Startup Checklist #1540	Revision 0, dated 02/15/95	Yes	IV
Procedure 105, Production Code Quality Assurance	Revision 15, dated 05/31/95	Yes	II, III-Sup'l, 10.A.4
Procedure 104, Independent Technical Review	Revision 14, dated 05/31/95	Yes	II, III-Sup'l
Procedure 107, Documents and Software Review, Approval, and Transmittal	Revision 14, dated 05/31/95	Yes	II, III-Sup'l, 10.A.4
AP-33, Virus Procedures	Dated 09/13/95	Yes	III-Sup'l
AP-34, Virus Procedures for Software	Dated 09/13/95	Yes	III-Sup'l
Procedure 102, Audit of and Corrective Actions for Quality Assurance	Revision 13, dated 05/31/95	Yes	10.C, 10.E, 10.F.2
Procedure 103, Personnel QA Training	Revision 4, dated 09/15/92	Yes	10.F.1
Procedure 108, Compliance with 10CFR21 and 50.55(e)	Revision 9, dated 05/31/95	Yes	10.B.3, 10.C
Quality Assurance Plan PLG-0223	Revision 23, with changes through 06/06/95	Yes	10.A.1-.3, 10.c
		*=DOCUMENT NOT VERIFIED	

TEAM MEMBER: J. E. Adkins, J. R. Harris, A. M. Richards DATE: 09/13/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION		ASSESSMENT/SUMMARY	RESULTS
10.1	Record the procedures/instructions and/or drawings used to verify implementation in this area. (Document O.E. on Figure 10)		
10.A.1	Verify that the individual/organization responsible for defining the overall effectiveness of the QA Program: a) is designated; (i.e., authority, organizational structure and responsibility is documented); b) has established a policy and authority statement; c) is independent of production pressures; d) has direct access to appropriate management levels; e) reports regularly on the effectiveness of the Program. Appendix B/ANSI N45.2 Ref: (1-3) ASME Section III NQA-1 Supplement 1S-1 Vendor Program Ref: QA Plan, Section 2.1 & 2.2	PLG identifies the make-up and responsibilities of their QA organization in the QA Plan, Sections 2.1 and 2.2, as follows: a&b) The QA Manager is responsible to the Corporate Officer for maintenance and implementation of the QA Plan and Procedures. c) The Corporate Officer shall assure that the QA and Project Managers have the authority snd independence needed to identify and resolve QA problems. d) The QA Manager shall report directly to the Corporate Officer (Vice President). e) PLG Management will perform an annual assessment of the PLG QA Program, for which they are responsible, to assure its effective implementation. The meeting will be attended, as a minimum, by the Responsible Corporate Officer and Corporate Officers or Managers in charge of Administration, Contracts, Project Management, and QA. In practice, the PLG QA Program is primarily implemented by the QA Manager, one Lead Auditor, an Auditor-in-training, and the Project Managers. Continued	S
10.A.2	Assess whether personnel performing verification activities have the authority, independence and organizational freedom to: a) Identify quality problems; b) Initiate, recommend or provide solutions to problems; c) Verify implementation of solutions; d) Control further processing of nonconformances until proper disposition has occurred. Appendix B/ANSI N45.2 Ref: (1-3) ASME Section III NQA-1 Supplement 1S-1 Vendor Program Ref: QA Plan, Sections 2.2	PLG's QA Plan, Section 2.2 assures that personnel performing verification activities have independence. The PLG Leed Auditor reports directly to the QA Manager. The Lead Auditor has the authority to identify quality problems through the Corrective Action Report (CAR) system. Quality problems identified on CARs are required to have a recommended corrective action proposed and the corrective action completion verified prior to closure. Processing of nonconforming conditions is controlled through the CAR system which assures timely completion of the proposed corrective actions - 30 days is the target for completion. PLG's program for this item is adequate and being effectively implemented.	S

TEAM MEMBER: J. R. Harris DATE: 09/12/95

CONTINUATION PAGE

10.A.1 (Continued)

These individuals revise and approve manual and procedure changes, provide independent verifications of PLG's quality-related activities and track corrective afctions to completion. All of these activities are summarized in semi-annual management meetings to assess the overall effectiveness of the PLG QA Program.
PLG's program for this item was adequate and being effectively implemented.

TEAM MEMBER: J. R. Harris

DATE: 09/12/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.A.3 Verify that the suppliers management regularly reviews, assesses and evaluates the application, status and effectiveness of the Quality Assurance Program consistent with importance to safety, reliability and performance for the items and services to which it applies. Appendix B/ANSI N45.2 Ref: (2/2) ASME Section III NQA-1 Basic Req 2 Vendor Program Ref: QA Plan, Section 2.1	PLG's QA Plan, Section 2.1 states that PLG Management will perform an assessment of the QA Program on an annual basis. PLG exceeds this requirement by performing semi-annual assessments. Reports dated 12/22/94 and 08/16/95 were reviewed during this audit. These assessments had been completed in Management Assessment Meetings which were attended by PLG Management. Topics discussed included: the QA Manual, internal audits, CARs, training, software verifications, and NUPIC audit finding response status. Additionally, project and internal audits are reviewed by the responsible Project Manager. See checklist item 11.C for more details. PLG's program for this item is adequate and being effectively implemented.	S
10.A.4 Describe the method that is used to control revisions to Vendor Technical/Maintenance Manuals, Service Advice Letters, Instruction Manual Updates and the method for transmitting those changes to their customers. Vendor Program Ref: QA Plan, Section 3	PLG's implementing Procedures 105, Section 4, and 107, Section 4.2.4, state that Computer Operations personnel shall provide validation documentation and installation instructions for every reproduction of PLG certified and non-certified source codes. PLG maintains a log identifying when letters were transmitted to customers. Reviewed transmittal logs for notifications to customers for Riskman revisions 6.0 and 6.01, sent on 02/14/95 and 07/18/95, respectively. All U.S. nuclear utilities on PLG's Riskman Technology Group list had been notified except one utility. Per PLG, this customer has chosen to continue using Riskman 5.2 at this time. PLG's program for this item was determined to be adequately implemented.	
10.A.5 Verify that measures are established and implemented for control of items returned from utility for repair/rework. (Document O.E. on Figure 11) Appendix B/ANSI N45.2 Reg. (15/16) ASME Sec. III NQ1-1 Supplement 15S.1 Vendor Program Ref: Not applicable	Not applicable to PLG, Incorporated. PLG scope of work does not include repair/rework of items.	N/A

TEAM MEMBER: J. R. Harris DATE: 09/12/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.8.1 Verify that measures are established and implemented to: a) identify nonconforming items; b) ensure that responsibility and authority for review/disposition is identified; c) controls further processing, delivery and installation of items until disposition is completed. d) notification to utility of nonconforming conditions when required by utility p.o. (Document O.E. on Figure 11) Appendix B/ANSI N45.2 Ref: (15/16) ASME Section III NQA-1 Supplement 15S-1 Vendor Program Ref: Not applicable	Not applicable to PLG. PLG is a service organization and nonconforming items are not within the scope of their activities.	N/A
10.8.2 Verify that the nonconforming items are reviewed and dispositioned such that: a) The disposition is identified and adequate b) Documented justification is provided verifying the acceptability of the nonconforming items which are dispositioned repair or use-as-is c) The as built records shall reflect the accepted deviation d) Procedures or instructions for repair and rework are provided e) Repaired & reworked items are reinspected f) Closeout is adequate (Document O.E. on Figure 11) Appendix B/ANSI N45.2 Ref: (15/16) ASME Section III NQA-1 Supplement 15S-1 (para 4.1) Vendor Program Ref: Not applicable	Not applicable to PLG. See checklist Item 10.8.1 above.	N/A

TEAM MEMBER: J. R. Harris DATE: 09/12/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.B.3 10CFR21 a) Are appropriate documents posted? b) Is there a mechanism to determine if a Part 21 condition exists? c) Is there a mechanism to provide for notification to the NRC or affected utilities? Regulatory Reference: 10CFR21.6 Vendor Program Ref: QA Plan, Section 4	a) PLG's Procedure 108 addresses 10CFR21, 10CFR50, and Section 206. This procedure is posted in the PLG lunch room. However, the copy posted was revision 8 when revision 9 had been issued on 05/31/95. This situation was immediately rectified by PLG with no further action deemed necessary. b) Sections 4 and 5 of Procedure 108 identify the reporting requirements and the responsible PLG officer. Section 4 also provides guidance in making the determination if a Part 21 condition exist. c) Section 6 of Procedure 108 states that the PLG officer shall advise the client within 5 days of notice of a potential defect or deficiency. Notification shall be made to the NRC within 2 days with a written follow-up notification within 30 days. PLG has not had any 10CFR21 reportable incidents for the period since the 1993 NUPIC audit. PLG's program is adequate for this checklist item.	
10.C Verify that measures are established and implemented to ensure a comprehensive system of planned and periodic internal audits. Verify that the participants have no direct responsibility in the areas audited. Verify that checklists were used with objective evidence documented, that audit results were documented and reviewed by management having responsibility in the area audited and that follow-up action is taken where needed. (Document O.E. on Figure 12) Appendix B/ANSI N45.2 Ref: (18/19) ASME Section III NQA-1 Supplement 18S-1 Vendor Program Ref: QA Plan, Section 7	PLG has established measures to ensure that a comprehensive system of planned and periodic internal audits are performed in their QA Plan, Section 7 and Procedure 102. See Figure 12 for PLG audits reviewed during this portion of the audit. All audits reviewed had been performed by QA auditors that were independent of the activities being audited. Audits of the QA group were performed by auditors appointed from outside the QA organization. Generic checklist are established in Procedure 102 and define the attributes to be evaluated for each type of internal audit. All internal audits reviewed contained completed checklist with sufficient objective evidence documented. Typically, copies of logs, start-up checklist, training records, etc., which had been covered by the audit were attached to the audit report. Continued	S
10.D Verify that measures are established and implemented to ensure a comprehensive system of planned and periodic external audits. Verify that checklists were used with objective evidence documented and that follow-up action is taken where needed. See Figure 5 for suppliers. (Document O.E. on Figure 12) Appendix B/ANSI N45.2 Ref: (18/19) ASME Section III NQA-1 Supplement 18S-1 Vendor Program Ref: QA Plan, Sections 3.5 & 7	PLG's Procedure 106 is written to address internal and external audits associated with subsupplier qualifications. However, per PLG's QA Manager, PLG has not performed any external audits for the period since the 1993 NUPIC audit. A deficiency was identified in this area and is described in checklist item 4.4.	U VDR 95-019

TEAM MEMBER: J. R. Harris DATE: 09/13/95

CONTINUATION PAGE

10.C (Continued)

Audit reports had been reviewed by responsible management in the area being audited. The audit reports were signed by the Lead Auditor, the Project Manager, and the QA Manager. PLG had noted items which required follow-up in CARs. Examples of audits requiring follow-up included:

9052-QAR-68 which issued CAR 9052-CAR-32. This CAR was closed 02/10/95.
9052-QAR-71 which issued CAR 9052-CAR-33. This CAR was closed 08/10/95.

Aslo see checklist item 10.A.3 which describes the semi-annual management assessment process utilized by PLG. This process provides a timely effectiveness evaluation of PLG's QA Program.

Audit schedules are tracked on a quarterly QA Audit Record. This document identifies the project internal audits that have been performed and/or scheduled. The report also notes the assigned auditor, the audit dates, the date the checklist was approved, and the status of any associated CARs. PLG's program for this item is adequate and being effectively implemented.

TEAM MEMBER: J. R. Harris DATE: 09/12/95

SECTION X - PROGRAM COMPLIANCE

	METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.E	Verify that measures are established and implemented to assure that conditions adverse to quality are promptly identified and corrected. These measures shall include as a minimum: (Document O.E. on Figure 11) a) Identification and description of the condition adverse to quality; b) Determination of the cause and actions taken to prevent recurrence for significant conditions adverse to quality. c) Review and approval by responsible authority on the adequacy of the corrective action; d) Follow-up action for closeout to verify that the corrective action has taken place or is scheduled. Appendix B/ANSI N45.2 Ref: (16/17) ASME Section III NQA-1 Basic Requirement 16 Vendor Program Ref: QA Plan, Section 5	PLG has established measures for the prompt identification and correction of problems in Procedure 102. Conditions adverse to quality including audit deficiencies are required to be identified on a Corrective Action Report (CAR). Corrective actions developed in response to CARs are required to be implemented within 30 days and require QA verification prior to closure. a) CARs are required to provide a description of the condition adverse to quality. b) CARs list the cause for the deficiency. c) CARs are reviewed and signed off by the person who completed the corrective actions, the QA Lead Auditor, the Project Manager, the QA Manager, and a Corporate Officer. d) QA verifies corrective actions are complete before the CAR is closed. PLG's program for this item is adequate and being effectively implemented.	S
10.F.1	Verify that measures are established and implemented for indoctrination and training of personnel who perform activities affecting quality. NOTE: Evidence to be obtained from Sections II and IV through VIII Appendix B/ANSI N45.2 Ref: (2/2) ASME Section III NQA-1 Supplement 2S-4 Vendor Program Ref: QA Plan, Section 3.6	PLG's Procedure 103 states that new employees shall be trained in the PLG QA Plan and procedures within 1 month of date of hire. Contrary to this requirement two PLG employees at the Bethesda, MD facility had not completed training as required. Four other Bethesda employees had received training but had not achieved a passing score on the indoctrination quiz within the thirty day period. (Note: this information was taken from PLG's QA Training Record dated 09/08/95.)	U VDR 95-020
10.F.2	Verify that inspection/test personnel, auditors, NDE, Welding and similar specialists (i.e., ASME Code work design personnel to ASME/ANSI N626.3) are qualified and have certifications, as applicable, on file in accordance with industry and/or supplier program requirements. (Document O.E. on Figures 13, 14) NOTE: Evidence to be obtained from Sections II, IV, VI, VII and X Appendix B/ANSI N45.2 Ref: (2, 9, 10, 11, 18/2, 10, 11, 12, 19) NQA-1 Supplement 2S-1, 2S-2, 2S-3 ASME Section III Vendor Program Ref: QA Plan, Sections 3.6 & 7	PLG Procedure 102, Section 3 states that the QA Manager shall assign personnel who are not involved in the project being audited and who are qualified to the intent of ANSI N45.2.23 (1978) and ANSI/ASME NQA-1-1989. The audit personnel shall report to the QA Manager for purposes of the audit. At the present time, PLG only has one certified Lead Auditor and one active Auditor-In-Training. See Figure 13 for specifics. PLG does not perform any testing or special processes and therefore does not have any other certified work classifications. PLG's program for this item is adequate and being effectively implemented.	S

TEAM MEMBER: J. R. Harris DATE: 09/13/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.G.1 Verify that measures are established and implemented to assure that records not transferred to the utility are maintained in facilities that provide storage, retention requirements and protection against environmental effects, damage and loss including, as a minimum: a) Inspection and test records; b) Audit reports; c) Quality related procedures/instructions/drawings; d) Qualifications and certifications; e) Material Analysis records; f) Certifications of Compliance/Conformance; g) Laboratory/Engineering/Manufacturing Operating Logs. h) Calibration Records i) Nonconformance Documents Appendix B/ANSI N45.2 Ref: (17/18) ASME Section III NQA-1 Supplement 17S-1 Vendor Program Ref: QA Plan, Section 6	PLG's controls for QA records are established in Procedure 101. This procedure provides guidance for indexing, filing, storage, retention, distribution, and maintenance and distribution of project records and deliverables. Other QA records such as TRRs, DRRs, CARs, OARs and deliverables are also specified to be stored in project files. Records not submitted to the customer are shipped to offsite storage after they become inactive. PLG's storage may be terminated after one year or the client may request the records for storage at the clients facility. All records reviewed during the audit were stored in metal file cabinets for protection. PLG maintains files for record types b, c, d, and i from the list associated with this checklist item. The other record types are not applicable to PLG. Records reviewed during this phase of the audit included the items identified in Figures 11, 12, 13 and Project Files for project 1590 and 1593 (HL&P) and 1280 and 1523 for Southern Nuclear (Hatch and Vogtle respectively). PLG's program for this item is adequate and being effectively implemented.	S

TEAM MEMBER: J. R. Harris DATE: 09/13/95

SECTION X - PROGRAM COMPLIANCE

METHOD OF VERIFICATION	ASSESSMENT/SUMMARY	RESULTS
10.G.2 Verify that records are legible, identifiable, and retrievable. For minor changes, verify that those which do not require the same review and approval and the persons who can authorize such a decision are clearly delineated. Appendix B/ANSI N45.2 Ref: (17/18) ASME Section III NQA-1 Supplement 17S-1, 6S-1 Vendor Program Ref: QA Plan, Section 6	Records reviewed during the audit were found to be legible, identifiable, and retrievable. PLG does not have a program to control minor changes to documents but records did not appear to have been inappropriately altered. PLG's control of records appears to be adequate and effectively controlled.	S
10.G.3 Verify that vendor record packages are consistent with contract/P.O. requirements and adequately document the "as-built" of the item or component. NOTE: These records should include material certification and test data for traceability and quality verification; reports of inspections, examinations, and test results for conformance verification; drawings, specifications, procedures, and instructions for use in control of configuration; and records of nonconformances and their resolution. Appendix B/ANSI N45.2 Ref: (17/18) ASME Section III Vendor Program Ref: QA Plan, Section 6	See checklist item 10.G.1 for the record types and records reviewed during this phase of the audit. The significant records associated with PLG's activities are delivered to the client as a final report which the customer reviews for acceptance. Software products are verified and validated by PLG and checked by the customer. PLG's program for this item is adequate and being effectively implemented.	S
10.G.4 Verify that measures are established and implemented to assure Certificates of Compliance/Conformance are only issued by authorized supplier personnel. Appendix B/ANSI N45.2 Ref: (6/7) NQA-1/Supp 7S-1 ASME Section III Vendor Program Ref: QA Plan, Section 6	PLG does not routinely provide certificates of calibration/conformance for the services they provide. However, it was noted that one utility (HL&P) had requested a certificate of conformance, which had not been provided and no exception was taken by PLG to the contract requirements. PLG issued the requested certification to HL&P during the audit and indicated they would continue to do so when requested in the procurement document. See checklist item 1.2 for specifics. The audit team determined that no further action was necessary.	S

TEAM MEMBER: J. R. Harris DATE: 09/13/95

SECTION X - PROGRAM COMPLIANCE

(FIGURE 11 NCR/CAR)

ITEM ID/DESCRIPTION	NCR/ CAR NUMBER	DATE INITIATED	DISCREPANT CONDITION	DISPOSITION	REINSPECTION/ VERIFICATION	FOR USE-AS-IS-OR REPAIR-CUSTOMER NOTIFIED?	CLOSURE DATE
*10.B, 10.E 10.A.5	*10.B, 10.E 10.A.5	*10.B & 10.E 10.A.5	*10.B, 10.E 10.A.5	*10.B, 10.E 10.A.5	*10.B.2 10.E	*10.B 10.A.5	*10.B, 10.E 10.A.5
Transmittals	1518-CAR-1	10/17/94	Transmittals not logged	Logged items and revised applicable procedure.	12/01/94	N/A	12/09/94
Technical Review Reports	1418-CAR-4	07/07/94	Missing documents	Copies were located and applicable procedure was revised.	09/06/94	N/A	09/12/94
Technical Review Reports	1280-CAR-1	09/03/93	Incomplete or missing documents	Documents were located and/or completed.	04/14/94	N/A	04/14/94
Documentation of Riskman 6.0 and 6.01	9052-CAR-34	08/11/95	Lack of complete documentation	Open	Scheduled for 10/05/95	N/A	Open
Configuration control of in-house PC stations	9052-CAR-35	08/11/95	Lack of documentation	Open	Scheduled for 09/30/95	N/A	Open
Training Records	9052-CAR-32	09/22/94	Training classes had not been completed within frequency	Completed training	02/09/95	N/A	02/10/95
SQA Training Records	9052-CAR-33	05/23/95	Unable to locate training records	Located records and revised applicable procedures.	07/21/95	N/A	08/10/95

* Refers to applicable question.

TEAM MEMBER: J. R. Harris DATE: 09/13/95

SECTION X - PROGRAM COMPLIANCE

(FIGURE 12 AUDITS/SURVEILLANCES)

REPORT ID #	PERFORMANCE DATE	SCOPE	INTERNAL EXTERNAL/ (I/E)	ITEMS CONSIDERED AND SUPPLIER PROCESSES EVALUATED (SPECIFY)	AUDITING ORGANIZATION TEAM MEMBERS	NUMBER OF DEFICIENCIES (OPEN/CLOSED)	CORRECTIVE ACTION VERIFICATION METHOD & DATE
*10.C, 10.D	*10.C, 10.D	*10.C, 10.D	*10.C, 10.D	*10.C, 10.D	*10.C, 10.D	*10.C, 10.D	*10.C, 10.D
1590-QAR-2	08/22/95	Project Review-Diesel Generator AOT Review	I	Procedure 101 Implementation	B. Shimizu	None	N/A
1593-QAR-3	08/22/95	Project Review-Revise Base Model for Electric Power Recovery Update	I	Procedure 101 Implementation	B. Shimizu	None	N/A
9052-QAR-68	09/22/94	Personnel Indoctrination	I	Procedure 103 Implementation	B. Shimizu	One-Closed	Document Review 02/10/95
9052-QAR-71	05/23/95	Computer Operations	I	Procedure 105 Implementation	B. Shimizu	One-Closed	Document Review 08/10/95
9052-QAR-70	12/07/94	Document Control	I	Procedure 107 Implementation	B. Shimizu	None	N/A
9052-QAR-72	01/24/95	10CFR21 Posting	I	Procedure 108 Implementation	B. Shimizu	None	N/A
9052-QAR-69	05/19/94	Quality Assurance Sys.	I	Procedure 102 Implementation	B. Shimizu and T. Fenstemacher	None	N/A
		The above audits were noted on the PLG 1995 QA Audits Record (reviewed 09/07/95) by the PLG QA Manager.					

* Refers to applicable question.

TEAM MEMBER: J. R. Harris DATE: 09/12/95

SECTION X - PROGRAM COMPLIANCE

(FIGURE 13 AUDIT/INSPECTION/NDE PERSONNEL)

NAME/STAMP *10.F.2	QUALIFICATION/CERTIFICATION CERT TYPE AND LEVEL *10.F.2	EYE EXAM DATES *10.F.2
Ben Shimizu - Lead Auditor (presentiv the only qualified Lead Auditor at PLG)	N45.2.23 Lead Auditor. Original Qualification at PLG was 11/11/86. Annual Evaluations have been performed on approximately 12 months intervals. The last two evaluations were on 07/07/94 and 07/05/95.	Not Required
T. E. Fenstermacher - Lead Auditor at the time he performed assessment of QA in 9052-QAR-69.	N45.2.23 Lead Auditor. Original qualification at PLG was 07/06/87. Annual evaluations completed through 07/07/94.	Not Required
W. L Albertson - Auditor-in-training.	Completed PLG training & auditors examination On 07/20/95. Presently working on required audits to become a Lead Auditor.	Not Required

* Refers to applicable question.

TEAM MEMBER: J. R. Harris DATE: 09/11/95

SECTION X - PROGRAM COMPLIANCE

(FIGURE 14 WELDER/WELD OPERATOR)

NAME/STAMP *10.F.2	CERT TYPE (PROCESS & POSITIONS) *10.F.2	CODE QUALIFIED TO *10.F.2	WPS PROCEDURES AND REV/DATE *10.F.2	MAINTENANCE OF QUALIFICATION *10.F.2
Not applicable. PLG does not perform welding.				

* Refers to applicable question.

TEAM MEMBER: J. R. Harris DATE: 09/11/95

SUPPLIER QUALITY PROGRAM
AUDIT CHECKLIST
ANSI N45.2.12 AND ANSI N45.2.23 SUPPLEMENT
(Regulatory Guides 1.44, R79 and 1.146, R80)

AUDIT ITEM NO.	QUALITY ELEMENT & SUPPLIER QUALITY PROGRAM REFERENCES	QUALITY REQUIREMENTS AND AUDIT GUIDELINES	RESULTS* S,X,N/A	SUMMARY OF INVESTIGATION
		Instructions: A. Complete attributes X.10.C, X.10.D of the NUPIC Audit Checklist. B. Complete the following items: AUDIT IMPLEMENTATION (Document O.E. on Figure 1)		
1.0 1.1	Preparation Ref. Procedure 102 QA Plan 7	Verify an individual audit plan describing the audit to be performed is developed and documented by the auditing organization. This plan shall identify the audit scope, the requirements, the activities to be audited, organizations to be notified, the applicable documents, the schedule, and written procedures or checklists.	S	Audit plans are an integral part of the audit report and notes the audit subject, persons to be notified, auditor, and date of notification. This plan is approved by the QA Manager and is attached to the checklist for the audit.
1.2	Reporting Ref. Procedure 102 QA Plan 7	Verify that an audit report, which is signed by the audit team leader, provides for the following: (1) Description of the audit scope. (2) Identification of the auditors. (3) Persons contacted during audit activities. (4) A summary of audit results, including an evaluation statement regarding the effectiveness of the quality assurance program elements which were audited.	S	Reviewed audits noted in Figure 12 and verified that items 1 through 4 had been addressed. No statements are made that the attributes were satisfactory, but deficient areas are noted for followup and CARs are written. Auditor Signature J. R. Harris Date 09/13/95

* S = SATISFACTORY X = UNSATISFACTORY N/A = NOT APPLICABLE

SA-031SUPPLIER PLG, Incorporated
REV. 04/17/95
AUDIT NO. 95-073 (VA)

SUPPLIER QUALITY PROGRAM
AUDIT CHECKLIST
ANSI N45.2.12 AND ANSI N45.2.23 SUPPLEMENT
(Regulatory Guides 1.44, R79 and 1.146, R80)

AUDIT ITEM NO.	QUALITY ELEMENT & SUPPLIER QUALITY PROGRAM REFERENCES	QUALITY REQUIREMENTS AND AUDIT GUIDELINES	RESULTS* S,X,N/A	SUMMARY OF INVESTIGATION
1.2	Reporting (Cont.)	(5) Description of each quality assurance program deficiency in sufficient detail to assure that corrective action can be effectively implemented by the audited organization.	S	Findings are identified in CARs for followup of corrective actions.
		(6) Recommendations for correcting program deficiencies or improving the quality assurance program as appropriate.	S	Corrective actions ar verified by QA and approved by PLG management. CARs including corrective action recommendations, are reviewed during PLG semi-annual assessments on the status of the PLG QA Program.
2.0	Lead Auditor Qualifications	PERSONNEL (Document O.E. on Figure 1)		
2.1	Ref. Procedure 102 QA Plan 7	Verify that the prospective Lead Auditor has verifiable evidence that a minimum of ten (10) credits under the scoring system established in Section 2.3.1 of ANSI N45.2.23.	S	B. Shimizu and T. Fenstermacher had 10 credits on N45.2.23 certification records. See Figure 13.
2.2		Verify that the Lead Auditor's capability to communicate effectively, both written and oral, is attested to in writing by the Lead Auditor's employer.	S	Both Lead Auditors had also been documented as having adequate communication skills; had completed a minimum of five audits within 3 years prior to qualification. Both Lead Auditors had been certified after passing the PLG audit exam.
2.3		Verify the Lead Auditor has participated in a minimum of five (5) quality assurance audits within a period of time not to exceed three (3) years prior to the date of qualification, one audit of which shall be a nuclear quality assurance audit within the year prior to his qualification.	S	
2.4		Verify the Lead Auditor has passed an examination which evaluates his knowledge and understanding of ANSI N45.2, ANSI N45.2.12, general structure of quality assurance programs, and audit planning and performance techniques. The test may be oral, written, practical, or any combination of the three types.	S	

Auditor Signature J. R. Harris Date 09/13/95

* S = SATISFACTORY X = UNSATISFACTORY N/A = NOT APPLICABLE

SUPPLIER QUALITY PROGRAM
AUDIT CHECKLIST
ANSI N45.2.12 AND ANSI N45.2.23 SUPPLEMENT
(Regulatory Guides 1.44, R79 and 1.146, R80)

AUDIT ITEM NO.	QUALITY ELEMENT & SUPPLIER QUALITY PROGRAM REFERENCES	QUALITY REQUIREMENTS AND AUDIT GUIDELINES	RESULTS* S,X,N/A	SUMMARY OF INVESTIGATION
2.5	Lead Auditor Qualifications (Cont.)	Verify copies of the objective evidence regarding the type(s) and content of the examination(s) are retained by the employer.	S	Exams for Shimizu and Fenstermacher are attached to their certifications.
2.6		Verify that documented management assessments are performed annually to evaluate the proficiency of Lead Auditors. Management may extend the qualification, require retraining, or require requalification.	S	Annual evaluations had been completed on the Lead Auditors as noted in Figure 13.
2.7		Verify each Lead Auditor is certified by his employer as being qualified to lead audits. This certification shall, as a minimum, document the following: (1) Employer's name. (2) Lead Auditor's name. (3) Date of certification or recertification. (4) Basis for qualification (i.e., education, experience, communication skills, training, examination, etc.) (5) Signature of employers' designated representative who is responsible for such certification.	S	Verified Lead Auditor certifications for Shimizu and Fenstermacher had addressed items 1 - 5 as follows: 1) Pickard, Lowe, and Garrick, Inc. 2) Ben Shimizu T. E. Fenstermacher 3) 11/11/86; 07/06/87, respectively. 4) 17 credits; 11 credits – combination of education and experience. 5) Both certifications signed by W. C. Gekler, QA Manager and B. J. Garrick, President. Auditor Signature J. R. Harris Date 09/13/95

* S = SATISFACTORY X = UNSATISFACTORY N/A = NOT APPLICABLE

SUPPLIER QUALITY PROGRAM
AUDIT CHECKLIST

ANSI N45.2.12 AND ANSI N45.2.23 SUPPLEMENT
(Regulatory Guides 1.144, R79 and 1.146, R80)

FIGURE 1

AUDIT REPORT ID NUMBER *1.0	AUDIT PLAN *1.1	AUDIT REPORT *1.2	LEAD AUDITORS *2.0	LEAD AUDITOR INITIAL QUAL/CERT *2.1, 2.2, 2.7	LEAD AUDITOR AUDIT PARTICIPATION *2.3	LEAD AUDITOR EXAMINATION *2.4, 2.5	MANAGEMENT EVALUATION *2.6
1590-QAR-2	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
1593-QAR-3	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
9052-QAR-68	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
9052-QAR-71	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
9052-QAR-70	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
9052-QAR-72	Yes	Yes	B. Shimizu	Yes	Yes	Yes	Yes
9052-QAR-69	Yes	Yes	B. Shimizu & T. Fenstermacher	Yes	Yes	Yes	Yes

* Refers to applicable question.

AUDITOR SIGNATURE J. R. Harris DATE 09/12/95

Revision
Date: 01-24-95

Supplier: PLG, Incorporated
Audit No: 95-073 (VA)

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
1. Determine if a separate software quality function has been established. If not, determine if the established programs are written such that software quality requirements are adequately addressed. If not, verify plans are being developed to address software concerns. Review the appropriateness of the organization which legitimizes the Software Quality Program.	10 CFR 50, Appendix B, Section I NQA-1, Section 1 ANSI N45.2.11 - 1974, 5.1.1	Implementing Procedures	S	III
2. Verify that verification results are reviewed, approved, documented; exceptions are adequately documented and reviewed by the original design group.	10 CFR 50, Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1	Implementing Procedures	S	II, III
3. Review the change control process employed by the Software Quality Program and verify that changes made to specifications and source code receive the same reviews, justification, approvals, and documentation required of the original design.	10 CFR 50 Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1	Implementing Procedures	S	II, III

Technical Specialist — 10/2/95 Date

Audit Team Leader — 10-2-95 Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
4. Verify procedures or instructions have been prepared to control and document the development of software systems in the following areas , as applicable: a. Software QA Plan b.Requirements Specification c. Design Specification d.Verification/Validation Plans e. User Documentation f. Standards Manual g.Product Release Procedures h.Installation Manual i. Training Manual j. Operations Manual k.Project file	N45.2.11 - 1974, Section 4.5. 10 CFR 50, Appendix B, Section V NQA-1-1989, Section 5 NQA-2a, Part 2.7	Implementing Procedures	S	III

Technical Specialist — 10/2/95 Date — Audit Team Leader — 10-2-95 Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
5. Verify measures are established to assure purchased software products or services conform to procurement documents.	10 CFR 50, Appendix B, Section VII NQA-1-1989, Section 7 NQA-2a-1990, Part 2.7, Sections 10.1, 3	Implementing Procedures	S	IV
6. Verify that there exists documented evidence that purchased software conforms to procurement documents.	10 CFR 50, Appendix B, Section VII	Implementing Procedures	Not Verified	III, IV
7. Verify that the monitoring of software contractors includes making sure the contractor has defined software quality program and that it is being properly implemented.	NUREG 4640, Sections 11.1, 2	Implementing Procedures Measures are in place to control items 6 & 7. However, PLG has not procured any software from software contractors for safety related application since the last NUPIC audit. Therefore, implementation could not be verified.	Not Verified	III, IV

Technical Specialist — 10/2/95 Date

Audit Team Leader — 10-2-95 Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
8. Verify that processes are established to manage and control changes to software, associated hardware, and documentation including: a. documentation of problems. b. notification of problems to affected individuals/ organizations c. evaluation of problems for potential impact on work already performed. d. correction of problems. e. retest of software or changes	NQA-2a 1990, Part 2.7	Implementing Procedures	S	II, III

Technical Specialist — 10/2/95 Date

Audit Team Leader — 10-2-95 Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
9. Verify that problems found during Verification and Validation activities are resolved (i.e., V&V is taken as a serious activity).	NQA-2a-1990, Part 2.7	Implementing Procedures	S	III

Technical Specialist — 10/2/95 Date

Audit Team Leader — 10-2-95 Date

The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

July 31 , 1995

Mr. William C. Gekler
Quality Assurance Manager
PLG, Incorporated
4590 McCarthur Blvd, Suite 400
Newport Beach, CA 92660-2027

Subject: Houston Lighting & Power Audit of PLG, Inc.
Newport Beach, CA - Audit Number 95-073 (VA)

Dear Mr. Gekler:

This is to confirm the arrangements made with you for Houston Lighting & Power Company (HL&P) to conduct an audit at your facility in Newport Beach, CA the week of September 11-14, 1995. The audit will be performed as a joint utility audit under the auspices of the Nuclear Procurement Issues Committee (NUPIC) Joint Audit Program. Attached for your information is the audit scope and a copy of the NUPIC Audit Program Description.

Participating in the audit will be Mr. C. D. Wright, Audit Team Leader (HL&P), Mr. R. A. Carvelle, Audit Team Member (Pacific Gas & Electric Company), Ms. M. G. Toole, Audit Team Member (HL&P) and Mr. C. R. Grantom, Technical Specialist (HL&P). Please plan for a brief entrance meeting to begin at 9:00 am on Monday, September 11, 1995 to discuss audit details, objectives and schedule.

You may reach Mr. Wright at (512) 972-7247 should there be any questions concerning this audit.

Sincerely,

R. J. Rehkugler for
R. J. Rehkugler
Director, Quality

CDW/kmw
Attachment

c: T. H. Cloninger N5009
L. E. Martin N5005
R. D. Martin N5014
R. J. Tennant N4003
G. C. Sandlin N3001
N. O. Laughlin N5010
C. R. Grantom N4011
NUPIC Membership

Mr. Bob Carvelle
Quality Assurance Department
Pacific Gas & Electric Company
P. O. Box 770000
San Francisco, CA 94177

Audit File 95-073 (VA)
Vendor History File

Project Manager on Behalf of the Participants in the South Texas Project

AD95-073.VA1

AUDIT SCOPE

AUDIT NUMBER 95-073 (VA)

ORGANIZATION:

PLG, Incorporated
4590 McCarthur Blvd., Suite 400
Newport Beach, CA 92660-2027

PURPOSE/SCOPE:

Evaluate the adequacy and verify effective implementation of the PLG, Inc. Quality Assurance Program for compliance with 10CFR50, Appendix B, as it relates .o a supplier of Engineering Services (Plant Risk Model Development).

APPLICABLE DOCUMENTS:

PLG, Incorporated Quality Assurance Manual, Revision 21, with changes through December 12, 1994.

REFERENCE DOCUMENTS:

NUPIC Checklist Revision, 6, dated March 26, 1995

NUPIC Supplemental Checklist for Software Development, Revision 0

Chet Wright 7-26-95 R H Stone 7/26/95

Prepared By Date Approved By Date

The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

July 6, 1995

To: NUPIC Membership

Subject: Houston Lighting & Power (HL&P) Audit of PLG, Inc.
Newport Beach, CA - Audit Number 95-073 (VA)

Dear Member:

HL&P is scheduled to lead the Nuclear Procurement Issues Committee (NUPIC) audit of PLG, Incorporated supported by Pacific Gas & Electric Company. The audit is scheduled for September 11-14, 1995.

This letter is to serve as ninety (90) day notification to all NUPIC Members. Please submit supplier history/concerns, critical characteristics and procurement documents (with suppliers location referenced), by August 7, 1995.

Please submit your response, to the audit team leader:

Mr. C. D. Wright
Houston Lighting & Power
P. O. Box 289 Mail Code N4006
Wadsworth, TX 77483

Should you have a question concerning the audit, please contact C. D. Wright at (512) 972-7247.

Sincerely,

J. E. Adkins
NUPIC Representative

CDW/kmw
Attachment

Supplier: PLG Inc.
Audit No: _____

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION I: ORGANIZATION				
1. Determine if a separate software quality function has been established. If not, determine if the established programs are written such that software quality requirements are adequately addressed. If not, verify plans are being developed to address software concerns. Review the appropriateness of the organization which legitimizes the Software Quality Program.	10 CFR 50, Appendix B, Section I NQA-1, Section 1 ANSI N45.2.11 - 1974, 5.1.1			
CHECKLIST SECTION II: DESIGN CONTROL				
2. Verify that verification results are reviewed, approved, documented; exceptions are adequately documented and reviewed by the original design group.	10 CFR 50, Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1			
3. Review the change control process employed by the Software Quality Program and verify that changes made to specifications and source code receive the same reviews, justification, approvals, and documentation required of the original design.	10 CFR 50 Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1			

S. S. Takhar — Technical Specialist
7.10.95 — Date
_____ — Audit Team Leader
_____ — Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION IIi: INSTRUCTIONS, PROCEDURE, AND DRAWINGS 1. Verify procedures or instructions have been prepared to control and document the development of software systems in the following areas , as applicable: a. Software QA Plan b. Requirements Specification c. Design Specification d. Verification/Validation Plans e. User Documentation f. Standards Manual g. Product Release Procedures h. Installation Manual i. Training Manual j. Operations Manual k. Project file	N45.2.11 - 1974, Section 4.5. 10 CFR 50, Appendix B, Section V NQA-1-1989, Section 5 NQA-2a, Part 2.7			

S S. Takar — Technical Specialist
7.10.95 — Date
Audit Team Leader
Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION IV: CONTROL OF PURCHASED ITEMS				
1. Verify measures are established to assure purchased software products or services conform to procurement documents.	10 CFR 50, Appendix B, Section VII NQA-1-1989, Section 7 NQA-2a-1990, Part 2.7, Sections 10.1, 3			
2. Verify that there exists documented evidence that purchased software conforms to procurement documents.	10 CFR 50, Appendix B, Section VII			
3. Verify that the monitoring of software contractors includes making sure the contractor has defined software quality program and that it is being properly implemented.	NUREG 4640, Sections 11.1, 2			

S. S. Tehrani — Technical Specialist
7-10-95 — Date
Audit Team Leader
Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION V: CONFIGURATION MANAGEMENT (IDENTIFICATION, CONTROL, AND STATUS) 1. Verify that processes are established to manage and control changes to software, associated hardware, and documentation including: a. documentation of problems. b. notification of problems to affected individuals/ organizations c. evaluation of problems for potential impact on work already performed. d. correction of problems. e. retest of software are changes	NQA-2a 1990, Part 2.7			

S.S. Tehan — Technical Specialist
7-10-95 — Date
Audit Team Leader
Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION VI: VERIFICATION AND VALIDATION (INSPECTION, TEST, AND CONTROL) 1. Verify that problems found during Verification and Validation activities are resolved (i.e., V&V is taken as a serious activity).	NQA-2a-1990, Part 2.7			

S.S. Tehrani — Technical Specialist
7-10-95 — Date
Audit Team Leader
Date

NUPIC COMPLIANCE COMMITTEE PROCEDURE
ATTACHMENT 1

Audit Lead Review Checklist

Supplier: PLG, INCORPORATED Audit Date: 9/11-14/95 Lead: HLP

Attribute	Sat (S)	Unsat (U)
1. Use of current, approved Checklist.	✓	
2. Adequate Lead Auditor certifications and Technical Specialist qualifications.	✓	
3. NUPIC Representative-approved Audit Plan which references the NUPIC Checklist.	✓	
4. Notification to members for input 90 days in advance of the audit to include completed preliminary PBSA Worksheet and notification to suppliers and members 30 days in advance which includes the Audit Plan, the schedule and the Joint Audit Program Description. *		✓
5. Report identifies the supplier scope of supply and applicability of program for safety related and commercial grade item procurement. PLG DOES NOT PROCURE CGIs	✓	
6. Report addresses unique order entry requirements for safety related procurements.	✓	
7. Report provides an assessment of QA Program effectiveness including nonconformance significance.	✓	
8. Report includes an assessment of corrective action from the previous NUPIC audit.	✓	
9. Report addresses status of activities in response to NRC information.	✓	
10. Report includes contacts at entrance, exit and during the audit.	✓	
11. Report includes summary of Technical Specialist evaluation.	✓	
12. Issuance of the report within 30 days.	✓	
13. Corrective action response requested for findings within 30 days.	✓	
14. Package includes Audit Report, the Checklist, 2 Summary Sheets, completed PBSA Worksheets, findings, personnel certification/qualification, and transmittal letter to supplier.	✓	
15. Results column of Checklist marked Sat, Unsat or Not Applicable.	✓	
16. All areas of Checklist including Vendor Program Reference, Assessment Summary and Data Sheets completed or marked Not Applicable with adequate explanation.	✓	
17. Corrections/revisions to the Checklist initialled and dated.	✓	
18. Supplemental pages properly identified and paginated.	✓	
19. Summary Sheet signed by Audit Team Leader and NUPIC Representative or designee.	✓	
20. Legibility and reproduceability of audit package.	✓	
21. Copy of Audit/Survey Feedback Questionnaire left with supplier.	✓	
22. NUPIC supplier database updated.	✓	
23. Completed Audit Frequency Assessment Form sent to Information Services Working Group Chairperson.	✓	
24. Audit Status: (Open) Closed		

Lead Review: 90 DAY NOTIFICATION MISSED DUE TO SCHEDULING AROUND HLP REFUELING OUTAGE.

Reviewed by NUPIC Representative: JE Addison Date: 10-5-95

The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

July 31 , 1995

Mr. William C. Gekler
Quality Assurance Manager
PLG, Incorporated
4590 McCarthur Blvd, Suite 400
Newport Beach, CA 92660-2027

Subject: Houston Lighting & Power Audit of PLG, Inc.
Newport Beach, CA - Audit Number 95-073 (VA)

Dear Mr. Gekler:

This is to confirm the arrangements made with you for Houston Lighting & Power Company (HL&P) to conduct an audit at your facility in Newport Beach, CA the week of September 11-14, 1995. The audit will be performed as a joint utility audit under the auspices of the Nuclear Procurement Issues Committee (NUPIC) Joint Audit Program. Attached for your information is the audit scope and a copy of the NUPIC Audit Program Description.

Participating in the audit will be Mr. C. D. Wright, Audit Team Leader (HL&P), Mr. R. A. Carvelle, Audit Team Member (Pacific Gas & Electric Company), Ms. M. G. Toole, Audit Team Member (HL&P) and Mr. C. R. Grantom, Technical Specialist (HL&P). Please plan for a brief entrance meeting to begin at 9:00 am on Monday, September 11, 1995 to discuss audit details, objectives and schedule.

You may reach Mr. Wright at (512) 972-7247 should there be any questions concerning this audit.

Sincerely,

R. J. Rehkugler for
R. J. Rehkugler
Director, Quality

CDW/kmw
Attachment

c: T. H. Cloninger N5009
L. E. Martin N5005
R. D. Martin N5014
R. J. Tennant N4003
G. C. Sandlin N3001
N. O. Laughlin N5010
C. R. Grantom N4011
NUPIC Membership

Mr. Bob Carvelle
Quality Assurance Department
Pacific Gas & Electric Company
P. O. Box 770000
San Francisco, CA 94177

Audit File 95-073 (VA)
Vendor History File

Project Manager on Behalf of the Participants in the South Texas Project

AD95-073.VA1

AUDIT SCOPE

AUDIT NUMBER 95-073 (VA)

ORGANIZATION:

PLG, Incorporated
4590 McCarthur Blvd., Suite 400
Newport Beach, CA 92660-2027

PURPOSE/SCOPE:

Evaluate the adequacy and verify effective implementation of the PLG, Inc. Quality Assurance Program for compliance with 10CFR50, Appendix B, as it relates to a supplier of Engineering Services (Plant Risk Model Development).

APPLICABLE DOCUMENTS:

PLG, Incorporated Quality Assurance Manual, Revision 21, with changes through December 12, 1994.

REFERENCE DOCUMENTS:

NUPIC Checklist Revision, 6, dated March 26, 1995

NUPIC Supplemental Checklist for Software Development, Revision 0

Chet Wright 7-26-95 RH Stone 7/26/95

Prepared By Date Approved By Date

The Light company
Houston Lighting & Power South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

July 6, 1995

To: NUPIC Membership

Subject: Houston Lighting & Power (HL&P) Audit of PLG, Inc.
Newport Beach, CA - Audit Number 95-073 (VA)

Dear Member:

HL&P is scheduled to lead the Nuclear Procurement Issues Committee (NUPIC) audit of PLG, Incorporated supported by Pacific Gas & Electric Company. The audit is scheduled for September 11-14, 1995.

This letter is to serve as ninety (90) day notification to all NUPIC Members. Please submit supplier history/concerns, critical characteristics and procurement documents (with suppliers location referenced), by August 7, 1995.

Please submit your response, to the audit team leader:

Mr. C. D. Wright
Houston Lighting & Power
P. O. Box 289 Mail Code N4006
Wadsworth, TX 77483

Should you have a question concerning the audit, please contact C. D. Wright at (512) 972-7247.

Sincerely,

J. E. Adkins
NUPIC Representative

CDW/kmw
Attachment

Revision 9
Date: 01-24-95

Supplier: PLG Inc.
Audit No: _____
Page: 1 of 5

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION I: ORGANIZATION				
1. Determine if a separate software quality function has been established. If not, determine if the established programs are written such that software quality requirements are adequately addressed. If not, verify plans are being developed to address software concerns. Review the appropriateness of the organization which legitimizes the Software Quality Program.	10 CFR 50, Appendix B, Section I NQA-1, Section 1 ANSI N45.2.11 - 1974, 5.1.1			
CHECKLIST SECTION II; DESIGN CONTROL				
2. Verify that verification results are reviewed, approved, documented; exceptions are adequately documented and reviewed by the original design group.	10 CFR 50, Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1			
3. Review the change control process employed by the Software Quality Program and verify that changes made to specifications and source code receive the same reviews, justification, approvals, and documentation required of the original design.	10 CFR 50 Appendix B, Section III N45.2.11 - 1974 NQA-1 3s-1			

S. S. Talwar — Technical Specialist
7.10.95 — Date
_____ — Audit Team Leader
_____ — Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION III: INSTRUCTIONS, PROCEDURE, AND DRAWINGS 1. Verify procedures or instructions have been prepared to control and document the development of software systems in the following areas , as applicable: a. Software QA Plan b. Requirements Specification c. Design Specification d. Verification/Validation Plans e. User Documentation f. Standards Manual g. Product Release Procedures h. Installation Manual i. Training Manual j. Operations Manual k. Project file	N45.2.11 - 1974, Section 4.5. 10 CFR 50, Appendix B, Section V NQA-1-1989, Section 5 NQA-2a, Part 2.7			

S. S. Tehrani — Technical Specialist
7.10.95 — Date
_____ — Audit Team Leader
_____ — Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION IV: CONTROL OF PURCHASED ITEMS				
1. Verify measures are established to assure purchased software products or services conform to procurement documents.	10 CFR 50, Appendix B, Section VII NQA-1-1989, Section 7 NQA-2a-1990, Part 2.7, Sections 10.1, 3			
2. Verify that there exists documented evidence that purchased software conforms to procurement documents.	10 CFR 50, Appendix B, Section VII			
3. Verify that the monitoring of software contractors includes making sure the contractor has defined software quality program and that it is being properly implemented.	NUREG 4640, Sections 11.1, 2			

S.S. Tahir — Technical Specialist
7.10.95 — Date
_____ — Audit Team Leader
_____ — Date

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION V: CONFIGURATION MANAGEMENT (IDENTIFICATION, CONTROL, AND STATUS)				
1. Verify that processes are established to manage and control changes to software, associated hardware, and documentation including:	NQA-2a 1990, Part 2.7			
a. documentation of problems.				
b. notification of problems to affected individuals/ organizations				
c. evaluation of problems for potential impact on work already performed.				
d. correction of problems.				
e. retest of software are changes				

S.S. Tehan — Technical Specialist
7-10-95 — Date
_____ — Audit Team Leader
_____ — Date

Revision 9
Date: 01-24-95

Supplier: PLG Inc.
Audit No: _____
Page: 5 of 5

PBSA WORKSHEET

Items Description: Computer Software
(Part #, Process, Service) Risk Model Analysis

1) Technical Characteristics (Essential For Form, Fit or Function) and/or items of interest	2) Acceptance Criteria	3) Supplier 's Method of Control	Results	References (Checklist Section)
CHECKLIST SECTION VI: VERIFICATION AND VALIDATION (INSPECTION, TEST, AND CONTROL) 1. Verify that problems found during Verification and Validation activities are resolved (i.e., V&V is taken as a serious activity).	NQA-2a-1990, Part 2.7			

S.S. Tahvon — Technical Specialist
7.10.95 — Date
_____ — Audit Team Leader
_____ — Date

ATTACHMENT 7

STP NUCLEAR SAFETY EVALUATION REPORT OF PSA PROGRAM

HL&P 1006A (10-88)

Houston Lighting & Power Company

OFFICE MEMORANDUM

To D. A. Leazar July 3, 1996

From R. J. Rehkugler

Subject Nuclear Safety Evaluation Report (NSE 96-02)
Shutdown Risk Assessment and Probabilistic Risk Analysis

Nuclear Safety Evaluation (NSE) performed an evaluation of the Shutdown Risk Assessment process used during the Unit 1 Outage and the Probabilistic Risk Analysis process used for the performance of on-line maintenance for Unit 2. The purpose of the evaluation was to determine the adequacy of the implementation of risk management as outlined in Nuclear Group Policy 181.

The evaluation identified two deficiencies, CR 96-7901 (CAQ-D) which identified an inadequacy of procedures that describe the use of the Risk Assessment Computer programs and CR 96-7898 which documents that the Risk Assessment programs are not in compliance with the requirements of the Software Quality Assurance Program. Four concerns/ recommendations were identified and are being tracked on CR 96-7931 (CNAQ). Responses to the recommendations are requested within sixty (60) days.

The results of the evaluation were discussed with Plant Management during an exit meeting on June 20, 1996.

NSE welcomes feedback from our customers and appreciates your comments. Please address feedback to Stan Eldridge at extension 7099 or Arnold Granger at extension 8092.

SJE/kmw
Attachment

cc:Mail:

W.	T.	Cottle	M.		Berrens
J.	F.	Groth	S.	L.	Rosen
T.	H.	Cloninger	D.	C.	Poole
L.	W.	Myers	R.	W.	Heward
R.	E.	Masse	M.	J.	Berg
G.	L.	Parkey	A.	J.	Granger
L.	E.	Martin	M	E.	Smith
R.	D.	Martin	H.	G.	Domschke
T.	J.	Jordan	D.	I.	Towler
K.	D.	Richards			

c: N. O. Laughlin N5010

NUCLEAR SAFETY EVALUATION 96-02
May 13 - June 14, 1996

Shutdown Risk Assessment & Probabilistic Risk Analysis Evaluation

PURPOSE/SCOPE

The purpose of this evaluation was to determine the adequacy of the implementation of the Shutdown Risk Assessment process as outlined in Nuclear Group Policy 181, "Shutdown Risk Assessment".

The scope of the evaluation was to focus on maintenance activities during the Unit 1 refueling outage and how effective shutdown safety was coordinated during the outage. Although the focus was on Unit 1, the team examined maintenance operational support of Unit 2 and the Probabilistic Risk Assessment (PRA) usage on Unit 2.

SUMMARY

The Team found that the station's focus on reactor safety through the use of the Shutdown Risk Assessment procedure and the Work Process Program's risk analysis is achieving a nuclear-safe work process and providing a mechanism to provide early identification of potential schedule improvements. The Team also identified a broad awareness of the need to coordinate work to insure reactor safety and maintain Technical Specification required systems in service.

During the Unit 1 Refueling Outage, the Outage Management Team's use of a computer generated risk assessment program (ORAM) provided the information needed to make sound decisions for schedule adjustments and the tool to evaluate the overall schedule during the Shutdown Risk Assessment Group meetings. Personnel were able to achieve the desired results when using the computer program without written procedures or guidelines.

The implementation of the computer generated Risk Profile Program to assist in assessing and scheduling on-line maintenance is effective in reducing potential core damage frequency to an acceptable level. Scheduling, Maintenance, Operations, and Management personnel are knowledgeable and familiar with scheduling combinations that effect the Risk Profile. The groups work together to reduce the levels of risks to acceptable levels.

Two deficiencies were documented on Condition Reports which identified programmatic issues. The first Condition Report deals with the lack of procedures or guidelines that describe how to use the computer programs and how to interpret the results. The second has documented the failure of the risk assessment programs to meet the requirements of 0PGP07-ZA-0014, "Software Quality Assurance".

There are four concerns associated with the use of the computer programs because of the increasing reliance upon them for assistance in maintenance scheduling. The concerns are:

- Lack of training program to insure consistent understanding and use of the computer programs.

SUMMARY (Con't)

- The application of the Risk Management Program for maintenance activities has been inconsistent between units.
- The integration of the Risk Assessment Program into the Maintenance Program should be evaluated relative to the upcoming implementation of the Maintenance Rule.
- The traceability of the databases to the original inputs may be lost because of the lack of a long-term configuration control program.

CONDITION REPORTS

Deficiencies

1. CR 96-7901 - The procedures that describe the use, program description, and scope of the application of the risk management computer programs (ORAM, RASCAL, and PSA) are still in the "draft stage" or non-existent while the programs are being used.

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

2. CR 96-7898 - Two of the three computer programs (ORAM and RASCAL) currently being used by the plant staff to evaluate the risk management of maintenance activities do not meet the requirements of 0PGP07-ZA-0014, Rev. 0, "Software Quality Assurance Program".

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

Conditions Not Adverse to Quality - Concerns

1. CR 96-7931, Action 1 Concern - The maintenance and operations groups knowledge levels of the programs used during the risk assessments are, for the most part, a combination of trial and error, shared knowledge from one another and some instruction from the PSA group. To date, no training program exists for the PSA customers in the use of the programs.

   Recommendation: Coordinate with the Nuclear Training Department to establish training for the risk assessment programs, establishing job specific task and training for users of the system.

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

CONDITION REPORTS (Con't)

Conditions Not Adverse to Quality - Concerns (Con't)

2. CR 96-7931, Action 2 Concern - The application of the risk management programs for maintenance activities has been inconsistent between Unit 2 and Unit 1. This may be caused by the lack of a common procedure system or owner that has the authority and responsibility for the overall development and application of the three programs.

   Recommendation: Establish the structure necessary to achieve a common interpretation of and application of the risk assessment process between the two units.

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

3. CR 96-7931, Action 3 Concern - The current levels of integration of the risk assessment programs into the maintenance programs should be evaluated relative to the upcoming implementation of the Maintenance Rule.

   Recommendation: Processes such as the work control, scheduling, planning, and craft activities should be examined to identify the points where the risk assessment is required and where it may be cost effective to be included as a good business practice.

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

4. CR 96-7931, Action 4 Concern - The long term configuration control of the databases from which the risk management programs use inputs may be in jeopardy of being lost due to a lack of clear direction, such as procedures, policies, or guidelines.

   Recommendation: The means to insure the long term security of the databases and the capability to reconstruct the logic used to develop the models should be in place prior to the commitment for the implementation of the Maintenance Rule.

   Owner: C. R. Grantom, Supervising Engineer, Risk & Analysis

DETAILS

Shutdown Risk Assessment

Interviews were conducted with senior management to determine their expectations during the Unit 1 Refueling Outage. Those interviewed expressed a dominant theme of focusing on reactor safety while working to the approved schedule sequence. This theme was emphasized during the planning stages through pre-outage meetings and training. In addition, specific goals were established to help maintain the focus on reactor safety. Early planning and the use of the ORAM computer program provided schedule evaluations that maintained the maximum levels of safety and, at the same time, the maximum availability of equipment and systems for maintenance.

The ORAM program was utilized by the outage group during the planning stage to develop the best schedule that also afforded the safest configuration. This planning capability was also used to include the addition to scope of the Emergency Diesel Generators to show the required sequence for complying with the safety requirements. During the outage, the program was extensively used to assess the changes to the schedule as it advanced due to work finishing early.

The process of ORAM report updating generally started at 0800 every morning as the ORAM Coordinator reviewed the control room logs, ECO Database, and OAS records. He used the information to determine the times at which the components were declared functional. He then acquired a download of the revised work schedule. Both of these pieces of information were then put into the ORAM program. The resultant product provided a picture of the risk just endured based upon real time data and a closer examination of upcoming work. Because the ORAM run is based on the 0800 schedule and the speed at which work was being completed, the shift supervisors working the back-shift had less confidence in the presentation representing the risk faced at the time. The update process was based upon verbal direction and on a set of notes that the previous ORAM Coordinator had passed along to the current coordinator. The Coordinator demonstrated a good knowledge of the program, its capabilities, and who he could call for problems with the program. A program restriction occurs in the colored bar chart if the analysis indicates a change in color for two hours or less. This situation may appear as a slightly wider black line.

The Shutdown Risk Procedure, 0PGP03-ZA-0101, provides a slightly different approach to monitoring reactor safety in that it uses forms to guide the assessment of safety in terms of operable equipment. This is a yes/no evaluation which is also performed once a day. This limitation will not show the effects of work in progress or completed during the day, upon the assumptions made when the form was completed. The assessment form also does not contain the same safety parameters for examination. Because of the differences and the dynamics of the outage, it may be possible to miss a condition that could lessen safety, although none were

Shutdown Risk Assessment (Con't)

identified. The procedure does have some requirements that have resulted in schedule improvements in that it also provides for a close examination of the schedule during the preparation stage and requires periodic meetings to review the plant's readiness to make mode changes before they occur.

The capability of assessing and providing real time monitoring of reactor safety could be greatly increased by combining the capabilities of the procedure and computer processes. Equipment changes could be updated and schedule changes noted by providing the actual times a job starts. This could then provide the backshift shift supervisor a better knowledge of the challenges facing him in terms of risk.

Two deficiencies were identified regarding programmatic issues with the computer programs. CR 96-7901 deals with the lack of procedures that describe the process of applying the ORAM program. With the absence of a clear guide and what is an acceptable level of risk, other than a color change on the bar chart presented by ORAM, the burden of making a decision to remove a system or component from service still remains with the Shift Supervisor, which is not a change. The other CR 96-7898, deals with the compliance of the program with the requirements of 0PGP07-ZA-0014, "Software Quality Assurance Program". The verification and validation of the inputs to the program and how they compare to the current plant configuration must be accurate to insure the expected results. For instance, one of the inputs may have come from a specific sequence of steps in a procedure. If those steps are changed, can the results be the same if we now compare the risk to the assumed condition?

CR 96-7931 has been issued as a CNAQ to track the concerns and recommendations resulting from this evaluation.

PSA Application to on Line Maintenance

Personnel in Operations Work Control Group(OWCG) were interviewed concerning the On-Line Maintenance Assessment efforts. Each new CR is reviewed by either the Unit 1 or Unit 2 OWCG. Items that can be worked as minor or rover maintenance are added to those lists, as long as they do not effect the Risk Profile that is generated weekly for each unit. These items are not scheduled work. Items that need to be scheduled or affect the Risk Profile are included in the Risk Profile assessment performed by OWCG. Unplanned events that occur are reviewed by the OWCG to assess the Risk Profile impact. If needed, a new Risk Profile is generated. A review of the Unit 2 unscheduled work performed, during three consecutive weeks, did not identify any work that should have been included in the Risk Profile for these weeks. The OWCG personnel indicate that they receive numerous inquires from the craft supervisors on items that might affect the Risk Profile. Considerable effort appears to be ongoing to ensure an accurate Risk Profile is generated.

Shutdown Risk Assessment & Probabilistic Risk Analysis Evaluation

PSA Application to on Line Maintenance (Con't)

A computer program called RASCAL is used by the OWCG personnel to develop a Risk Profile for each unit. The N-2 week is generally the first week that the profile is generated. The Risk Profile is presented in the Monday Daily Communication & Team Work meeting. The RASCAL program is user friendly and easy to learn how to use. After the inputs are entered, the program automatically generates the necessary Risk Profile curves and listing of the different maintenance states. The program has been developed by the Nuclear Fuels & Analysis Risk Analysis Group. The program is still considered in the draft stage, with the Verification & Validation effort scheduled to be completed July 3, 1996. The verification and validation efforts to bring the PSA program under configuration control are scheduled to be completed by July 26, 1996. This schedule does not support the implementation date of July 10, 1996 for the Maintenance Rule.

The RASCAL program has the capability to generate the actual Risk Profile, if the actual times are entered for the items taken out of service. OWCG and the Risk Analysis personnel have indicated plans for this capability to be implemented by the Operations personnel. Thus far this capability has not been implemented by Operations personnel.

The OWCG personnel indicated that they were provided training by the Risk Analysis personnel on use of the computer program, but written guidance has not been provided. The OWCG personnel have developed various rules for implementation of the program as a consequence. One rule is the 15 minute rule. This 15 minute rule considers if a component is capable of being made functional within 15 minutes by operator action, then the effect of it being taken out of service does not count against the Risk Profile. Unit 1 OWCG only considers inside the control room actions where Unit 2 OWCG considers operator actions both inside and outside the control room for making a component functional. The generation of the Risk Profile relies upon the equipment being functional for assessment credit. The definition of functional is not written down for implementation of this Risk Profile, although each person interviewed had the same general understanding. Functional is defined in the Shutdown Risk Procedure and is the definition applied in these cases. When interviewed, the Shift Supervisors and one Operations Manager were not aware of the 15 minute rule the OWCG personnel were using.

The Shift Supervisors interviewed indicated that some training on the Risk Profile and the use of RASCAL had been provided, but no written guidance is available. Each Supervisor interviewed is aware of the Risk Profile program. The computer program is available to them in the Shift Supervisor's office. Some were more familiar than others with how to use it, but indicated that the OWCG personnel performed this assessment for them on the schedule. They were aware that items on the schedule were evaluated, and that if the schedule is followed, the Risk Profile would be acceptable. If unscheduled work is presented for work start, then this situation would need to be evaluated. The Risk Profile is used, but generally the other

PSA Application to on Line Maintenance (Con't)

programs, such as OAS, ECO, and Technical Specifications, are the programs that control the work start process. Decreasing levels of knowledge of the Risk Profile is the norm concerning the Unit Supervisor and the other control room personnel. Very little guidance or training has been provided to these personnel. Any knowledge of implementation of the program solely rests with the Shift Supervisor.

Interviews with craft supervision indicate a good knowledge and awareness of the Risk Profile. Each supervisor interviewed was knowledgeable of the items that were included in the Risk Profile that they were assigned to work. The Risk Analysis personnel have provided training sessions on the use of the Risk Profile and PSA. Each indicated that they do not have anything in writing on the program. Some indicated they would like feedback on how they do each week. The craft supervisors indicate that they frequently contact the OWCG personnel concerning items that might affect the Risk Profile. Some indicate the OWCG screens items and if they are added to the minor and rover packages then they will not affect the Risk Profile. An indicator on the weekly schedule has been added to flag an activity that is a PSA component, which will affect the Risk Profile. This information has not been provided to all of the Craft Supervisors and some did not know this information was available.

Schedule personnel have developed scheduling skills concerning the scheduling and sequencing of components that affect the Risk Profile by trail and error. No written guidance or training has been provided concerning the implementation of the Risk Profile. Feedback on the effects of the Risk Profile results has provided the lessons by trial and error.

NUCLEAR SAFETY EVALUATION TEAM

Team Leader:	S. J. Eldridge
Team Member:	M. A. Ludwig

7/2/96
NSE Team Leader — Date
S. J. Eldridge

J. JOHNSON 7/3/96
Administrator, NSE — Date
A. J. Granger

NUCLEAR ENGINEERING EVALUATION
96-02

ATTENDANCE SHEET

NAME	TITLE	PHONE NUMBER
KEVIN Richards	WC MANAGER	7017.
KEN CONTOS	Maint - 2 Mgr	8902
Bob Masse	U2 PM	7988
[illegible]	U1 Plt Mang	7239
JR Lazell	U1 Ops Mgr	7799
M. J. Berg	Unit 1 MM Mgr	7030
MICHAEL BERRENS	U-1 WC MANAGER	8786
Richard Graham	Outage DW manager	8187
D.A. CEAZAR	Director, Nuclear Fuel & Analysis	7795
Alex Kent	Reliability Eng Mgr	7786
TJ JORDAN	SED Mgr.	7902
Gary Parkey	Gen Mgr, Generation Support	7800
S. L. ROSEN	MANAGER, INDUSTRY RELATIONS	7138
A. J. GRANGER	Administrator, NSE	8092

ATTACHMENT 8

DOCUMENTATION OF APPENDIX B APPLICATION TO PSA VENDOR

PURCHASE ORDER (CONTRACT SERVICES)
OF
HOUSTON LIGHTING & POWER COMPANY
ACTING AS PROJECT MANAGER FOR
SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

VENDOR #: P506'7 DATE: 04/11/96 CONTRACT NO. ST-401491 SUPPLEMENT NO. N/A

To: PLG, Inc.
4590 MacArthur Blvd., Suite 400
Newport Beach, CA 92660-2027

ATTN: Elizabeth M. Ward
PH: 714/833-2020

Intended Use: General Services Agreement for PRA/PSA Offsite/Onsite Work		
RPD.No.: 98802	Req. By: C. R. GRANTOM	Date: 03/06/96
The following billing information must appear on all invoices.		
CCC: below	FERC: below	Unit No.: below
E of E: below	Program Elem.: below	Charge To: below
Tax Code: 000	Pymt. Terms: see compensation	CA:BJR/ar

HOUSTON LIGHTING & POWER COMPANY, ACTING AS PROJECT MANAGER OF THE SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION ON BEHALF OF ALL PARTICIPANTS THEREIN UNDER THE SOUTH TEXAS PROJECT PARTICIPATION AGREEMENT EXECUTED AS OF JULY 1, 1973, AS AMENDED (PURCHASER), AND PLG, INC. (CONSULTANT), HEREBY AGREE THAT ALL WORK SPECIFIED HEREIN SHALL BE PERFORMED BY CONSULTANT IN ACCORDANCE WITH THE PROVISIONS OF THIS CONTRACT, WHICH, IN ADDITION TO THIS PURCHASE ORDER AGREEMENT WITH EFFECTIVE DATE OF FEBRUARY 16, 1996, CONSISTS OF THE FOLLOWING DOCUMENTS:

SAFETY RELATED/10CFR21 DOES APPLY/SERVICES

THE HL&P APPROVED VENDOR FOR THIS PURCHASE ORDER IS AS STATED ABOVE. THE HL&P PURCHASE ORDER, INCLUDING ALL ATTACHMENTS, MUST BE FORWARDED TO THE APPROVED VENDOR. ALL DOCUMENTATION AND CERTIFICATION FOR ITEMS/SERVICES PROCURED MUST BE PROVIDED BY THE APPROVED VENDOR. REFER TO ATTACHMENT "A" FOR TECHNICAL AND QUALITY REQUIREMENTS.

1.0 The Terms and Conditions of Purchaser's Order No. ST-300070 dated March 26, 1984, subsequently renumbered as Contract No. ST-400258, as amended, are incorporated herein and by this reference made a part hereof.

2.0 APPENDIX A-SCOPE OF WORK AND SCHEDULE OF PERFORMANCE dated 02/16/96 including all attachments and exhibits thereof.

3.0 APPENDIX B - COMPENSATION SCHEDULE dated 02/16/96.

4.0 ATTACHMENT "A" - CONTRACT SERVICES REQUIREMENTS as approved 03/20/96.

5.0 Work authorized under the terms and conditions of this Contract No. ST-401491, as may be amended from time to time, shall be awarded in accordance with the Work Authorization Process described in APPENDIX A.

-continued-

article 33.0 + 33.1

PLG, Inc.	HOUSTON LIGHTING & POWER COMPANY, PROJECT MANAGER ON BEHALF OF ITSELF AND THE OTHER OWNERS OF THE SOUTH TEXAS PROJECT
AUTHORIZED SIGNATURE Elizabeth M Ward	AUTHORIZED SIGNATURE G. J. Child 4/25/96
TITLE/DATE Sr Vice President 4/24/96 Contracts and Administration	TITLE/DATE SR. CONTRACT ADMINISTRATOR

PURCHASE ORDER (CONTRACT SERVICES)
OF
HOUSTON LIGHTING & POWER COMPANY
ACTING AS PROJECT MANAGER FOR
SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

DATE: 04/11/96

ORDER NO. ST-401491

TO: PLG, Inc.

SUPPLEMENT NO.: N/A

DESCRIPTION

6.0 Supplements to this Contract shall be issued periodically as required for funding of the Work as authorized by the Purchaser.

7.0 Purchaser's Contract Technical Coordinator (CTC) for the scope of services provided herein is Mr. C. R. Grantom at telephone (512) 972-7372. Alternate CTC's may be identified for specific Work scopes released by Work Authorization. Purchaser's Financial Services Representative (FSR) is Mr. R. E. Franklin at 512/972-7048.

8.0 Under the Work Authorization Process of APPENDIX A, either Safety-Related or Non-Safety Related scopes of Work may be released by Purchaser's CTC and such Safety or Non-Safety designation shall be evidenced on the Work Authorization Form.

The total authorized value of this Contract for 1996 services is an amount NOT-TO-EXCEED ..... $[redacted]

PURCHASER MAKES NO REPRESENTATIONS OR GUARANTEES THAT THIS CONTRACT WILL REACH THIS VALUE OR ANY OTHER VALUE.

CONTRACT NO. ST-401491 IS SAFETY-RELATED/10CFR21 DOES APPLY/SERVICES

-END-

Billing Information

CCC: 932
FERC: O&M: A517-000
CAP: D-9527
Unit No.: 1&2
Program Element: H9NASI (O&M)
H95980 (CAP)

Charge To: 50% - STP01
50% - STP02

Values: O&M: $[redacted]
CAP: $[redacted]

PLG, Inc.	HOUSTON LIGHTING & POWER COMPANY, PROJECT MANAGER ON BEHALF OF ITSELF AND THE OTHER OWNERS OF THE SOUTH TEXAS PROJECT
AUTHORIZED SIGNATURE Elizabeth M Ward	AUTHORIZED SIGNATURE Bruce J. Colwell 4/25/96
TITLE/DATE Sr Vice President 4/24/96 Contracts and Administration	TITLE/DATE SR. CONTRACT ADMINISTRATOR

APPENDIX A

SCOPE OF WORK AND SCHEDULE OF PERFORMANCE

1.0 SCOPE OF WORK - GENERAL

Consultant shall provide Probabilistic Risk Assessment/Probabilistic Safety Assessment (PRA/PSA) services for and in support of the South Texas Project Electric Generating Station (STPEGS/STP) Units 1 & 2, located near Wadsworth, Texas in accordance with these Contract Documents and the Terms and Conditions referenced therein (i.e. the Work) on a non-exclusive basis, during the Schedule of Performance of this Contract, by the methods of onsite staff augmentation and offsite consulting services, generally defined as follows, but more specifically defined through the Work Authorization Form of the Work Authorization Process (as described below):

1.1 Onsite PRA/PSA Analysis

The PRA/PSA workscope(s) for onsite staff augmentation support by Consultant's assigned personnel is as follows:

1. Develop PRA/PSA system level and/or event tree level risk models to support STP station business initiatives relative to Balance-of-Plant Risk Model, Graded Quality Assurance (QA), Configuration Risk Management, and Comprehensive Risk Management.

2. Risk model development and maintenance using RISKMAN©, ORAM©, Microsoft ACCESS©, etc. software.

3. Risk-related outage support (i.e. Purchaser's refueling outages, forced outages, etc.).

4. Plant-specific data analysis.

5. Deliverables will be developed for each assigned task and task assignments will be determined throughout the course of the contract. Onsite staff augmentation personnel will work and adhere to STP administrative policies, QA Program requirements and STP station procedures and shall be under Purchaser's supervision.

1.2 Offsite PRA/PSA Analysis

The PRA/PSA workscope(s) for offsite consultant work is as follows:

1. Develop PRA/PSA system level and/or event tree level risk models to support STP business initiatives relative to Balance-of-Plant Risk Model, Graded QA, Configuration Risk Management, and Comprehensive Risk Management.

2. Risk model development and maintenance using RISKMAN©, ORAM© , Microsoft ACCESS©, etc. software.

3. Work performed by Consultant shall be in accordance with Consultant's QA Program requirements per Attachment "A".

4. Scope, schedule and deliverables will be developed and approved by Purchaser for each task assigned. Task assignments will be determined on a "case-by-case" basis via the Work Authorization Form of the Work Authorization Process.

1.3 Consultant personnel augmenting onsite staff work to STP QA Programs and Procedures, and Purchaser assumes 10CFR Part 21 reporting requirements. This portion of the Contract is considered Non-Safety Related services. Services performed at the Consultant's facility are performed in accordance with Consultant's QA Program and Procedures. This portion of the Contract is considered Safety-Related, and Consultant assumes 10CFR Part 21 reporting requirements.

1.4 Additional services as requested and required in support of specific analyses, evaluations or special projects.

1.5 The location at which these services are to be provided is at the mutual agreement between Purchaser and Consultant on a project or task-specific basis.

1.6 Technical Interface

Purchaser's Contract Technical Coordinator (CTC) for the scope of services to be provided herein is Mr. C. R. Grantom, Supervisor of Nuclear Fuels & Analysis (NF&A) Department, Risk and Reliability Analysis (RRA) Section or his designee, who is responsible under this Contract for the day-to-day contact with Consultant or its assigned personnel for technical matters. Such CTC responsibilities and duties shall include coordination and overall direction of the activities performed under this Contract but shall not relieve Consultant of its duties and responsibilities for the Work under this Contract. All correspondence of a technical nature shall be addressed to the responsible Purchaser CTC.

1.7 Quality Assurance Requirements

The performance of these services will entail Safety-Related and Non-Safety Related services. As described in article 1.3 above, whether the Work is performed onsite at Purchaser's facility or offsite at Consultant's facility shall determine under whose QA Program and Procedures the Work will be performed and who has 10CFR Part 21 reportability. Work performed by Consultant offsite shall be performed in strict conformance with Purchaser's Attachment "A" - Contract Services Requirements and a Certificate of Conformance shall be provided by Consultant evidencing its conformance to these requirements. Should the requirements of the Purchaser's Attachment "A" change during the course of this Contract, Purchaser's CTC shall ensure that the changes are addressed in a revised Attachment "A" and transmitted to the Consultant via a duly authorized written Supplement to this Contract. In like manner, Consultant shall ensure that Purchaser is immediately and properly notified of any changes to its QA Program requirements which affect the Work being performed under this Contract.

1.8 Consultant Personnel Requirements

Consultant shall not replace or reassign key personnel assigned to the Work under this Contract without providing a proper replacement to perform the Work required. Purchaser retains the right to approve of any proposed replacement personnel prior to actual replacement.

1.9 Commercial Interface

Purchaser's designated representative for Contract commercial matters is Mr. Bruce J. Rudd, Sr. Contract Administrator, of Nuclear Purchasing & Materials Management, Nuclear Contracts Section. All correspondence regarding commercial matters shall be addressed to Mr. Rudd. In the absence of Mr. Rudd, such correspondence may be addressed to the General Supervisor, Nuclear Contracts.

1.10 Consultant Requirements

Consultant shall establish a Primary and Secondary Point-of-Contact to implement the responsibilities established by this Contract. Such responsibilities shall include, but not be limited to:

a) serve as Primary or Secondary Point-of-Contact for all activities performed hereunder;

b) utilize an organized and qualified staff of PRA/PSA knowledgeable resources to implement the Work assigned;

c) direct, coordinate and control all assigned activities performed hereunder;

d) develop, implement, and monitor the plans, schedules, cost estimates, manhours expended, procedures, QA Program etc. required to perform the Work correctly and accurately;

e) approve any Work Authorization Forms on behalf of Consultant.

1.11 Purchaser Responsibilities

Purchaser shall be responsible for the following:

a) Purchaser's CTC shall be responsible for the overall monitoring of Consultant's services provided hereunder;

b) Purchaser's CTC shall be responsible for ensuring that the appropriate levels of Consultant expertise is being utilized for the Work assignments and that the requisite level of quality and technical adequacy is achieved;

c) Purchaser's CTC shall be responsible for ensuring the completion of the Work in accordance with the contracted scope of work, applicable STP procedures, QA Program requirements, schedule and within the approved budget;

d) Purchaser or Purchaser's CTC may conduct periodic visits to Consultant's office to ensure and verify that the Work assignments being performed by Consultant's personnel are consistent with Purchaser's expectations and contractual requirements;

e) Purchaser's CTC shall ensure that all deliverables (i.e. technical documentation/submittals) received from Consultant are properly dispositioned and that such records are forwarded to Records Management;

f) Purchaser shall provide resources reasonable and commensurate with its participation with Consultant in the Work while Consultant is at STP; such resources include software tools, certain consumables, office space, telephones, copy machines, fax machines, etcetera.

1.12 Staff Augmentation - General Provisions

For onsite Work being performed by Consultant's assigned personnel, the terms and conditions as stated in Attachment B shall also apply.

PR/RPD NO. 0098802
P.O. No.: ST-401491

ATTACHMENT A
CONTRACT SERVICES REQUIREMENTS
PROCUREMENT LEVEL N/A
04/25/94

This document describes additional quality requirements to be implemented in fulfilling the contract. This document is an attachment to the contract documents and does not describe the entire contract requirements. Unless specifically identified elsewhere in the contract, costs for any access, examination, audits, inspections, surveillance and/or access to records shall be included in the pricing of the services supplied under this contract.

A. Quality Program

1. Purchaser's Approved Contractor

Services on this contract shall be supplied in accordance with the contractor's Quality Assurance program which has been approved by the Purchaser's Quality Assurance Department, **QA Program Manual, Revision 23, with changes through 06/06/95**, plus any other programs/procedures which may be necessary to comply with A.2.

2. The contractor shall maintain a Quality Assurance Program that complies with 10CFR50 Appendix B, and any other Code, Standard, etc. that may apply to each particular service.

3. Unless previously submitted, the Quality Assurance program shall be submitted to purchaser for review and statusing prior to other contract activities unless otherwise authorized in writing. Purchaser accepted Quality Assurance Programs shall remain in force throughout the life of the contract; changes to the approved program identified in this document must be approved by HL&P prior to commencing work.

4. The applicable requirements of the contract document shall be extended to lower tier subcontractors including purchaser's right of access to facilities and records.

5. Documented evidence shall be maintained that supplier personnel are trained and qualified to perform assigned duties.

B. Documentation

1. All documents shall be attested to by an authorized and responsible employee of the contractor who shall be identified by the contractor. Preferably the Quality Assurance Department Manager.

2. Reports of tests, inspections, examinations, or processes shall indicate the procedure(s), including revisions, used to control the activity, acceptance criteria, specific results obtained, requirements met and those not met.

3. The supplier documentation shall be traceable to the services and the purchaser's contract.

4. All contractor documentation submitted to purchaser shall be of a quality suitable for reproduction and microfilming.

C. Certification

1. The contractor shall provide certification of all the requirements of the contract, including all referenced documents such as drawings and specifications have been compiled with. A contractor supplied certificate may be provided in lieu of the HL&P Form 405001A(12/89) attached, if the contractor's certificate contains all the information as on the HL&P Form and there is no HL&P surveillance inspection specified in that order.

D. Deviations/Nonconformances/Noncompliances

1. The contractor shall report all nonconformances which may adversely affect the reliability of any services furnished for this contract. This report shall include technical justification for nonconformance dispositions. All dispositions which do not comply with conditions stated in an approved drawing or specification shall be approved by purchaser.

2. The provisions of 10 CFR Part 21 shall apply to the services on the contract. Should the contractor provide any information to the NRC regarding such services this information shall be provided to purchaser at the same time.

3. The contractor shall make no changes, deviations or substitutions in the services specified in this contract. Should the contractor be unable to fill this contract exactly as written, the contractor shall promptly notify, in writing, Purchaser's Nuclear Contract's Division prior to proceeding with the questionable service. Alteration or modification of the requirements of this contract can be made only by a written change to the contract.

E. Rights of Access

1. Purchaser, or their authorized representative shall have access to the contractor's premises for the purpose of:

   a. Auditing implementation of the contractor's QA program.

b. Surveillance inspection of services ordered (see F. for applicability).

The authorized representative shall have the authority to stop work or refuse acceptance of service if procurement requirements, including those for documentation, are not met. Notice of audit, will be communicated to the supplier by written request or telephone at least five working days prior to arrival.

F. Surveillance Inspection

Applied ( ) Does Not Apply (X)

1. Purchaser, or their authorized representative shall inspect the services at the work location. Witness/hold points for this inspection are identified in Attachment B. Contractor shall notify the purchaser's representative identified in Attachment B, at least 5 working days prior to reaching the witness/hold points.

2. Contractor shall prepare and submit for purchaser's review a work schedule showing quality control inspection and/or monitor points.

3. Purchaser reserves the right to waive inspection or tests. Such waiver shall be in writing.

4. Services having purchaser inspections or tests shall not be accepted by purchaser without them having been implemented; or documented evidence provided by the contractor that inspections or tests were waived.

ENCLOSURE:

1. Restricted components list 5A23HGS0001 Revision 6 including DCNs JS-28, JS-30, ES-40 and MS-126 shall apply by this reference as if fully rewritten herein.

2. HL&P Quality Assurance Department Conformance Certificate Form 405001A (12/89).

NOTE: Should any of the documents referenced, or listed as an enclosure, not be available for review prior to this order, Houston Lighting & Power Co. shall be notified and the needed document will be supplied.

PREPARED BY: Jerry Knox, 3/20/96
ENGINEERING DATE

CONCURRENCE BY: A Waller, 3/20/96
REVIEWER DATE

405001A (12/89) SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

NUCLEAR ASSURANCE DEPARTMENT CONFORMANCE CERTIFICATE

(1) PROJECT (2) UNIT PAGE OF

(3) VENDOR (4) ADDRESS OF VENDOR FACILITY

(5) PURCHASE ORDER NO. (6) CO (7) SPECIFICATION NO. REV. (8) DRAWING NO. REV.

(9) ITEM DESCRIPTION(S) (8A) QUALITY ASSURANCE PROGRAM REV/DATE

(10) INSPECTION AGENCY

(11) INSPECTION AGENCY ADDRESS

(12) P.O. ITEM NO. (13) NO RELEASED

(14) P.O COMPLETE ☐ YES ☐ NO

(15) SERIAL NUMBER OR IDENTIFICATION NO.(S)

(16) REMARKS

DEVIATIONS ☐ NONE ☐ LISTED BELOW

(17) VENDOR CERTIFICATE

The Vendor certifies that the item(s) described above are in conformance with the requirements of the Purchase Order and Specifiction(s) with the approved deviations listed above, are suitable for the conditions of service specified, are free from defects in design, workmanship and materials and are new and of specified quality. A copy of this complete Conformance Certificate will be included with the bill of lading and shipped with the item(s) to Houston Lighting & Power job site at the address designated in the procurement documents.

VENDOR AUTHORIZED SIGNATURE TITLE DATE / /

(18) RELEASE STATEMENT

The Vendor has certified that the item(s) above meet all contractural requirements. Houston Lighting & Power Quality Assurance reviewed evidence supporting this certificate and found no deficiencies except as noted under "Remarks" above. This Certificate does not waive any rights Houston Lighting & Power may have under the Purchase Order including the right to reject the item(s) upon discovery of deficiencies during or after arrival at designation.

FINAL SURVEILLANCE ☐ PERFORMED ☐ WAIVED

SIGNATURE OF HL&P QA REPRESENTATIVE DATE / / TELECOPY NUMBER IF WAIVED (copy attached) DATE / /

The item(s) described above are hereby released by Houston Lighting & Power Quality Assurance Representative Shipment may be made subject to authorization by Houston Lighting & Power Purchasing

ATTACHMENT 9

PLG, INC., REVIEW OF STP INTERIM MODEL AND STP RESPONSE

4050U1A (12/89) SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION

NUCLEAR ASSURANCE DEPARTMENT CONFORMANCE CERTIFICATE

(1) PROJECT: **STPEGS PSA**

(2) UNIT: **1 and 2**

PAGE **1** OF **3**

(3) VENDOR: **PLG**

(4) ADDRESS OF VENDOR FACILITY: **4590 MacArthur Blvd., Suite 400, Newport Beach, CA 92660**

(5) PURCHASE ORDER NO.	(6) CO	(7) SPECIFICATION NO. REV.	(8) DRAWING NO. REV.
ST-401491	0	N/A	N/A

(9) ITEM DESCRIPTION(S): **Review of PSA model STPREV1.**

(8A) QUALITY ASSURANCE PROGRAM: **PLG QA Program Manual** REV/DATE: **23/6-6-95**

(10) INSPECTION AGENCY: **NUPIC**

(11) INSPECTION AGENCY ADDRESS: **Address Unknown. Jim Adkins of HL&P was Chairman of Last NUPIC Audit at PLG.**

(12) P.O. ITEM NO.: **WA 96-PLG-0002**

(13) NO. RELEASED

(14) P.O COMPLETE: ☐ YES ☒ NO

(15) SERIAL NUMBER OR IDENTIFICATION NO.(S)

Work Authorization: 96-PLG-0002

Program Element: H9NASI

Cost Center: 932 **FERC: A517-000**

Location: STP 01/02 **E of E: 3480**

(16) REMARKS

DEVIATIONS ☒ NONE ☐ LISTED BELOW

The attached report fulfills PLG's obligations under Work Authorization 96-PLG-0002.

(17) VENDOR CERTIFICATE

The Vendor certifies that the item(s) described above are in conformance with the requirements of the Purchase Order and Specifiction(s) with the approved deviations listed above, are suitable for the conditions of service specified, are free from defects in design, workmanship and materials and are new and of specified quality. A copy of this complete Conformance Certificate will be included with the bill of lading and shipped with the item(s) to Houston Lighting & Power job site at the address designated in the procurement documents.

VENDOR AUTHORIZED SIGNATURE: S[illegible]D TITLE: **Project Manager** DATE: **05 / 23 / 96**

(18) RELEASE STATEMENT

The Vendor has certified that the item(s) above meet all contractural requirements. Houston Lighting & Power Quality Assurance reviewed evidence supporting this certificate and found no deficiencies except as noted under "Remarks" above. This Certificate does not waive any rights Houston Lighting & Power may have under the Purchase Order including the right to reject the item(s) upon discovery of deficiencies during or after arrival at designation.

FINAL SURVEILLANCE ☐ PERFORMED ☐ WAIVED

SIGNATURE OF HL&P QA REPRESENTATIVE DATE / /

TELECOPY NUMBER IF WAIVED (copy attached) DATE / /

The item(s) described above are hereby released by Houston Lighting & Power Quality Assurance Representative Shipment may be made subject to authorization by Houston Lighting & Power Purchasing

PLG
Contract No. ST-401491
Work Authorization: 96-PLG-0002
May 23, 1996

REVIEW OF THE SOUTH TEXAS PROJECT PSA MODEL STPREV1

A top level review was performed of the revised STP PSA model STPREV1. This model specifically models the configurations of the plant in terms of the planned maintenance states and the status of the operating support systems. The top 50 sequences of each initiating event were reviewed for reasonableness. Associated parts of the PSA model were also reviewed as part of the review of the sequences.

Not only the are the sequences in the database checked, an attempt was made to review for sequences that did not make it into the database. This is the difficult and time consuming part of the review, for which good documentation is very essential.

The general comment on this model is that it needs more documentation. While substantial documentation is provided with the RISKMAN model itself, this is not sufficient and definitely very cumbersome to use. For example, to realise the meaning of a macro, one must go through the rules of four or more trees to locate the macro.

It appears that macros have been defined for top event states of "disabled" and "failed". This is great for defining downstream top event split fraction rules. However, it would be easier to understand the rules if the macros had some flavor of normal terms in them. For example, high head injection train A disabled and failed could be named HHAD and HHAF respectively. Nested macros that are not logically named and without documentation make the model a reviewer's nightmare.

From the model, it is gathered that the meaning of two trains running is two trains of Essential Cooling Water are in operation together with their associated trains of Essential Chilled Water, Component Cooling Water and the EAB HVAC fans. The ECCS pumps rooms cooling dependency of the chilled water system seems to be back in the model.

1. States TIMEB, TIMEC, TIMED, and TIMEF have multiple definitions. For example. TIMEB can mean trains A and B operating or trains B and C operating or trains C and A operating. Since the impacts of these states on the plant are different for initiating events, it would be much simpler if different split fraction designators were used for each state.

2. Other than the loss of offsite power type events, the initiating event frequencies in the data module do not match the initiating event frequencies in the event tree module. I suspect that the appropriate initiators have been

increased by 25% to account for TIMEA. If not, 25% of the core damage has been discarded during the binning process.

The branch for TIMEA is appropriate for a few initiators only. If it must be retained, why not provide a pass-through for all other initiators so that no computing time is spent on calculating sequences going to bin REMAIN. Set it equal to zero. This will also make the information on initiating events in the data module consistent with the information in the event tree module. The output reports will then be consistent with the rest of the PSA industry.

Adding up the fractions in the different power states results in total exposure at power of 0.734 instead of 0.75. This is due to error in calculation of TIMEB.

3. For states GENS7, GENS8 and GENS9, one can deduce or assume the running and standby trains. Which trains are running during state GENS10?

4. For loss of offsite grid sequences, where operator action OR is successful and offsite power is recovered, it is then assumed that all equipment in the OFFGRID event tree and the buses EA, EB, EC are available even though the random hardware failures were not questioned. The event tree OFFGRID seems to be revised to have all the branches needed. EPONSITE always had all branches. Why not just ask the availability of the hardware and write rules to figure out what is available after OR is successful?

   The logic is {(loss of power*operator fails) + hardware fails}. The sum contribution of all the hardware that is bypassed may not be small.

5. The macro DGMNT2 can never be true because the maintenance states of the three diesels have been defined as exclusive states.

4. ECW and CCW trains are tied together for standby logic so that low pressure in the CCW header (PSL 4644), or the ECW discharge (PSL 6885A or 6890A) will start the trains designated as STANDBY. No such logic exists for Essential Chilled Water Chillers or pumps, or the EAB HVAC fans. All trains start for SI and loss of power at their respective 13.8kV buses. What start signal is modeled for non-SI, non-LOP initiating events (e.g. reactor trip or turbine trip) for the non-running trains of ECH and EAB HVAC fans? No operator actions were easily identifiable for these actions.

5. Same question for Centrifugal Charging Pumps, what starts the standby pump for non-SI, non-LOP initiating events?

6. CCW to Charging pumps is rather complicated. An earlier review of the fault trees for component cooling water, charging and other CCW loads uncovered the following and the text is simply reproduced here. Some of the points are still valid for this model.

****

STP CCW SYSTEM AND CCW HEADER VALVES

1. *Check valves to the discharge into the CCW header are best included with the CCW pumps (CC0311, CC0313 and CC0315).*

2. *Header valves MOV CC0312, CC0314 and CC0316 open with their respective pumps, but close only on low level signals from their respective section of the surge tank. Similarly, MOV CC0192, CC0132 and CC0052. The header discharge check valves (CC0191, CC0131 and CC0051) do not disable the charging pumps. A top event defined for this header (HDR) can contain these 6 MOVs and three check valves so that failure of this top event is failure to supply the spent fuel loads, the RCP motor and thermal barrier cooling, and the other non-essential loads.*

3. *If top event HDR is successful, then the top event for non-essential loads may be asked as it is in the power PSA model now. (Spent fuel header valves CC0447 and CC0032 and other loads header valves CC0235 and CC0236.) If top event HDR is failed, then not only the non-essential loads have already been isolated, but also the RCP loads.*

4. *The two centrifugal charging pumps are supplied through some type of a headered system. Two AOVs in the headers are normally open and close on low level in the train A compartment of the surge tank or on loss of 125V dc at panel PL039A or on loss of instrument air. The result is to dedicate CCW train C supply to charging pump 1A, and CCW trains B and A supply to charging pump 1B.*

Charging pump 11A:

- *It can be supplied by train A through valves MOV CC0768, AOV FV4656 and discharge through MOV CC0772, AOV FV4657. MOVs CC0768 and CC0772 open when CCW pump A starts.*

- *It can also be supplied through train B MOV CC0770 and AOV FV4656, and discharge through MOV CC0774 and AOV FV4657. MOVs CC0770 and CC0774 open when CCW pump B starts and will close if pump B fails.*

- *It can also be supplied through train C MOV CC0771 and discharge through MOV CC0775. MOVs CC0771 and CC0775 open when CCW pump C starts and will close if pump C fails.*

Charging pump 11B:

- *It can be supplied by train A through valves MOV CC0768, and discharge through MOV CC0772. MOVs CC0768 and CC0772 open when CCW pump A starts.*

- *It can also be supplied through train B MOV CC0770 and discharge through MOV CC0774. MOVs CC0770 and CC0774 open when CCW pump B starts and will close if pump B fails.*

- *It can also be supplied through train C MOV CC0771, AOV FV4656 and discharge through MOV CC0775, AOV FV4657. MOVs CC0771 and CC0775 open when CCW pump C starts and will close if pump C fails.*

The easiest way to model these two pumps is to have two separate top events CGA and CGB, making CGB dependent on success or failure of CGA.

5. *The RCP loads supply and return headers are rather easily modeled. The piping to be modeled is entirely shown on P&ID 5R209F05021, Sheet 1. It starts on the top left hand corner with manual valve CC0429, through the four RCPs (motor coolers and seal coolers) and ends with the header at check valve CC0036, through the discharge header back to the top right hand corner with manual valve CC0437. There is an AOV in the return header controlled by the D train of DC power.*

6. *There are three room cooling fans for each CCW pump. The present PSA models only one per train. This is a conservative assumption since the success criterion for the fans was originally assumed to be one of the three fans required for successful cooling.*

COMMENTS ON EXISTING FAULT TREE MODELS

a. *The AOV (FV4493) in the RCP return header has been modeled in the PSA as a passive component. The dependencies should be modeled (separate top event split fractions) or the valve should be removed from the model making the model slightly conservative.*

b. Thermal barriers (heat exchangers) have not been modeled in the model for RCP seals, only the CCW supply.

c. The header valves in point 2. above have been included with the pump train. This is a conservative assumption. However, for the standby trains B and C, the MOVs on the supply and return headers must open on demand and this failure mode is not modeled.

d. The charging pumps top events has a conservative model. It does not model the capability of tying the train C header to the trains A and B header to supply both charging pumps through any CCW train. If the cross-tie AOVs are modeled, then their dependencies must also be modeled. (The event tree, however, allows all three CCW trains to supply both charging pumps.)

****

7. With all the macros defined for each train of each system, it would help the documentation in the model to have the impacts of the external events in the macros. For example, fail the appropriate AFW macros for initiator FR10, instead of just assigning the appropriate split fraction rule. Yes

8. According to the dependency matrix, loss of DC C fails the charging pumps A and loss of DC A fails the charging pump B This dependency is not reflected in the charging pump macro. fixed already

9. Reactor trip split fraction on loss of dc power initiators does not reflect failure of the shunt trip coils.

10. If macro MSIF is intended to be failure of MSIVs to close, the terms for DC power should not be included. According to the dependency matrix, loss of either DC A or DC B will close the MSIVs. check (Not fixed)

11. No sequences in the database for LOCCW1, LOCR1, LOEAB1, and LOECW1. The meaning of these initiating events is not quite clear. Does LOCCW1 mean that only one CCW train is available and it fails? The impact of -1, -2, and -3 seem to be the same. You can add the initiating events together to quantify just once and reduce the number of sequences in the database. explain

12. The database information suggests that split fraction RTA should be about 3.6E-04 and more. MFF has 5.5E-05. Shoba looked at wrong var.

13. RE5 - operator fails to recover T.D. AFW pump. This action must be justified in the sense of what are the types of

failures that are recovered and what is the available time window.

As noted in an earlier comment, when these late recovery actions are successful, the sequence is simply sent to a success state. The sequence, however, contains guaranteed failed split frations so the hardware of a lot of the systems is never questioned.

14. Sequences in LOECW2 (numbers 13, 14, 15, etc going to HANNS) are not core damage sequences. (and a few other initiators)

15. What is the definition of the additional recovery actions RPDS?

16. The top sequences in LOCCW_, MSV go to the non-core damage state of REMAIN.

17. The top sequences in LOSP, LOSPX going to HANNI are not core damage sequences.

18. There are two initiating events for the steam generator tube rupture. I assume that one handles core damage sequences after the faulted S/G has been isolated and the second handles core damage sequences for an unisolated S/G. It would be much easier to have the two models combined into a single model.

19. There are sequences of PZR PORV opening and failing to reseat in the SLBI initiator. Is this realistic? With at least one steam generator guaranteed to blow down dry, why would the PORVs lift? It makes more sense to have these sequences in SLBD if the break is downstream of the MSIVs.

20. Why is no credit taken for AFWD for SLBD but is allowed in SLBI?

21. Since the main steam PORVs are upstream of the MSIVs, why is top event CD guaranteed failed for SLBI and SLBD?

22. It is interesting that the top 100 sequences of SLBD are all loss of EAB HVAC sequences.

GENERAL COMMENTS

The end states HANNS, HANNI and REMAIN need to be examined closely for the nature of sequences that they contain. The sequences examined seem to be reasonable core damage sequences in characteristic. The worrisom part about the model is the low overall core damage frequency. With the recovery actions included in the model, it is difficult to think about the core

damage sequences that are simply sent to success state at the end of the model. Very good documentation is required for all the recovery actions that have been modeled in EPONSITE as well as in the recovery event trees. The total recovery (OR*OM*RE) seems to be extremely small number. The values in the MFF must be justified along with the time windows that each combination of OR, OM and RE require.

To: Rick Grantom June 25, 1997

From: Bill Stillwell

Subject: Response to PLG comments on STP IPE Revision 1 Model, STPREV1

The following responses to PLGs comments of May 23, 1996 on the Revision 1 IPE model, STPREV1, are provided for your review. The numbers refer to the comment numbers in PLGs letter. This is an updated response to the July 25, 1996 memo.

1. States TIMEB, TIMEC, TIMED, and TIMEF have multiple definitions. For example: TIMEB can mean trains A and B operating or trains B and C operating or trains C and A operating. Since the impacts of these states on the plant are different for initiating events, it would be much simpler if different split fraction designators were used for each state.

RESPONSE

The average model states TIMEB, TIMEC, TIMED, and TIMEF have been redefined to indicate the actual support state operating condition as follows:

OLD	NEW
TIMEB	TMBAB, TMBBC, TMBCA
TIMEC	TMCAB, TMCBC, TMCCA
TIMED	TMDAB, TMDBC, TMDCA
TIMEF	TMCAB, TMCBC

2.a. Other than the loss of offsite power type events, the initiating event frequencies in the data module do not match the initiating event frequencies in the event tree module. I suspect that the appropriate initiators have been increased by 25% to account for TIMEA. If not, 25% of the core damage has been discarded during the binning process.

RESPONSE

The plant initiating event frequencies were corrected, using the "Initiating Events" option in RISKMAN, to allow for use of IPE model in on-line maintenance calculations. The correction factor used was 0.70. This correction factor is based on the understanding that the initiating event frequencies used in the STP IPE model were derived assuming an average plant availability of 70%. The correction was applied by dividing the data base frequency by 0.70. The result of this correction is an annual initiating event frequency rather than an initiating event frequency based on average availability. The LOSP and LOSPX initiators were not corrected originally, but have been corrected in the current model.

The plant specific initiators and the external event initiators were not corrected as the frequency of these events is already presented in terms of an annual frequency.

TIMEA is used, as implied, to correct the initiating event frequency used in model quantification by the actual plant availability. For purposes of initial model quantification, the TIMEA correction factor is 0.25, which corresponds to an average plant availability of 75%.

2.b. The branch TIMEA is appropriate for a few initiators only. If it must be retained, why not provide a pass-through for all other initiators so that no computing time is spent calculating sequences going to bin REMAIN. Set it equal to zero. This will also make the information on initiating events in the data module consistent with the information in the event tree module. The output reports will then be consistent with the rest of the PSA industry.

RESPONSE

As used and quantified, the TIMEA branch is applicable to all initiators in the STP RISKMAN model STPREV1. No significant quantification time is spent on sequences going through the TIMEA branch as they are set to zero at the branch by split fraction rule assignment in the PMET event tree (SFGS0, with a value of 0.0, is used whenever the top event GENST is equal to the correction factor CFCORR, e.g. GENST=CFCORR). Further investigation has revealed that the variable TIMEA is never assigned because the rule that assigns TIMEA shows up in the split fraction rules of PMET after the assignment of 0 to top event GENST.

[SFGS0 GENST=CFCORR]

The process is described in the revision to the event tree quantification notebook.

Given the industry trend toward longer times between refueling, and fewer initiating events, both of which result in higher unit availability, the process used is felt to be a reasonable approach to allow model STPREV1 fulfill all of its intended uses at STP, including on-line maintenance.

2.c. Adding up the fractions in the different power states results in total exposure at power of 0.734 instead of 0.75. This is due to an error in calculation of TIMEB.

RESPONSE

Correction to the method of calculation of TIMEB has been incorporated in the current model.

3. For states GENS7, GENS8, and GENS9, one can deduce or assume the running and standby trains. Which trains are running during state GENS10?

RESPONSE

The comments associated with each GENST variable detail which support systems trains are operating. For state GENS10, "... Support trains A and B are assumed to be operating."

4. For loss of offsite grid sequences, where operator action OR is successful and offsite power is recovered, it is then assumed that all equipment in the OFFGRID event tree and the buses EA, EB, EC are available event though the random hardware failures were not questioned. The event tree OFFGRID seems to be revised to have all the branches needed. EPONSITE always had all branches. Why not just ask the availability of the hardware and write rules to figure out what is available after OR is successful?

The logic is {(loss of power*operator fails) + hardware fails}. The sum contribution of all the hardware that is bypassed may not be small.

RESPONSE

The electric power recovery included in top event OR has been moved to a new top event OGR in the OFFGRID event tree. This new top event models the recovery of the offsite grid within approximately one hour after its initial loss. The values for the OGR split fractions are the values previously used to model offsite power recovery in top event OR. Placing top event OGR in the OFFGRID tree directly after the top event that models the offsite grid, top event OG, resolves the concern about the status of the hardware associated with providing power to the 4160V buses E1A, E1B, and E1C.

The sum contribution of the hardware failures of the 4160V buses is not small and is now present in the sequences.

5. The macro DGMNT2 can never be true because the maintenance states of the three diesels have been defined as exclusive states.

RESPONSE

Checking

4.(6) ECW and CCW trains are tied together for standby logic so that low pressure in the CCW header (PSL 4644), or the ECW discharge (PSL 6885A or 6890A) will start the trains designated as STANDBY. No such logic exists for Essential Chilled Water Chillers or pumps, or the EAB HVAC fans. All trains start for SI and loss of power at their respective 13.8kV buses. What signal is modeled for non-SI, non-LOP initiating events (e.g. reactor trip or turbine trip) for the non-running trains of ECH and EAB HVAC fans? No operator actions were easily identifiable for these actions.

RESPONSE

No operator actions to manually start the third train of EAB HVAC, ECH, ECW or CCW after a general plant transient are included explicitly in the current model. These actions are explicitly included in the support system initiating event quantification. Operator response to failures in support systems after "General Transient" initiating events will be guided by the emergency operating procedures, abnormal operating procedures, or system operating procedures, as appropriate. The operator actions necessary to start the third train after failure of the two normally operating support systems (in the case of CCW the normally operating and the standby train) or the operating CVCS pump will be explicitly included in top event OR in a future revision.

For clarification, all available trains of the identified support systems are sent an automatic start signal for loss of offsite power or for safety injection actuation events.

5.(7) Same question for Centrifugal Charging Pumps, what starts the standby pump for non-SI, non-LOP initiating events?

RESPONSE

See the response to question 4(6) above.

6.(8) CCW to Charging pumps is rather complicated. An earlier review of the fault trees for component cooling water, charging and other CCW loads uncovered the following and the text is simply reproduced here. Some of the points are still valid for this model.

RESPONSE

See next section.

STP CCW SYSTEM AND CCW HEADER VALVES

1. Check valves to the discharge into the CCW header are best included with the CCW pumps (CC0311, CC0313, and CC0315).

RESPONSE

They are included with the associated CCW train (i.e., they are with the pumps)

2. Header valves MOV CC0312, CC0314 and CC0316 open with their respective pumps but close only on low level signals from their respective section of the surge tank. Similarly, MOV CC0192, CC0132, and CC0052. The header discharge check valves (CC0191, CC0131, and CC0051) do not disable the charging pumps. A top event defined for this header (HDR) can contain these 6 MOVs and three check valves so that failure of this top event is failure to supply the spent fuel pool loads, the RCP motor and thermal barrier cooling, and the other non-essential loads.

RESPONSE

Incorporated into STP_1996 as top events CLA and CLB for charging pumps A and B respectively.

3. If top event HDR is successful, then the top event for non-essential loads may be asked as it is in the power PSA model now. (Spent fuel header valves CC0447 and CC0032 and other loads header valves CC0235 and CC0236.) If top event HDR is failed, then not only the non-essential loads have already been isolated, but also the RCP loads.

RESPONSE

Incorporated changes to non-essential cooling model into STP_1996.

4. The two centrifugal charging pumps are supplied through some type of a headered system. Two AOVs in the headers are normally open and close on low surge tank level in the train A compartment of the surge tank or on loss of 125V dc at panel PL039A or on loss of instrument air. The result is to dedicate CCW train C supply to charging pump 1A, and CCW trains B and A to charging pump 1B.

The easiest way to model these two pumps is to have two separate top event CGA and CGB, making CGB dependent on CGA.

RESPONSE

This has already been incorporated in the system model for the charging pumps, top event CH.

5. The RCP loads supply and return headers are rather easily modeled. The piping to be modeled is entirely shown of P&ID 5R209F05021, Sheet 1. It starts on the top left hand corner with manual valve CC0429, through the four RCPs (motor coolers and seal coolers) and ends with the header at check valve CC0036, through discharge header back to the top right hand corner with manual valve CC0437. There is an AOV in the return header controlled by the D train of DC power.

RESPONSE

Already incorporated in top event SE.

6. There are three room cooling fans for each CCW pump. The present PSA models only one per train. This is a conservative assumption since the success criterion for the fans was originally assumed to be on of three fans required for successful cooling.

RESPONSE

There are three fans per room cooling unit. The one of three criteria applies to the number of CCW trains required. The three fans are modeled as a single air handling unit. An open item has been generated to resolve this issue in the near future either by collection of data by individual fan or individual air handling unit or analysis to support less than three fan operation per train for success.

COMMENTS ON EXISTING FAULT TREE MODELS

a. The AOV (FV4493) in the RCP return header has been modeled in the PSA as a passive component. The dependencies should be modeled (separate top event split fractions) or the valve should be removed from the model making the model slightly conservative.

RESPONSE

This AOV fails closed on loss of power, air or on a Train A or Train B ESF signal. It is in a parallel flow path with MOV CC0404. Closure of both valves results in a loss of cooling to the RCP motor, oil and thermal barrier coolers which could lead to a seal LOCA. This incorporated in the current model STP_1996.

b. Thermal barriers (heat exchangers) have not been modeled in the model for RCP seals, only the CCW supply.

RESPONSE

The thermal barrier heat exchangers are now included in the model for top event SE.

c. The header valve in point 2 above have been included with the pump train. This is a conservative assumption. However, for the standby trains B and C, the MOVs on the supply and return headers must open on demand and this failure mode is not modeled.

RESPONSE

Incorporated into the current model, STP_1996 as top event CLA and CLB.

d. The charging pumps top events has a conservative model. It does not model the capability of tying the C train header to the trains A and B header to supply both charging pumps through any CCW train. If the cross-tie AOVs are modeled, then their dependencies must also be modeled. (The event tree, however, allows all three CCW trains to supply both charging pumps.)

RESPONSE

Already included in new charging pump cooling model, top events CLA and CLB.

****

7(9) With all the macros defined for each train of each system, it would help the documentation in the model to have the impacts of the external events in the macros. For example, fail the appropriate AFW macros for initiator FR10, instead of just assigning the appropriate split fraction rule.

RESPONSE

This is a good idea. Incorporated into event tree documentation.

8.(10) According to the dependency matrix, loss of DC C fails the charging pump A and loss of DC train A fails the charging pump B. This dependency is not reflected in the charging pump macros.

RESPONSE

Corrected in the event tree model.

9.(11) Reactor trip split fraction on loss of dc power initiators does not reflect failure of the shunt trip coils.

RESPONSE

New split fractions that reflect loss of DC power have been incorporated into the reactor trip top event.

10(12) If macro MSIF is intended to be failure of MSIVs to close, the terms for DCpower should not be included. According to the dependency matrix, loss of either DC A or DC B will close the MSIVs.

RESPONSE

Corrected in EPONSITE model. Macro is used when MSIV isolation is necessary, MSIVs are designed to go closed on loss of either DC train.

11(13) No sequences in the data base for LOCCW1, LOCR1, LOEAB1 and LOCCW1. The meaning of these initiating events is not quite clear. Does LOCC1 mean that only one CCW train is available and it fails? The impact of -1, -2, and -3 seem to be the same. You can add the initiating events together to quantify just once and reduce the number of sequences in the database.

RESPONSE

The support system initiators, LOECW, LOCCW, LOEAB, and LOCR, are quantified under three different (and unique) boundary conditions. LOCCW1 implies that failure of the CCW function(system) occurs GIVEN that only one CCW train is available for operation and two trains are unavailable. LOCCW2 implies that failure of the CCW function occurs GIVEN that two trains are available and one train is unavailable. And, LOCCW3 implies that failure of the CCW function occurs GIVEN all three trains of CCW are available, no trains are out of service. For any of the support system initiator categories (e.g., LOCCW) the individual categories, LOCCW1, LOCCW2, LOCCW3, are mutually exclusive and cannot be summed. For a particular model quantification given a unique plant configuration, only one of the categories of support system initiator will be quantified. The other two categories are multiplied by zero using the PMET split fractions rules. For the average model, single train support system initiators are not possible.

12(14) The database information suggests that split fraction RTA should be about 3.6E-04 and more. MFF is 5.5E-05.

RESPONSE

A new data variable, ZTCB4D, Reactor Trip Breaker - Fail to Open on Demand, was developed and used in the PSA update.

This data variable is based on a review of relevant industry reactor trip breaker mechanical failures form 1980 to 1993. All reactor trip breaker failures were reviewed, those involving shunt trip failure or undervoltage trip coil failure were screened out. The remaining breaker failures were assumed to be caused by the breaker mechanically failing to operate. The number of demands was estimated by using an industry average of 8 trips per year per plant and a monthly reactor trip breaker test (on each of two breakers) that is capable of discriminating between the various causes of breaker failure.

The old data variable, ZTCB3D REACTOR TRIP BREAKER FOD, STP 94 UPDATE, was not used in the update but remains in the data base.

The MFF is correct.

13(15) RE5 - operator fails to recover T.D. AFW pump. This action must be justified in the sense of what are the types of failures are recovered and what is the available time window.

As noted in an earlier comment, when these late recovery actions are successful, the sequence is simply sent to a success state. The sequence, however, contains guaranteed failed split fractions so the hardware of a lot of the systems is never questioned.

RESPONSE

RE5 is used for LOSP, LOSPX, LOEAB and LOECW initiators only. These initiators all have similar characteristics in that loss of all AC power is implicit in the timing analysis (time to steam generator boil down). The value for RE5 is based on a previously performed data review that developed a distribution that represents the fraction of all TD AFW failures that are easily recoverable (e.g. overspeed trip on start). The value of RE5 is 0.7307 which indicates that only 30% of all failures are recoverable.

Consideration will be given to moving or creating, in a manner similar to OR/OGR above, a top event that explicitly models the likelihood of TD AFW pump recovery after initial failure. This will be resolved in a future update.

14(16) Sequences in LOECW2 (numbers 13, 14, 15, etc. going to HANNS) are not core damage sequences. (and a few other initiators)

RESPONSE

All LOECW sequences retained in the modeled were reviewed. Based on this review, it is felt that the sequences reatined are core damage sequences.

15(17) What is the definition of the additional recovery actions RDPS?

RESPONSE

Checking

16(18) The top sequences in LOCCW_, MSV go to the non-core damage state of REMAIN

RESPONSE

The top sequences of all initiators have been reviewed for correct assignment. The LOCCW_ and MSV sequences were corrected.

Core damage state REMAIN is a core damage state and is treated as such.

17(19) The top sequences in LOSP, LOSPX going to HANNI are not core damage sequences.

RESPONSE

The top sequences of all initiators, including LOSP and LOSPX, have been reviewed to ensure that they are actual PSA core damage sequences and for correct assignment to plant damage states.

18(20) There are two initiating events for steam generator tube rupture. I assume thatone handles core damage sequences after the faulted steam generator has been isolated and the second handles core damage sequences for an unisolated S/G. It would be much easier to have the two models combined into a single model.

RESPONSE

Yes. Will be incorporated in a future revision to the model.

19(21) There are sequences of PZR (pressurizer) PORV opening and failing to reset in the SLBI initiator. Is this realistic? With at least one steam generator guaranteed to blow down dry, why would the PORVs lift? It makes more sense to have these sequences in SLBD is the break is downstream of the MSIVs.

RESPONSE

Checking

20(22) Why is no credit taken for AFWD for SLBD but is allowed for SLBI?

RESPONSE

Checking

21(23) Since the main steam PORVs are upstream of the MSIVs, why is top event CD guaranteed failed for SLBI and SLBD?

RESPONSE

Top event CD models the operation of the AFW system and the steam generator PORVs for controlled decay heat removal. Failure of top event CD for SLBI is conservative in that the RCS cooldown is uncontrolled. CD is not failed for initiator SLBD if top event TT is successful.

22.(24) It is interesting that the top 100 sequences of SLBD are all loss of EAB HVAC sequences.

RESPONSE

Checking

GENERAL COMMENTS

The end states HANNS, HANNI, and REMAIN need to be examined closely for the nature of the sequences that they contain. The sequences examined seem to be reasonable core damage sequences in characteristic. The worrisome part about the model is the low overall core damage frequency. With the recovery actions included in the model, it is difficult to think about the core damage sequences that are simply sent to success state at the end of the model. Very good documentation is required for all the recovery actions that have been modeled in EPONSITE as well as the recovery event trees. The total recovery (OR*OM*RE) seems to be extremely small number. The values in the MFF must be justified along with the time windows that each combination of OR, OM, RE require.

RESPONSE

REMAIN contains no sequences with a frequency greater than approximately 2E-10. All sequences in REMAIN are treated as core damage sequences and are a result of slight (still under investigation) "discontinuities" in Binning Rule assignment.

The product of OGR (old OR) times OM times RE for all recovery actions modeled equals the sequence specific recovery values for various LOSP conditions received from PLG. The time windows, etc. are based on the status of AFW, the number of DGs available for recovery, whether or not the positive

displacement charging pump is available, and the time to SG uncovery/Core damage given these conditions.

Recovery is not applied for most general transient initiators. Limited recovery is quantified for the SLOCA, ISLOCA, Seismic and SGTR initiating events. Significant recovery is modeled for LOSP, LOSPX and somewhat less significant for LOEAB and LOECW initiators. It is felt that recovery is correctly applied in the set of recovery event trees.

As a test of model "robustness", a run was quantified that set all recovery actions to 1 (guaranteed failure), core damage frequency increased less than a factor of ten.

The current core damage frequency, approximately 1E-05, does not appear unreasonable in light of the three trains (four trains for AFW) design at South Texas. Most Westinghouse PWRs now have CDFs in the range 1 to 5 E-05.