

EXHIBIT 33

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Act, exemptions b2
FOIA- 2004-321

Case No. 3-2001-055

6-20
Exhibit 33

Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

June 14, 2002

Mr. Scott Langan
Special Agent, Office of Investigations
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-43551

Re: Oscar Shirani

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Dear Mr. Langan:

Enclosed are documents produced by [REDACTED] following his interview on May 30, 2002.

Please let me know if you have any questions regarding any of these documents.

Sincerely,



Robert E. Helfrich
Assistant General Counsel
Exelon Nuclear

Enclosures

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GE Nuclear Services

Open Forums
January 1997



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AGENDA

- 1996 CLOSURE
- FIRST IMPRESSIONS
- THE QUALITY IMPERATIVE!
- RESOURCING STRATEGY
- 1997 CHALLENGES

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DRH FIRST IMPRESSIONS - LIMITATIONS

- Variable quality
- Resource limitations
- Procedures/process discipline
- Information flow to NAMs

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8-2001-0554

THE QUALITY IMPERATIVE!

- Quality is broadly recognized as a MUST for success
- Extensive 6 Sigma initiatives underway

- a little bit harder
in Svcs

HOWEVER:

- Delivery problems being experienced
- High cost of quality
- Customer perceptions increasingly negative
- Slow to acknowledge and correct problems
- Weak fundamentals

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- Resource shortage / business opportunity
- bu

LEADERSHIP OBLIGATIONS FOR QUALITY

- Provide clear expectations
- Effective processes and procedures
- Performance measures/monitoring
- Self-assessment processes

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QUALITY EXPECTATIONS AND COMMITMENTS

- Procedure/process compliance is NOT optional
 - follow procedures
 - identify problems
- We WILL fix and improve processes
- This WILL be the focus of our 6 Sigma efforts
- We WILL limit the work to what can be done properly!

Services Procedures - Schedule

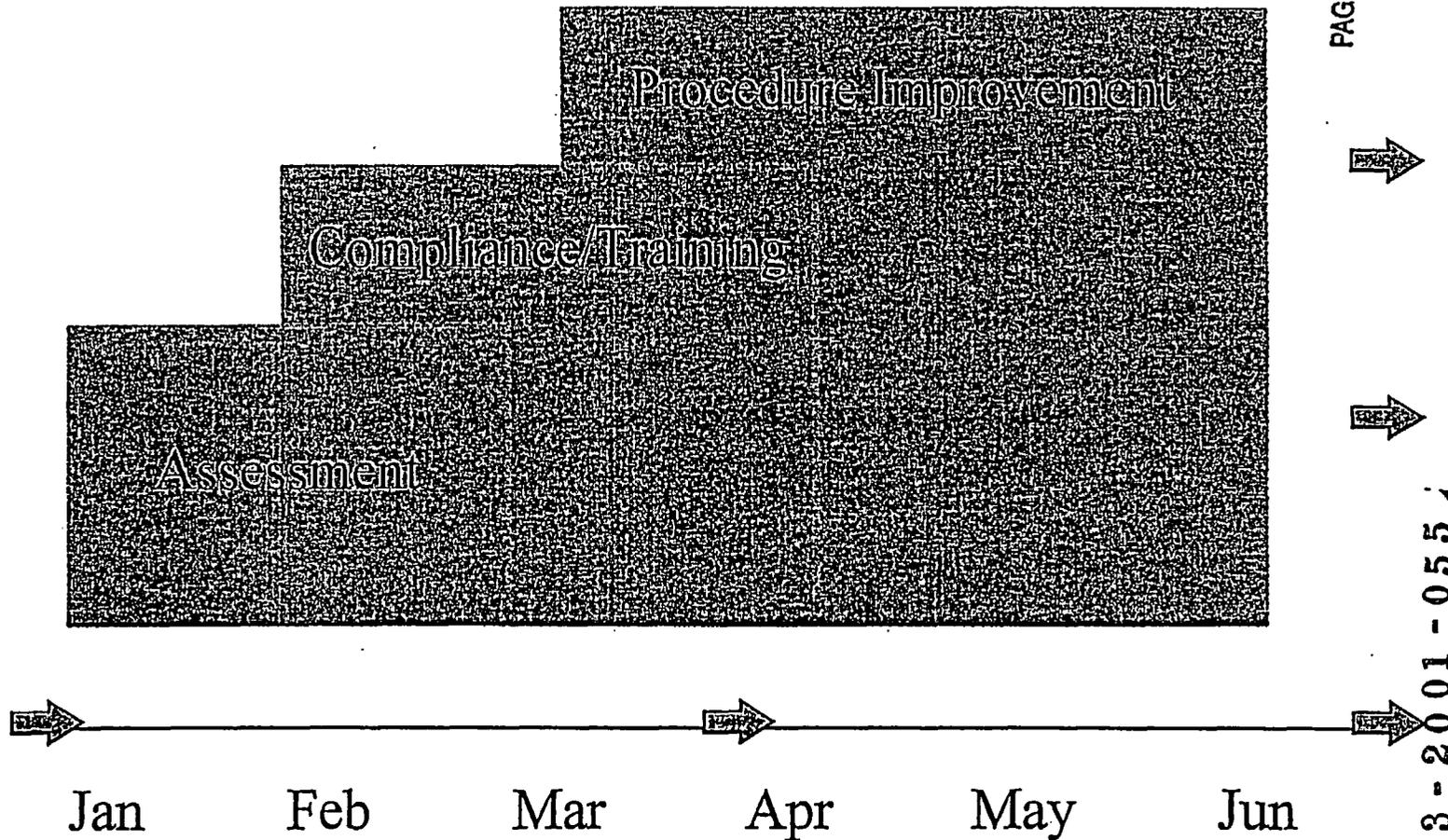


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Continuous Improvement Process

RESOURCING STRATEGY

- We WILL supply resources to support the business
- Need to be aggressive and creative
- Leveraged relationships
- Improved resource planning
- We WILL limit the work to what can be done properly!

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1997 CHALLENGES

- Quality
- Growth

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GE Nuclear Energy

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SERVICES LEADERSHIP MEETING

APRIL 2, 1997

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NUPIC/PECO Audits

- Some signs of improvement
- SCAQ - Incomplete CA processes
- Continued procedure non-compliance
- Poor line management accountability
- Incomplete and untimely corrective actions
- Weak self-assessment

Management Oversight	Generic Issues	Causal Factor 1A	Causal Factor 1B	Causal Factor 1C	Causal Factor 1D	Causal Factor 2	Causal Factor 3	Causal Factor 4A	Causal Factor 4B	Causal Factor 5	Causal Factor 6	Causal Factor 7	Causal Factor 8	Causal Factor 9	Causal Factor 10	Causal Factor 11	Causal Factor 12	Causal Factor 13	Causal Factor 14	Causal Factor DOC	Causal Factor DOC	Causal Factor DRF	Causal Factor PROJ
	Weak Work Scope Definition	X				X							X										
	Internal Coordination	X	X	X	X	X						X	X			X		X					X
	External Interface	X	X	X	X																		
	Procedure Compliance/Monitoring									X	X			X	X		X			X	X	X	
	Weak Quality Plan							X	X	X			X	X			X	X		X	X	X	
	Work Load/Schedule/Resource						X				X					X	X	X					

Effectiveness of Management Oversight

- **Causal Factor**
 - Change in organizational structure hampered management oversight of generic processes
- **Root Cause**
 - Project delivery focus of organization raised the necessary oversight of common process deficiencies too high in the organization (General Manager level)
- **Corrective Actions**
 - Line Managers (business leaders) own corrective actions within their business
 - Line Managers are accountable for the implementation and monitoring of the corrective actions
 - Mission managers, Engineering Leaders and project managers are expected to ensure
 - execution of established process and procedures
 - compliance and monitoring of established procedures
- **Measurements**
 - Line management will establish and provide quarterly report of quality measurements
 - Periodic audits will be performed to ensure compliance and effectiveness of corrective actions

List of Corrective Actions

Generic Issues	Interim Corrective Actions	Long Term Corrective Actions	Monitoring
Procedure Compliance/ Monitoring	<ul style="list-style-type: none"> Written communication from GM to each employee to reinforce compliance requirements by 1/31/97 	<ul style="list-style-type: none"> Address procedure compliance difficulties and correct deficiencies – continuous effort. 	<ul style="list-style-type: none"> Mission Managers will conduct routine project reviews and document results in order to ascertain compliance. Results will be reported to GM on a quarterly basis. Conduct Quality Assurance Audit in 1997.
Weak Work Scope Definition	<ul style="list-style-type: none"> Improve Technical Review Guide for proposal work scope Require signoff of all PECO proposals for Services Communicate new requirements to all project managers Complete above actions by 1/31/97 	<ul style="list-style-type: none"> Apply improved Technical Review Guide and monitoring process to all GENE proposals and business by 2Q97. 	<ul style="list-style-type: none"> 100% review by GENE line management depending on value of proposal in accordance to existing procedures. Perform internal audits to verify compliance
Internal Coordination	<ul style="list-style-type: none"> Completed development of NF/NPP/NS Interface process. Complete training of Interface Process by 2Q97 <ul style="list-style-type: none"> Fuels (90%) Services (25%) 	<ul style="list-style-type: none"> Review and enhance Policy and Procedures to institutionalize the Interface Process by 2Q97 	<ul style="list-style-type: none"> 100% verification by Mission Managers that each interface project has a Quality Plan that addresses interface requirements. Perform internal audits to verify compliance

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List of Corrective Actions

Generic Issues	Interim Corrective Actions	Long Term Corrective Actions	Monitoring
Weak Quality Plan	<ul style="list-style-type: none"> • Require Quality Plan for each project • Communicate new requirements to all project managers • Complete above actions by 1/31/97 	<ul style="list-style-type: none"> • Review and enhance Policy and Procedures to institutionalize the requirement for a Quality Plan by 2Q97 	<ul style="list-style-type: none"> • 100% verification by Mission Managers that each project has a Quality Plan • Perform internal audits to verify compliance
External Interface	<ul style="list-style-type: none"> • Enforce procedure compliance to require documentation for verified customer inputs, data, and requirements 	<ul style="list-style-type: none"> • Establish better formality and change control in procedures and requirements by 4Q97. 	<ul style="list-style-type: none"> • Mission Managers will conduct routine project reviews and document results in order to ascertain compliance. Results will be reported to GM on a quarterly basis. • Conduct Quality Assurance Audit in 1997.
Work Load/Schedule/Resource	<ul style="list-style-type: none"> • Established Engineering Leaders with defined roles and responsibilities in resource allocation and 		<ul style="list-style-type: none"> • Engineering Manager will review resource utilization and allocation and report to GM on a quarterly basis.

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The Services Quality Challenge

- *Customer Scorecards/Dashboards*
- *Internal Measurements*
- *Performance Issues*
- *Improvement Priorities*

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Management of Business Quality issues

- *Multiple Issues in Business Processes*
 - *NQA Engineering Assessments*
 - *PECO Arts - Quality of Technical analysis*
 - *NUPIC - Corrective Action Effectiveness*
 - *ComEd - Technical Analysis/Records*
 - *Millstone*
 - *50.54f*
 - *Commercial Grade Dedication Process*
- *Root cause Analysis in Analysis Area Identified Causal factors and Generic problems*
- *Parts Dedication Impacted by Process Change that Introduces a Compliance Defect*
- *Training and Metrics established to Drive/Improve Management Accountability for Product Quality*

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Customer Provided "M" -
6 σ Tools & "A-I-C" Provided Solutions for Business



August 29, 1997
SES-97-261

Mr. Robert Nicholls
QA Manager
GE Nuclear Energy
175 Curtner Avenue
San Jose, CA 95125

Subject: Stop Work of GE Nuclear Energy (GENE) Nuclear Services safety related Engineering and Design activities performed at San Jose, CA for all ComEd BWR Stations (Dresden, Quad Cities, and LaSalle County). Effective Date for Stop Work - August 29, 1997

Dear Mr. Nicholls:

ComEd Supplier Evaluation Services performed a design audit, G-97-120, of GENE during the period of August 18 - 22, 1997. The focus of this audit was to evaluate engineering activities associated with ComEd design control processes with emphasis on calculations.

ComEd is issuing this letter as an enforcement for GENE Nuclear Services to stop work for all ComEd BWR stations on GENE safety related Engineering and Design activities performed at San Jose, CA as follows:

- GENE Nuclear Services shall not begin work on design activities for which no work has been started by GENE or future work received from ComEd until release of the stop work.
- Design work for ComEd that is currently underway may continue, however, upon completion is required to be independently reviewed by GENE and subsequently upon approval be provided to the respective ComEd Site Engineering Manager. ComEd Engineering will review this work for acceptance.

This decision is made based upon the extensive nature and severity levels of the subject audit findings. ComEd's expectation for lifting the stop work on General Electric is the demonstration that requisite programmatic controls are effectively in place for the design control process.

ComEd needs to establish confidence that proper steps will be taken by GENE Nuclear Services to restore the safety related engineering and design activities meeting applicable codes and standards.

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A Halton Company

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ComEd Stop Work Implications

9/18/97

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Agenda

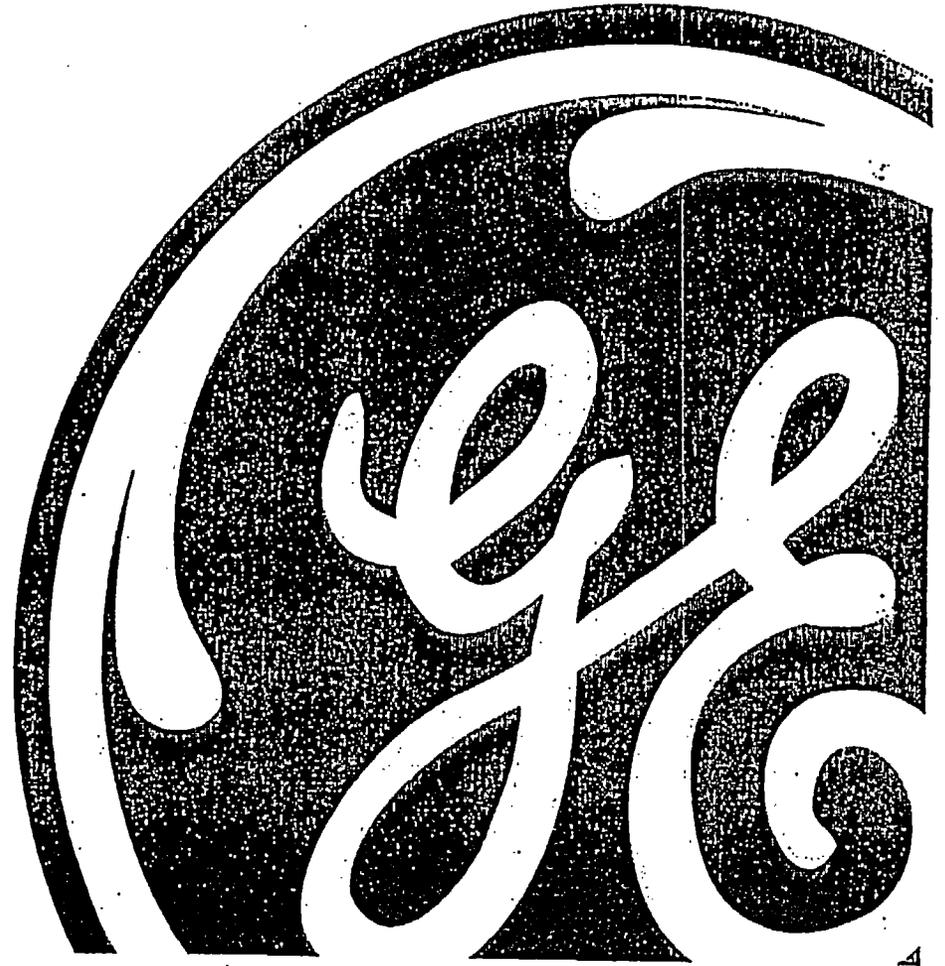
- Introduction
- Audit Findings and Stop Work Order
- Corrective Action Plan
- EOP Refresher
 - Independent Design Verification (42-6.00)
 - Design Record Files (42-10.00)
 - PERs (75-3.00)
- Summary

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Status of ComEd Audit Issues



September 15, 1997

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Review of ComEd Audit Performance

Audit Focus

- Audit focused on control of design calculations
 - Result of commitments made to the NRC
 - Beyond scope of previous NUPIC design audits
 - GE had supported the audits of other ComEd suppliers
- Audit scope limited to ComEd DRFs containing calculations
- Audit team reviewed
 - Available DRFs covered last 3 years
 - 11 from 94; 9 from 95; 4 from 96; 2 from 97
 - 15 DRFs reviewed by ComEd team
 - DRFs contained 48 calculation packages

Audit Outcome

- Restricted new work initiation for safety related design calculations in San Jose
- Work in process allowed to continue with increased management oversight
- Self imposed compensatory actions on all design calculations due to process similarity

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Summary of Issues

Key issues summarized

- Administrative and editorial errors
- Documentation of independent design verification
- Thoroughness of DRF documentation
- Lack of technical participation on audits
- Documentation of specific verification and validation of commercial software used in calculations
- Control of design inputs from customer agents (i.e. S&L inputs)

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Relationship to Existing Improvements

8-2001-0RB
8-2001-0RB

New Area for Evaluation

Issue Summary	Procedure Compliance	Work Scope Defn.	Internal Coord.	External Interface	Resources
Admin./Editorial Errors	X				X
Documentation of IDV	X		X		X
Thoroughness of Documents		X	X		X
Technical Audits					
Documentation of Software V&V	X				
Control of design inputs with Agents				X	

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Most Issues Identified Map to Existing Improvement Areas

Action Plan

- Evaluate technical issues to assure no impact on analytical results Underway
- Complete responses to ComEd findings - identify interim compensatory measures 9/16
- Communicate summary of issues with employees 9/17
 - provide examples of issues
 - discuss expectations going forward
- Perform audit of similar scope on recent work to assure current corrective actions are effective 9/15 - 17
- Request removal of ComEd restrictions on new work - schedule follow-up review 9/18
- Implement interim compensatory measures to provide added level of assurance until ComEd follow-up 9/18 +

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Conclusions

- **Previous interpretation of technical participation in audits under evaluation**
 - current position was based on results of NRC audit in NPP
- **ComEd audit identified historical issues in “backlog” of that had been identified in January 1997**
- **Root cause of issues identified were covered by existing improvement programs**
- **Action plan focused on reinforcing need for compliance and immediately assessing effectiveness of current corrective actions**
- **Assessment will confirm processes in place are effective in preventing recurrence of identified issues**
- **Working to release restrictions this week**

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Summary

- Prompt response to ComEd audit findings required
- On-going improvement activities showing positive trend
- Interim action:
 - Mission/functional manager review prior to issuance of final reports

Continued focus on the details needed

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GE Nuclear Energy

James F. Klapproth
Manager, Technical Services

General Electric Company
175 Curtner Avenue M/C 706
San Jose, CA 95125
(408) 925-5434

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November 17, 1997

To: All Tech Services Personnel
From: Jim Klapproth
Subject: Functional Manager Review Process

On August 29, ComEd issued a stop work order for any new GE analyses involving safety-related design calculations. In meetings with ComEd representatives on October 30-31, the GE actions required to lift the stop work order were defined. These actions include the issuance of acceptable responses to the 12 CARs issued by ComEd and an interim engineering and Quality Assurance oversight for ComEd deliverables involving safety-related design calculations.

The interim process for satisfying the independent engineering and QA oversight is designated as Technical Services Engineering Instruction EI # 001-97. This EI, a Functional Manager checklist and supporting information can be found at s:\techsvcs\procedur. The process requires that an independent review be performed by the Functional Manager or the designated backup knowledgeable in the technical area prior to release of the final product. These reviews will utilize the Functional Manager checklist provided as Attachment A in the EI. At the completion of the review, the Functional Manager will assign a grade to the final report and documentation based upon the following guidance:

- G1 - No comment. The reviewed product is acceptable as presented.
- G2 - There are comments that would improve the quality of the product; however, the product as presented is acceptable.
- G3 - Revision required to incorporate comments. A PER should be considered if the product is completed.
- G4 - Erosion of safety margin. Requires revision to assure adequacy for present use. A PER must be generated if the product is completed.
- G5 - Potential violation of design or licensing basis. Requires revision to assure adequacy for present use. A PER must be generated if the product is completed.

The results of these reviews will be trended and reported to ComEd on a monthly basis.

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Please note that while the Engineering Instruction applies only to ComEd, in the interim I am requiring that all safety-related design calculations for all utilities follow the same process.

I realize that this review requirement will result in an additional burden on the responsible engineers and Functional Managers. However, this action is necessary to demonstrate that our work is compliant with the existing EOP requirements. The checklist is a tool that compiles these requirements in one place and facilitates a consistent review by the Functional Managers. You are encouraged to utilize the checklist in the planning, performance and review of your work.

These requirements are consistent with the guidance provided at the September 18 and October 21 Technical Services meetings. Conformance with these requirements is essential to our efforts to have the stop work order removed.

Thank you for your support,

Jim Klapproth, Manager
Technical Services

cc: DR Helwig
SA Hucik
MT Savoff
GL Sozzi
G Plotycia
C Reda
RJ Nicholls
AE Sullivan
Services Business Managers

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November 19, 1997
SES-97-339

Mr. Robert Nicholls
QA Manager
GE Nuclear Energy
175 Curtner Avenue
San Jose, CA 95125

Subject: Lifting of Stop Work Order for GE Nuclear Energy (GENE) Nuclear Services Safety-Related Engineering and Design activities Performed at San Jose, CA for all ComEd BWR stations
Effective Date for Lifting Stop Work - November 19, 1997

Reference: Stop Work Order Letter from E. Netzel to R. Nicholls (SES-97-261), dated 8/29/97

Dear Mr. Nicholls:

The referenced stop work letter was issued in response to the extensive nature and severity levels of the ComEd audit findings resulting from an audit performed during August 18 - 22, 1997 at General Electric in San Jose. ComEd has had several conference calls and one meeting in San Jose to resolve the stop work. G.E. has provided the following actions to establish confidence with ComEd that safety-related engineering and design activities will meet applicable codes and standards. These actions are the following:

1. The establishment of an additional overview at General Electric for design analysis. This additional overview will be performed by the functional manager after the product has been through the independent design review and will include a technical review of the design analysis. Discrepancies will be documented for trending purposes. This process will be defined in a G.E. Technical Services Engineering Instruction.
2. G.E. QA will perform an independent review of the first six calculational design products in parallel with the functional managers review using the same checklist the functional managers will be using. QA will compare the results of their review with the functional managers review to determine consistency and the level of issues. Based upon the results of this review, G.E. QA will then determine the frequency of subsequent QA reviews.

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3. General Electric will provide ComEd a monthly trend report on the results of the functional manager reviews.
4. G.E. has provided acceptable responses to the individual audit findings from ComEd audit G-97-120.

As a result of the aforementioned actions taken by General Electric in response to ComEd letter SES-97-261, ComEd Supplier Evaluation Services Department is now lifting the formal Stop Work Order for safety-related Engineering and Design activities performed at San Jose, CA, for ComEd BWR stations. ComEd Supplier Evaluation Services will schedule a corrective action follow up to verify corrective actions and their effectiveness. Additionally, ComEd Engineering will continue to request safety-related calculation packages for review at G.E.'s Oakbrook facilities on a sampling basis.

Please acknowledge the lifting of the Stop Work Order by signing this letter and returning to me immediately. If you have any questions, please contact Oscar Shirani on (630) 663-7934.

Sincerely,



Edward R. Netzel
Supplier Evaluation Services Director

I acknowledge ComEd's lifting of the Stop Work Order for safety-related Engineering and Design activities performed by GENE Nuclear Services.

R. Nicholls
QA Manager G.E.

ERN:jkw/k:\seserv\joni\97-339.doc

cc: L. H. Waldinger (N.O. Manager)
J. B. Hosmer (Engineering Vice President)
R. Freeman (Site Engineering Manager - Dresden)
R. Fairbank (Site Engineering Manager - Quad Cities)
G. Poletto (Site Engineering Manager - LaSalle)
F. Famulari (Quad Cities Q & SA Manager)
D. Winchester (Dresden Q & SA Manager)
W. Riffer (Acting LaSalle Q & SA Manager)
S. Perry (Dresden SVP)
W. Subalusky (LaSalle SVP)

W. Pierce (Quad Cities SVP)
W. Betourne (C-Team)
O. Shirani
K. Salehi

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Robert J. Nicholls
Manager, and Master Black Belt
Nuclear Services Quality

General Electric Company
175 Curtner Avenue M/C 165
San Jose, CA 95125
(408) 925-5241
e-mail: NichollsR@sjcpo4.ne.ge.com

October 10, 1997
RJN 97-011

Mr. Oscar Shirani, PE
Audit Team Leader
Commonwealth Edison Company
1400 Opus Place
Downers Grove, IL. 60515-5701

Subject: Responses to Findings and Unresolved Issues from Special Audit G-97-120.

Reference: 1) SES 97-276, Mr. O. Shirani to Mr. R. Nicholls; Special Audit G-97-120, September 18, 1997
2) SES-97-261, Mr. E. Netzel to Mr. R. Nicholls; Stop Work of GE Nuclear Energy Safety Related Engineering and Design Activities performed at San Jose, CA; August 29, 1997.

Dear Mr. Shirani;

In response to the reference letter, please find enclosed the GE Nuclear Energy responses to the findings and unresolved issues from the subject Audit. Please review these responses, and provide your assessment of the adequacy of our planned actions. We believe the proposed actions, combined with actions we currently have underway, will re-establish the requisite programmatic controls for our design processes.

After completion of your review, we request a meeting with ComEd Supplier Evaluation Services to discuss the necessary actions to remove the work restrictions imposed in the reference 2 letter.

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We appreciate your candid and frank observations during the subject audit, and the efforts extended by the Supplier Evaluation Services organization over the subsequent time frame to assist in our resolution of the findings. If you have any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

Robert J. Nicholls

R.J. Nicholls
Manager - Nuclear Services Quality
GE Nuclear Energy

cc: Mr. E.R. Netzel - ComEd

N. Barclay
S. Dua
D. Helwig,
J. Klapproth
G. Plotycia
P. Sick
G. Stramback

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-01

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: E2

Response Due Date: 10/10/97

CAR Type: External

TITLE: Inadequate Engineering Records

DESCRIPTION: Numerous administrative and editorial errors were found in GENE design documents. Examples of these errors include document legibility, page numbering, record identification, changes made improperly and suitable identification of the preparer & reviewer. These discrepancies reveal a lack of formal control in the GENE design control process. Contrary to GENE Procedure EOP 42.100 specifies elements that need to be contained in design documents. However, the audit team found a variety of discrepancies which include: No identification by subject; originator and/or verifier not identified; data discrepancy in documents; many page numbering problems and legibility problems. A detailed description of the issues are described as follows: 1. In DRF 137-0010-7 (ISIS No. 1EXB5), all seven calculations in the Tabs B, C, D, E, F, G and N have no record identification number. 2. Page number is missing on the page following the page 17 of the calculation in Tab B of DRF 137-0010-7 (ISIS No. 1EXB5). 3. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab N, two pages following the page 4 have no page numbers. These two pages appear to be scratch pages, informally marked during some discussions, and seem to be out of context. 4. In DRF A12-00098 (ISIS No. ESR5), changes made by had on the pages A-3, A-5 and page # 224 of computer listing in index 5 are not initialed by the preparer and the reviewer. 5. In DRF A12-00098 (ISIS No. 1ESR5), all the figures and the tables have no record identification numbers. 6. In DRF A12-00098 (ISIS No. 1ESR5), all pages of computer output for SAFG07 program (about 6" thick output) have no record identification numbers. 7. "Structural Evaluation of Potential Top Guide & Core Plate Cracking at Dresden 2 & 3, DRF No. 137-0010-8, GE-NE-523-A081, ISIS No. 1FQXX, Dated 12/1/95. a) Sheet 1, (cover sheet), line 2 of ?? The total number of sheets is unknown. The sheet number is labeled up to 66. It can not be determined that there are any other sheets missing, since the total number is unknown. b) Sheet 1, (cover sheet), item 1A, Application: Dresden 2 reactor assembly. It should be Dresden 2 & 3 reactor assembly. c) Sheet 1, item 1F, Responsible Engineers are C.L. Chu/Ed Ng. Only Mr. C.L. Chu signed this sheet, but Mr. Ed Ng did not sign it. Mr. C.L. Chu indicated that Mr. Ed Ng resigned at that time and was not available to sign. d) Sheet 1, item 4A should be check marked. e) No sheet number is labeled on the Reference sheet. Also, References 2 and 4 have no indication of revision number or date. f) Cover sheet is labeled as sheet 1. Sheet of the Objective section is also labeled as sheet 1. Why do two separate sheets have the same number?? g) Sheet 1 (item 1C) 4, 5, 8, 57, 58, 59 and 60 have been "Lined-out and Changed" without being initialed and dated. h) Several sheets have no DRF Numbers to indicate that these sheets belong to this DRF. i) Letter from C.L. Chu/D.B. Drendle (GE) to J. Williams (comEd), Subject "Dresden Nuclear Power Plant Units 2 and 3, Structural Evaluation of Potential Top Guide and Core Plate Cracking", Dated 11-17-98. The date 11-17-98 is incorrect (i.e. it is a future date). 8. DRF No. 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. a) Sheets 18 and 19 are missing, Were these sheets part of the original calculation? b) Several sheets have no DRF Numbers to indicate that these sheets belong to this DRF. c) Sheet 1, item 1D indicated, "see sheet 5 of letter". Sheets 3 through 10 are editorial comments on Draft Letter GLS 94-11, Dated 6/8/94. Sheets 25 through 34 are the final letter GLS 94-11. Sheet 1 item 1D should indicate, "see Sheet 25 through 34" instead of sheet 5, since sheet 5 is one of the pages of the draft letter. d) Sheet 1, item 4A should be check marked. 9. "KVS a Profile for H5 Weld". DRF # 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. a) Several sheets have no DRF Numbers to indicate that these sheets belong to this DRF. b) Sheet 1, item 4A should be check marked. 10. "Evaluation of the indications Found at H5 Weld in Dresden Unit 3". DRF No. 137-0010-7, GE-NE-A69, ISIS No. 1EXB8, Dated 6/7/94. a) Sheet 1 indicates that this DRF has 14 sheets. However, after carefully counting the sheet numbers, the total number of sheets is 20. b) Sheet 1, item 4A should be check marked. 11. "LaSalle Unit 1 and Unit 2, Riser Pipe Flaw Evaluation Handbook". DRF No. B13-01869-009, ISIS No. 1G5WA, Dated 3/26/97. a) The results summary from computer analysis on sheets 15, 17 and 18 should have a detailed cross

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Customer CAR #: G-97-120-01

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reference for these computer analysis. Also, a detailed list of all computer analysis should be provided in this DRF. b) Sheet 1, item 4A should be check marked. c) Several sheets have no DRF Number to indicate that these sheets belong to this DRF. 13. "Dresden 2 In-Vessel Visual Inspection Flaw Acceptance/Disposition Criteria", GE DRF No. 137-0010-7, ISIS No. 1F3ST. a) Sheet 47b was initialed by MKK as a preparer, but he didn't sign as a preparer on the verification cover sheet, (MKK was not a preparer nor a verifier on the cover sheet). b) Sheet no. 48, "Superseded by...", "Signature, initial of person who wrote this statement, and date were missing. c) The calculation portion of DRF does not have final page no. or total no. of sheets. It also does not have a control on the subpages. In addition, many sheets have no DRF numbers, nor GE titles, etc. to identify which DRF sheets should belong to. 14. DRF portion is dated 4/12/95, "RCIC System Performance Calculations for Operating Plan", DRF No. E51-00178 Volume 1, Section 6, ISIS No. ISIS LS509. a) On Engineering Analysis Verification Cover Sheet, Section 1D input section, item C, date is August 17, 19972, which is a typographical error. b) One attached sheet after sheet 12 of 12 is found. Therefore, the item 4A on the engineering analysis verification sheet should have been check marked. c) Sheet nos, 7, 8, 9 and 9A (Dated 8/15/96) were included in this portion of DRF after the preparer and the verifier had signed (Date of 4/ 12/ 95? for the original document. 15. Portion of this DRF, date 8/15/96, "RCIC System Performance Calculations for Operating Plan", DRF No. E51-00178 Volume 1, Section 6, ISIS No. ISIS LS509. a) On Engineering Analysis Verification Cover Sheet, Section 1D input section, item C, date is August 17, 19972, which is a typographical error. b) One attached sheet after sheet 12 of 12 found. Therefore, the item 4A on the engineering analysis verification sheet should have been check marked. 16. DRF T23-00740: Four calculations in sections 1.0, 2.0, 2.7 and 2.9 of DRF T23-00740 contains calculation pages that do not have sequential or total page numbers or have no DRF # and section in the header identifying the page belonging to this DRF. This should be corrected for the sections indicated and all sections of this DRF which apply. 17. DRF B13-01760: Availability Section has calculation pages which do not have total page numbers. This should be corrected for the section indicated and all sections of this DRF which apply. DRF B13-01760 PER # TS-97-003, GE self identified significant deficiencies with this DRF. These PER items must be corrected. Items not found in PER were: all final reports delivered to ComEd and their independent design verification were not included in DRF microfiche. All of ComEd comments on draft revisions were not included in DRF. These should be inserted into the DRF. 18. DRF L12-00817: "MSLB TRACG analysis": Many of the pages of the DRF did not have page numbers or the DRF identified. This should be corrected for all sections of this DRF which apply. 19. DRF L12-00817: The output files that were used for ATRAC could not be determined from the documentation. 20. DRF L12-00817: "ISCOR calculation of Quad Cities Cycle 14": This calculation was represented by computer input and computer output. The output used for input to ATRAC was difficult to follow from the lack of organized documentation. 21. DRF L12-00817: "PANACEA Calculation of Quad Cities"; This calculation was represented by computer input and computer output. The output used for input to ATRAC was difficult to follow from the lack of organized documentation. 22. DRF L12-00817: "ODYN-SS Calculation of Quad Cities": This calculation was represented by some minor calculations and a computer input and computer output. The output was used for input to ATRAC was difficult to follow from the lack of organized documentation. 23. DRF L12-00817: ATRAC Calculation of Quad Cities, this calculation used input from ISCOR, PANACEA, OPL-3, and ODYN-SS to develop input to TRAGG. ATRAC identified values that were needed to complete the TRACG input. These values were developed as part of the DRF. The output used for input to ATRAC was difficult to follow from the lack of organized documentation. 24. DRF B21-0537: Water Level instrumentation Support- "Calculation RVWILLS Condensing chamber,": Could not read calculation and drawings. 25. DRF B21-0537, "Mixed Mean Model Spread Sheet Usage,": Calculation document illegible. 26. DRF B21-0537: "Calculation of Puddle Depth in the CC at LaSalle,": Calculation document illegible. 27. DRF B21-0537: "Calculation Heat Transfer Coefficient Estimate,": Calculation document illegible. 28. DRF B21-0537: "Calculation of Condensing Chamber Data Flow Split Calculation.": Calculation document illegible. 30. DRF B21-0537, "Data Used in EXCEL Spread Sheet (Mixed Mean Temperature).": calculation document illegible. 31. DRF B21-0537, "Steam Leg Depth Calculation,": Calculation document illegible.

RECOMMENDED ACTION:

- CAUSE:**
1. Lack of Management work planning and oversight.
 2. Accelerated schedule and lack of resources.

EFFECT / EXTENT: Random errors. No safety impact.

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Customer CAR #: G-97-120-01

CORRECTIVE ACTION: A Design Record File (DRF) is an in-process record which is subject to change until it is closed (EOP 42-10.00, Revision 7). There is no EOP requirement to number the DRF pages until the DRF is submitted for closure. The administrative and editorial errors will be corrected. A corrective action plan to address all items, 1 through 31, on this CAR has been developed. Specifically for items 18 through 23, additional information will be added at the front of the calculation such that a reviewer, with minimal knowledge of the subject matter, can understand the calculation. Also for items 24 through 31, legible copies will be placed in the DRF supplement.

PREVENTIVE ACTION:

1. Management will be instructed to establish effective work scheduling consistent with available resources.
2. Train engineers and management in the DRF process to produce quality documents.
Done on 9/18/97.
3. Management will be instructed to increase their attention to details before approving DRFs for closure.

Scheduled Completion Date: 12/31/97

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

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EXHIBIT 33
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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-02

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: A2

Response Due Date: 10/10/97

CAR Type: External

TITLE: Independent Design Review process was determined to be ineffective

DESCRIPTION: Due to the numerous design control deficiencies being identified during this audit, the GENE independent design review process was determined to be ineffective. Contrary to GENE Procedure EOP 42.600 "Independent Design Verification", Sections 2.4 and 2.5, revision 8, dated 2/3/97, the independent design review process failed to ensure that design calculation integrity was obtained (reference CARs G-97-120-01 & G-97-120-03 for details). Furthermore, the following GENE design documents were found deficient for documenting independent design verification: 1. "Response to Commonwealth Edison Technical audit Questions", DRF No. 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. (Engineer Interviewed: H. Mehta) a) Sheet 1 indicated that Mr. H. Mehta is the independent verifier. However, sheets 17 through 24, Mr. H. Mehta as signed as originator. 2. "Dresden 2 In-Vessel Visual Inspection Flaw Acceptance/ Disposition Criteria", GE DRF No. 137-0010-7, ISIS No. 1F3ST. a) On the Engineering Analysis Verification Cover Sheet, the Independent Verifier signed and dated for the preparer (Responsible Engineer) and sheet nos. 17, 18, 25, 28, 30, 32, 33, 40, 47a, 49 and 50 have changed several numbers, but no preparer's and verifier's signatures were evident. It appears that document control has been lost for this DRF and independent review process is questionable. Conversation with the verifier Mr. Chu, Principal Engineer, determined that he signed for the preparer, E. Ng, because Mr. Ng had resigned from GENE, however, the calculation was performed by E. Ng. b) Sheet 47b was initialed by MKK as a preparer, but he didn't sign as a preparer on the verification cover sheet (Mkk was not a preparer nor a verifier on the cover sheet). Preparer and verifier of this document may not even be aware of sheet 7b. This may also constitute a change in the design document. 3. DRF T23-00740, all sections, the Reviewer had checked the "no comments" box on each of the independent design verification sheets, but contrary to this, GENE engineer stated that there were comments prior to signature that had been resolved on an informal basis. The sheet which identified reviewer's comments should have been added and the preparer addressed all of the reviewer's issues. 4. In the Availability section of DRF B13-01760, the Preparer did not sign and date answers to Reviewer. The preparer should sign and date the answers to the reviewer's comments. This should be corrected for the section indicated and all sections of this DRF which apply. 5. DRF B21-00537, Water of Cond. Pot section, the sign off sheet was signed by preparer and reviewer, but not approved. The reviewer had comments, but resolution of the comments were not documented and comments were not resolved. There was an inadequate completion of required design review documentation. 6. DRF B21-00537, RVWILLS Cond. Chamber section, the sign off sheet was missing. A sheet signed by the preparer, reviewer, and approved was either never completed or destroyed during microfiching. This is inadequate design review documentation. 7. DRF B21-00537, Mixed Mean Model Spreadsheet section, the sign off sheet was missing. A preparer was identified on the calculation sheets but on the calculation sheets but not a reviewer. A sheet signed by the preparer, reviewer, and approved was either never completed or destroyed during microfiching. This is inadequate design review documentation. 8. DRF B21-00537, H/T Coef. Estimate section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 9. DRF B21-00537, H/T Coef. Estimate section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 10. DRF B21-00537, Flow Area, 1D Stratification section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 12. DRF B21-00537, Data used in EXCEL Spreadsheet section, the sign off sheet was missing. A preparer was

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identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 13. DRF B21-00537, Steam Leg Depth Calc section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 14. DRF B21-00537, H/T Coef. DR & QC section, the sign off sheet was missing. A preparer was identified on the calculation sheets but not a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 15. DRF B21-00537, Rx Water & Instr. Nozzle Data section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 16. DRF B21-00537, Length of 2" pipe for QC section, the sign off sheet was missing. A preparer was identified on the calculation sheets but not a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation. 17. DRF B21-00537, 2nd Data used in EXCEL Spreadsheet section, the sign off sheet was missing. A preparer was identified on the calculation sheets and a reviewer. A sheet signed by the preparer, reviewer, and approver was either never completed or destroyed during microfiching. This is inadequate design review documentation.

RECOMMENDED ACTION:

- CAUSE:**
1. Non-compliance with procedures.
 2. Lack of attention to details.
 3. Lack of management oversight.

EFFECT / EXTENT: Widely prevalent.
No safety Impact

CORRECTIVE ACTION: Plans have been developed to address items 1 through 17 to document "verification" properly in the Design Record File (DRF). For items 5 through 17, all verification sheets will have Preparer, Verifier and Approver signatures. Re-verification will be performed as necessary.

- PREVENTIVE ACTION:**
1. Use of standard, or equivalent, verification sheets requiring the Preparer, Verifier and Approver signatures will be required.
 2. The most recent revision of the EOP on Independent Verification (EOP 42-6.00, Revision 7, dated 9/12/97) now includes a requirement to document all comments and resolution of comments (to address process deficiency in item #3).
 3. A training session was held for all Technical Services personnel on proper implementation of the verification procedure.

Scheduled Completion Date: 12/31/97

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-03

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: C2

Response Due Date: 10/10/97

CAR Type: External

TITLE: Inadequate Independent Design Verification

DESCRIPTION: Numerous GENE calculations were found to have design control deficiencies such as unjustified assumptions, references lacking, design input errors and inadequate detailed analysis. Contrary to GENE Procedure EOP 42.100 "Design process", Sections 4.3.3, 4.3.5 revision 3, dated 6/26/96, the following GENE design documents were deficient for documentation and verification of assumptions, design input, references, and being sufficiently detailed: 1. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab B, in the finite element model, the tee box geometry is modeled as 8" Sch. 40S pipe. The actual "tee" element with corresponding stress intensification factor is not used in the analysis. Basis for simplification in modeling is not provided. (Inadequate detailed analysis). 2. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab B, justification of the assumptions is not provided in the calculation. On page 5 of the Tab B of DRF 137-0010-7 (ISIS No. 1EXB5), for Impingement Loads, 90 degrees deflection is assumed, but no justification is provided for this assumption. On the same page, it is assumed that all of the flow returns as downcomer flow, but no justification for this assumption is included. On page 7 of Tab B, the flow velocity is assumed to be 5 ft./sec, but no justification is provided for this assumption. (Justification of Assumptions) 3. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab c, the reference for the plastic hinge formation methodology is incomplete. (Reference) 4. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab E, reference/document number for the Monticello vibration analysis is not provided. (Reference) 5. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab E, applicability of the vibration analysis of the core spray line crack of Monticello plant to the Quad Cities plant is not documented. (Inadequate detailed analysis) 6. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab F, reference/document number for the Monticello fatigue crack growth analysis is not provided. (Reference) 7. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab F, applicability of the fatigue crack growth analysis of the corespray line crack of Monticello plant to the Quad Cities plant is not documented. (Inadequate detailed analysis). 8. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab G, reference/document number for the Monticello thermal mismatch analysis is not provided. (Reference) 9. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab G, applicability of the thermal mismatch analysis of the corespray line crack of Monticello plant to the Quad Cities plant is not documented. (Inadequate detailed analysis). 10. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab N, on page 2, it is stated that "P-Ping = 64 psid (source: Lukejen, Core Spray LSE)." This is an incomplete reference. Proper documentation of the reference is missing. (Reference) 11. In DRF 137-0010-7 (ISIS No. 1EXB5), Tab M, references to the applicable calculations from other tabs of the DRF are not provided. Also the references for the potential flow induced vibration considering 180 degrees through-wall crack are not provided. (References) 12. In DRF A12-00098 (ISIS No. 1ESR5), no analysis is performed for the SRV and other hydrodynamic high frequency loadings for the new (80-mil) RPV finite element model. The impact of high spectral peaks of the SRV and other hydrodynamic spectra on the localized high frequency modes (up to 100 Hz) is not evaluated. (Inadequate detailed analysis). 13. In DRF A12-00098 (ISIS No. 1ESR5), the vertical fuel-lift analysis was performed by using an in-house computer code for non-linear analysis. This analysis is described on page 6 of the DRF, but no reference is provided for the GE non-linear in-house code used in the analysis, (Reference) 14. In DRF A12-00098 (ISIS No. 1ESR5), the prediction of the excessive channel to control rod friction for the 80-mil channels is based on statistical evaluation of parameters such as channel bulge, channel bow, differential pressure, irradiation induced creep, manufacturing tolerances, etc. However, no evaluation is performed for the adhesive wear and the deformation of the localized asperity contacts which primarily determine the interface friction condition. No test data are provided for justification of the analysis method to predict the high friction condition at the interface of the channel and the control rod. (Inadequate detailed analysis). 15. "Structural Evaluation of Potential Top Guide & Core Plate Cracking at Dresden 2 & 3", DRF No. 137-0010-8, GE-NE-523-A081-0895, ISIS No. 1FQQX, Dated 12/1/95. a) Sheet 5, considered

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OBE is the governing loading case and used the scaling factor = $(180/171) = 1.05$ for the evaluation. However, per sheet 13, the ratio between SSE and OBE of the TOP Guide of Dresden Scismic Loading is $(390/180) = 2.16$. The safety factor ratio between OBE and SSE is only 2.0. Since $2.16 > 2.0$, therefore, the SSE should be the governing loading case for Top Guide (not the OBE loading case). Reevaluation of Top Guide is required. (Inadequate Detailed Analysis). b) Sheet 13, Note: Vertical Coefficients in paragraph 3.9.3.1.1.2 of the UFSAR are 0.08g and 0.16g, but it is assumed that ComEd and GE have agreed to the above values from reference 6 (reference 6, the vertical coefficient: Top Guide = 0.067). $0.08/0.067 = 1.19$. Provide the justification of this assumption to address the 19% difference. The assumption needs to have some solid justification. (Assumptions) c) Sheet 8, line 1, the crack growth rate is based on 304 Stainless Steel. The specific references are required to provide that: (1) The material is 304 stainless steel for the top guide and (2) The crack growth rate is based on the maximum temperature of how much degree F for the top guide. (References). d) Sheet 13 is from Reference 3 which is not applied to Dresden Unit 2. Since this DRF applies to both units 2 and 3, the justification should be provided for using the information from Reference 3 to indicate that Reference 3 also applies to unit 3. (References/Justification). e) Sheet 6, BWR/6 loads, Horizontal OBE = 500.0 kips. It can not be verified that this value is correct or not. This value is from sheet 37, however, the definitions of HD, MD, HE and HF should be provided to prove that the correct value is being used. (Design Input). f) Sheet 53, the dimension of b - 4.464 inches is from Reference 5. Provide the justification to show that this value b - 4.464 inches can be applied to Dresden units 2 & 3. (References/Justification). g) Sheet 60, b, int - (MY/I) - $(388.538) X (25.5-16.68) / 24.17$. Since $Y - 25.5 - 16.68 - 8.82$ is less than 16.68. Provide the justification to prove that the stress calculated at $Y = 8.82$ is critical (as opposed to the stress at location of 16.68). (Inadequate Detailed Analysis/Justification). h) Sheet 31, line 3, only the maximum axial stress which occurs at point B is evaluated. Provide the justifications to prove that the stresses at all other directions and locations are not critical. (Inadequate Detailed analysis/Justification.) 16. "Response to Commonwealth Edison technical Audit Questins", DRF No. 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. a) Sheet 17, using the thickness = 3" to calculate the R/t ratio, However, sheets 13, 14 and 23 indicated that the thickness is 2". Based on the thickness of 2", the R/t ratio = $(207.125-2)/(2X2) = 51.28$. The results will be changed based on the R/t ratio being different. (Inadequate Detailed Analysis). b) This DRF is for Dresden Unit 3 and Quad Cities Unit 1 (indicated on sheet 1). However, the comparison (sheets 13 through 24) is only from Dresden Unit 3. The justification should be provided to indicate that this comparison is applicable to Quad Cities Unit 1. (References/Justification). c) Sheets 13 and 14 should provide a reference to indicate the source of these values (References). d) Sheet 16, the last line, a specific reference is needed for S.F. = 1.4. (References). e) Sheet 17, ratio = $2.009/1.8567$ and constant = 2.7 should have a detailed explanation regarding the meaning of these values. (References/Justification). f) Sheet 23, Line 13, a specific reference or explanation is needed for "2 X 0.75". (References). g) Sheet 22, specific reference or explanation is needed for this sheet. (References). 17. "KVS a Profile for H5 Weld", DRF # 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. a) Sheet 4, a specific reference or explanation is needed for Weld Residual Stress Profile. (References/Justification). b) Sheet 5 needs a detailed explanation why the results are the same and which chart is being compared to? (References/Justification). 18. "Evaluation of the Indications Found at H5 Weld in Dresden Unit 3", DRF No. 137-0010-7, GE-NE-A69, ISIS No. 1EXB8, Dated 6/7/94. a) Sheet 4, Line 17, a specific reference is needed for $S_m = 16900$ psi which includes the material as being 304 stainless steel and the maximum temperature as 550 degrees F. (References). b) Sheet 4, 3" = the wall thickness (2") + fillet weld (1"). Specific reference is needed to explain that the strength of the weld is equal or stronger than the strength of the shroud material. (References/Justification). c) Sheet 1, item 1E, outputs: Report GE-NE-523-A69-0594 rev. 0. Report GE-NE-523-A69-0594. rev. 0 is prepared and verified on 6/7/94. However, this DRF is prepared on 5/17/94 which is earlier than 6/7/94. This output was not approved yet to be used as an input into this DRF, (design input). 19. "LaSalle Unit 1 and Unit 2, Riser Pipe Flaw Evaluation Handbook", DRF No. B13-01869-009, ISIS No. 1G5WA, Dated 3/26/97. a) Sheet 9, line 6, states load combinations are consistent with LSCS UFSAR. After carefully reviewing LSCS UFSAR Table 3.9-16, Rev. 4, Dated April 1988, there are several loading cases that are missing in Emergency/Faulted combination: Load Cases 3: (N +SRV + SSE), Load Case 5: (N +SRV ads +OBE = SBA/IBA), and Load Case 6: (N+ SRVads+SSE+SBA/IBA). These loading cases should have been evaluated. Also, LSCS UFSAR should be added as a Reference on Section 9. (References Section). (Inadequate Detailed Analysis). b) Sheet 1, item 1E indicated that this cover sheet is for Final Draft report GE-NE-523-B13-01869-009, (Draft which is signed on 3/26/97). However, the final report is prepared and reviewed on May 1997. First, the Engineering Analysis Verification Cover Sheet for the final report is not

documented. Second, after comparing, the results of the draft report (3/26/97) and the final report (May 1997), it was found that they are different (see Section 7.1, Fatigue Evaluation and Section 7.2, Leakage Calculation). The justification should be provided to explain these two issues. (References/Justification). c) Sheet 13, line 17, a specific reference is needed for $S_m = 16900$ psi which includes the material as being 304 stainless steel and the maximum temperature as 550 degrees F. (References). d) Sheet 14, the last 2 line, a specific reference is needed for K of thermal expansion is less than 18 ksi (in) -5 . (References) e) Sheet 9, line 5, a specific reference is needed for the safety factors of 2.77 and 1.39. (References). f) Sheet 14, line 3, a specific reference is needed for the calculated allowable axial flaw being 7.4". (References) 20. "LaSalle Unit 1 and Unit 2, Riser Pipe Flaw Evaluation Handbook, Verify FTV Stress", DRF No. B13-01869-009, GE-NE-523-B13-01869-009/TAB9, ISIS No. 1G5WA, Dated 3/26/97. a) Refer to Item 19a stated above for load combination. (Inadequate Detailed Analysis). 21. "Dresden 2 In-Vessel Visual Inspection Flaw Acceptance/Disposition Criteria", GE-DRF No. 137-0010-7, ISIS No. 1F3ST. a) Outputs from the program "CRITFLAW" were included in this DRF. Being considered as a hand calculation, the input, the parameters, the equations, and the output shall be included in the DRF and shall be reviewed. Being considered as an in-house program, it needs to be validated, verified, and document controlled properly. Without performing those actions and results are not reliable. (Inadequate Detailed analysis). b) On sheets 34, 35, 36, and 37, a plus b are less than $\pi(3.14)$. For this condition Case 1 should have been used, instead of Case 2. Also several actual Pb stresses tabulated on these sheets are higher than the allowables. (Inadequate Detailed analysis). c) Design input data of OD (2") and ID (1.5"), ID (1.9") and ID (1.5"), and M were verbally taken from Dave Drendel. The references for these inputs were not documented. (Inadequate control of design input and references). d) Design input data of 10 ksi, crack growth rate = 2×10^{-6} in/hr, and 1 fuel cycle = 17000 hrs of operation were verbally taken from H. Mehta. The references for these inputs were not documented. (Inadequate control of design input and references). e) S_m value and input value of 0.01 on sheet no. 5e were not referenced. (Inadequate control of design input and references). f) References on sheet 29, 46, and 48 were taken verbally from Maharaj Kaul. They were not documented and referenced properly. (Inadequate control of design input and references). 22. "Evaluation and Screening criteria for the Dresden 3 Shroud Indication", DRF No. 137-0010-7, ISIS No. 1EJJS, index 2, sheet no. 2-1 to 2-34. a) The assumption on sheet no. 2-11 "The bounding crack growth estimated for the next fuel cycle was included in postulated flaw lengths used for evaluation" need to be verified. (Inadequate control of assumption). b) On Sheet no. 2-12, the justification for using the crack growth rate of 5×10^{-5} in/hr is not documented. Why it is conservative? (Inadequate control of reference). c) Need to provide references for the following: (Inadequate control of references). Date and Rev. no. for Dresden 2 & 3 Final safety Analysis Report ASME Section XI, sub-article IWA-3300 (1989 edition) proximity criteria, used in the DRF, however, it is not listed in the Reference section -Sheet no. 2-21, reference for vertical seismic accelerations (0.067 g's OBE and 0.134 g's DBE) was not documented -Sheet no. 2-24, needs reference for S_m value and temperature of 550 deg. F (design or max. operating temperature) Sheet no. 2-24, needs reference for the safety factors of circumferential flaw and axial flaws (Which section and which edition of ASME code was used?) -Sheet no. 2-24, needs to document the reference for shroud thickness of 2.0". -Sheet no. 2-29, needs to document the reference for safety factors of 3.16 and 1.4. d) Sheet 2-23, "Nevertheless a conservative fracture mechanics evaluation was performed using an equivalent K_{je} ...The K_{je} for the overseas plant shroud was approximately 150 ksi....". However, the information source was not specified and was not referenced. This data should be verified and documented to show the comparability between these two plants. (Inadequate control of reference). 23. Two portions of this DRF, 4/12/95 and 8/15/96, "RCIC System Performance Calculations for Operating Plant", DRF No. E51-00178 Volume 1, Section 6, ISIS No. ISIS LS509. a) The test report of Bingham Pump Co. is used as the design input. However, there is no pump model number, pump ID number, or system number shown on this test report. GENE needs to document the evidence and the reference to support that the correct test report is used for this RCIC pump. (During the audit T. Simpson presented a document to support that the test report is for the subject RCIC pump. However this document needs to be signed, verified and documented in the DRF. (Inadequate control of reference). b) GENE needs to document the justification that there will be no insignificant flow into the connected branch lines between the RCIC pump to the RCIC spray nozzle when the RCIC pump is operating. (Lacked justification for detailed analysis). c) Justification for the additional losses, such as the relative power losses in bearing and stuffing box friction, and the hydraulic friction loss, is not documented for using the test report for a full-sized pump tested at the reduced speed (3595 rpm) and for using equations, such as $H_2/N_{22} = H_1/N_{12}$ and $Q_1/N_1 = Q_2/N_2$. Also need to document that the 4487 rpm is equal to or less than the full speed for pump operating condition. (lacked justification for detailed analysis). d) Need to add

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"NEDE-22034 (Based on A 251-BWR/5 LaSalle), Figure 2-4" into the Reference Section. (Inadequate control of reference). e) Need to provide the Rx assembly drawing No. and Rev. no. for reference of the elevation from HFCS nozzle to RCIC head spray nozzle. Inadequate control of reference). f) Need to explain the reason for listing all information on sheets 2 and 4 within the assumption section. Confusion is caused as to whether those are actually design inputs or assumptions. It is believed that those are design inputs and subsequently need to provide references for such design inputs. (Inadequate control of design input and assumption). 24. DRF T23-00740, all sections have three issues: (1) ECCS volumetric flow rate was converted to a mass flow rate assuming constant density that was not identified or justified, (2) Non-condensable containment model uses air not the actual post LOCA gases nitrogen and hydrogen that was not identified or justified, (3) Break area not identified as a design input in OPL-4a or in final report and did not include the Recirculation Piping Replacement diameter for Dresden Unit 3 or the Bottom Head Drain/RWCU additional flow path break area. These assumptions must be identified and quantified as to the impact on the results. Section 1 of DRF T23-00740. There was a letter to J. Nash (GE) from W. Dingle (ComEd) dated 10/16/96 which transmitted input data for the containment analysis. This OPL-4a document did not include a line item for the DEA LOCA break area to be used. This break area should be identified in the OPL-4a. GE should issue a revised OPL-4a with all inputs listed for ComEd concurrence. Section 2.7 of DRF T23-00740, Reactor building heat transfer was not included or addressed. Similarly, this assumption must be identified and quantified as to the impact on the results. Sec 2.9 the Reference 1 teleconference was a design input which should have been transmitted as an acceptable design input with a prepared and approved source. Please include a summary sheet of the information provided in teleconferences for two ComEd cognizant engineers to sign and return to DRF T23-00740, (Design input, reference, assumption, detailed analysis). 25. DRF B13-01760, L2C7 was used as a design input or rather as an assumption but it was not treated as a design input. Although use of L2C7 seems appropriate, no written authorization from ComEd was evident regarding the use of this input. This should be clearly identified that the L2C7 cycle specific inputs were used for each calculation and have to be verified as appropriate prior to final application for later cycles at the plant. This statement was included in the reports but could not be found in any of the calculations. (design input, assumption). 26. MSLB TRACG analysis-DRF L12-00817: an OPL-3 from Quad Cities Unit 1 was used to bound the Quad Cities Unit 2 and Dresden Units 2 & 3. The basis for Quad Cities Unit 1 OPL-3 values bounding the Quad Cities Unit 2 and Dresden Units 2 & 3 was that Quad Cities Unit 1 has been analyzed for 108% core flow and Dresden has not. Therefore the Quad Cities Unit 1 conditions are expected to bound conditions of Dresden. However, if Dresden performed a new design basis calculation to increase core flow to 108%, there does not appear to be a GE process or control to trigger a reassessment of the MSLB TRACG Analysis. This is a Lack of Control of Design Input. 27. MSLB TRACG analysis-DRF L12-00817. Data was taken from a data base identified as LaSalle FDS.CYCLE.CEO and was used as input to the MSLB analysis for Quad Cities and Dresden. Apparently, the FDS.CYCLE.CEO is a GE controlled data base. However if data in FDS.CYCLE.CEO, that was used in the MSLB analysis, is changed, there is no mechanism in place to ensure that the potential impact on the MSLB DRF is evaluated. This is a Lack of Control of Design Input. 28. MSLB TRACG analysis-DRF L12-00817, ISCOR calculation for Quad Cities Cycle 14, this calculation was represented by computer input and computer output. The output used for input to ATRAC was not clearly organized and was difficult to follow. References were not given which made the inputs not traceable. 29. MSLB TRACG analysis-DRF L12-00817, PANACEA calculation for Quad Cities Cycle 14, this calculation was represented by computer input and computer output. The output used for input to ATRAC was not clearly organized and was difficult to follow. References were not given which made the inputs not traceable. Cycle 13 input was used instead of Cycle 14. No comparison or justification for use of Cycle 13 data for applicability to a cycle 14 analysis. The validity of this design input was not demonstrated. 30. MSLB TRACG analysis-DRF L12-00817, ODYN-SS calculation for Quad Cities, this calculation was represented by some minor calculations, computer input and computer output. The output used for input to ARAC was not clearly organized and was difficult to follow. References were not given which made the inputs not traceable. 31. MSLB TRACG analysis-DRF L12-00817, ATRAC calculation for Quad Cities, this calculation used input from ISCOR, PANACEA, OPL3, and ODYN-SS to develop input to TRACG. ATRAC identified values that were needed to complete the TRACG input. These values were developed as part of the DRF. Some of the values did not have adequate references, e.g., separator pitch. Traceable references were not given. The output used for input to ATRAC was not clearly organized and was difficult to follow. References were not given which made the inputs not traceable. 32. MSLB TRACG analysis-DRF L12-00817, TRACG Calculation of Quad Cities, the decay power used to perform the TRACG calculation was not referenced. References were not given

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which made the inputs not traceable. 33. DRF B21-00537, Dresden Backfill Section, GENE-637-031-1093, dated October 1993, the calculations for the cold liquid flow into the condensing pot, design inputs of 15 lb/hr and 19 lb/hr (found on page 3 of the report) did not have any reference which made the inputs not traceable. This brings the validity of these design inputs into question. 34. DRF B21-00537, In Report "LaSalle Unit 2 Reactor Vessel Water Level Instrumentation System Backfill Report", GENE # 637-027-0993, many of the design inputs have no references and therefore the basis can not be established. An example of this is on page 10 & 11 of the report. Other examples were found on pages 28, 29, 30, 31, 32, 33, 34, 35 and 36. The lack of references make the inputs not traceable. This brings the validity of these design inputs into question. 35. DRF B21-00537, "Reactor Water Level Backfill", an Engineering Services Verification Cover Sheet (Ref. EOP 42.600 and EOP 25-6.00), related to the "Revised Heat Transfer Coefficients" was prepared on 11/8/93 by Joe Darr and approved by Hank Pfefferlen on 11/21/95, but the report included and the DRF were approved 9/9/93. It appears that design analysis were performed after the DRF was approved. It was not clear from the DRF if the revised heat transfer calculation was used as a design input for a 1993 report or for a 1995 report. The heat transfer coefficient design input was changed without proper controls or references. 36. DRF B21-00537, Report # GENE-637-031-1093, the RPV level instrumentation bias should be evaluated against the setpoint methodology program to ensure that the set point basis was addressed. No evidence or references could be found that this evaluation was performed. The lack of references make the inputs not traceable. This brings the validity of these design inputs into question. 37. DRF B21-00537, Water of Cond. Pot calculation, the lack of a response to the reviewers comments on the design verification bring the validity of these design inputs into question. 38. DRF B21-00537, RVWLLS Cond. Chamber calculation, the lack of legibility and design verification bring the validity of these design inputs into question. 39. DRF B21-00537, Mixed Mean Model Spreadsheet calculation, the lack of legibility and design verification brings the validity of these design inputs into question. 40. DRF B21-00537, LS Puddle Depth in the CC at LaSalle calculation, the lack of legibility and design verification brings the validity of these design inputs into question. 41. DRF B21-00537, H/T Coef. Estimate calculation, the lack of legibility and design verification bring the validity of these design inputs into question. 42. DRF B21-00537, Flow Area, 1D Stratification calculation, the lack of legibility and design verification brings the validity of these design inputs into question. 43. DRF B21-00537, Cond. Chamber Flow Split calculation, the lack of legibility and design verification brings the validity of these design inputs into question. 44. DRF B21-00537, Data used in EXCEL Spreadsheet calculation, the spreadsheet itself was not provided in the DRF. The lack of legibility and design verification brings the validity of these design inputs into question. 45. DRF B21-00537, Steam Leg Depth calculation, the lack of legibility and design verification brings the validity of these design inputs into question. 46. DRF B21-00537, H/T Coefficient "h" for DR & QC calculation, the lack of references and design verification bring the validity of these design inputs into question. 47. DRF B21-00537, Rx Water & Instr. Nozzle Data calculation, the lack of design verification bring the validity of these design inputs into question. 48. DRF B21-00537, Length of 2" pipe for QC calculation, the lack of design verification brings the validity of these design inputs into question. 49. DRF B21-00537, 2nd Data used in EXCEL Spreadsheet (Mixed Mean Temperature) Calculation, the lack of legibility and design verification brings the validity of these design inputs into question.

RECOMMENDED ACTION:

CAUSE: Quality control less than adequate
 Procedural non-compliance
 Lack of effective work and resource planning
 Lack of management oversight

EFFECT / EXTENT: Extent: widely present
 Impact: No safety impact found due to identified deficiencies.

CORRECTIVE ACTION: 1. Develop action plan to address all the 49 items listed under this CAR (Completed). This plan will be discussed, item by item, with the audit team during their next visit to San Jose.
 2. Where applicable, provide references in the DRFs to address the findings in items 1 through 49. In some cases, the requested reference already exists in the DRF.
 3. Where applicable, provide justification for the assumptions made in the analysis to address the findings in items 1 through 49. For some cases, the justification already exists in the DRF.

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4. Evaluate impact of identified input discrepancies (items 15a, 19a, 24). The current assessment indicates that even though some calculational results have changed as a result of these input deficiencies, there is no safety impact or operabilty concern due to these changes. The one case (item 24) where there was possibly an operability concern due to the containment pressure affecting the pump NPSH, the change in the containment pressure due to the identified issues was evaluated to be small (.01 to.02 psi) . This issue has been discussed and resolved with the utility. The results of the evaluation were transmitted to John Freeman of ComEd .

5. For items 28 through 33, we will add a few pages in the DRFs describing the calculational process such that these calculations are easily understood by a reviewer with minimal background on the subject matter.

6. For items 33 through 49, appropriate clarifications/verifications will be provided. It should, however, be noted that several of these items are repeat from the CARs 01 and 02.

7. In compliance with GENE procedures, the V & V of all non-level 02 codes will be provided in the DRF for each application.

8. We do not agree with some of the items in this CAR (such as items 14, 18c, and others). These items will be discussed with the audit team for further clarifications/ discussions during their next visit to San Jose.

PREVENTIVE ACTION:

1. Instruct Engineers/Managers to perform effective work/resource planning to allow time for proper and complete documentation (justification for assumptions, references etc) to support the design calculations.
2. Train engineers and managers to put significantly increased attention on checking details to ensure compliance with design, verification and documentation procedures.
3. Perform periodic self-assessments and /or technical audits to verify improvement.
4. Review Management and Organization (M & O) to ensure that the organizational structure promotes environment for quality growth and that the right persons are at the right positions (skill match) to deliver quality products and services.
5. Review EOP 42-100 on "Design Process" for possible future improvements.

Scheduled Completion Date: 3/31/98

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-04

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code:

Response Due Date: 10/10/97

CAR Type: External

TITLE: DRFs had missing contract agreements.

DESCRIPTION: Design Record Files (DRFs) had missing contractual agreements as required per GENE procedures. EOP 42-10.00 "Design Record File (DRF)", Appendix D, rev. 7 indicates that all DRFs require an assignment sheet, a table of contents, and any supporting information required by EOPs. Supporting information includes the following, as applicable: contractual or commercial documents which supply customer unique requirements, e.g., QA and design inputs. Contrary to the procedural requirements. The following GENE DRF Nos. did not include the ComEd purchase orders: 137-0010-7, Tabs B through H (ISIS No. 1EXB5). A12-00098 (ISIS No. 1ESR5). 137-001007 (ISIS No. 1F3ST). E51-00178 (ISIS No. LS509), I & II. T23-00740, Section 1.0 (DR Cont.) (ISIS No. 1GY5D). B13-01760, Section 3.0 (LS SRV Rem.) (ISIS No. 1FAMN).

RECOMMENDED ACTION:

CAUSE: Contrary to the finding, the existing EOP directions do not require that a copy of the ComEd purchase order be in the DRF. Therefore, the finding is not accepted. EOP 42-10.00 "Design Record File (DRF)", requires that the DRF be organized and compiled as the work progresses and modified as required to accommodate changes in technical/regulatory/commercial requirements. Unless there is a unique customer requirement that is contained in the customer purchase order there would be no need to include such information in the DRF. Most unique customer requirements are contained in other letters and transmittals between GE and the customer or his agents.

Typically, ComEd purchase orders contain a reference to the GE proposal which references standard terms and conditions and quality references. These standard terms and conditions and quality references are covered within GE by performing the work under the GE Nuclear Energy Quality Assurance Program as described in the current NRC accepted revision of Licensing Topical Report NEDO-11209, which is implemented by the EOPs. This phraseology is in each GE proposal. Therefore, the ComEd purchase order would not provide any unique customer requirements, only normal requirements covered by performing the work under the EOPs. In Appendix D of EOP 42-10.00, Rev. 7, there is a list of the potential sources of information that could be supporting information for the DRF, and item d. of that list states:

"d. Contractual or commercial documents which supply customer unique requirements, e.g., QA and design inputs."

As can be seen from this guidance, the important supporting information should be customer unique requirements. A review of the available ComEd purchase orders for the DRFs referenced in the finding reveal that they referenced the GE proposal which references standard terms and conditions and quality references; therefore, no customer unique requirements existed for inclusion in the DRFs. As stated above, the finding is not accepted.

EFFECT / EXTENT: None

CORRECTIVE ACTION: None

PREVENTIVE ACTION: None

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Scheduled Completion Date: 10/10/97

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

Customer CAR #: G-97-120-04

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-05

Assigned to: G. Sozzi

Send Response to: O. Shirani

M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code:

Response Due Date: 10/10/97

CAR Type: External

TITLE: Missing training records for ComEd engineers working at GE-NE.

DESCRIPTION: ComEd Engineers performed and reviewed design analysis calculations under GENE QA Program without being employed and indoctrinated to GENE procedures. GENE-Policies & Procedures NEDE-31746, Procedure No. 70-30 "Personnel proficiency in Quality related activities", issued 8/94 has established the minimum personnel requirements to be implemented. This procedure states "Each employee, prior to assignment of work activities affecting quality of products, shall be indoctrinated or instructed in the applicable quality system procedures. Contrary to the subject procedure requirements, three ComEd engineers (i.e. Bob Ayer, Hosseir Yousefnia, and Jeff Boyar) prepared and reviewed the CECO Water Level Analysis project. ComEd Engineering personnel prepared and performed independent verification of calculations under GENE QA Program without being indoctrinated and trained. Furthermore, GENE violated its program by not using its own employees. The following calculations were affected: 1. DRF B21-00537, Water of Cond. Pot section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 2. DRF B21-00537, RVWLLS Cond. Chamber section, this calculation was prepared and perhaps reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 3. DRF B21-00537, Mixed Mean Model Spreadsheet section, this calculation was prepared and perhaps reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 4. DRF B21-00537, LS Puddle Depth in the CC at LaSalle section, this calculation was prepared and perhaps reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 5. DRF B21-00537, H/T Coef. Estimate section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 6. DRF B21-00537, Flow Area, 1D Stratification section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 7. DRF B21-00537, Cond. Chamber Flow Split section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 8. DRF B21-00537, Data used in EXCEL Spreadsheet section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 9. DRF B21-00537, Steam Leg Depth Calc section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 10. DRF B21-00537, H/T Coef. DR & QC section, this calculation was prepared and perhaps reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 11. DRF B21-00537, Tx Water & Instr. Nozzle Data section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 12. DRF B21-00537, Length of 2" pipe for QC section, this calculation was prepared and perhaps reviewed by ComEd engineers without proper indoctrination into the GENE QA program. 13. DRF B21-00537, 2nd Data used in EXCEL Spreadsheet section, this calculation was prepared and reviewed by ComEd engineers without proper indoctrination into the GENE QA program.

RECOMMENDED ACTION:

CAUSE:

EFFECT / EXTENT:

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CORRECTIVE ACTION: NONE. We disagree with the finding.

ComEd engineers were trained in appropriate GENE QA procedures. This has been confirmed with the project manager (B.P. Grim) and with one of the ComEd engineers (Mr. Hosseir Yousefnia). The GENE policy (EOP 75-5.00) on training record retention states

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that these records must only be retained for three years. More than three years have passed since the training was given and the work was completed. The records do not exist today and this is within the GENE requirements.

PREVENTIVE ACTION:

Scheduled Completion Date:

Actual Completion Date:

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Closed By:

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-06

Assigned to: R. Nicholls
N. Barclay

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: E1

Response Due Date: 10/10/97

CAR Type: External

TITLE: Ineffective internal audits in overviewing the design analysis area.

DESCRIPTION: GENE's internal audits are ineffective in independently overviewing the design analysis area. GENE Policies & Procedures NEDE-31746; Procedure No. 70-11 "Quality system requirements", Section 3.13 "Audits" delineates the requirements of internal audits. ANSI N452.11 Standard, Section 11 requires a comprehensive system of planned and documented audits to verify compliance with all aspects of Quality Assurance program for design including those procedures delineating quality assurance actions required during the design process. During this audit, GENE QA was unable to demonstrate that it performed audits of the design portion of the Design Review File (DRF). Several audits were faxed to ComEd after the audit exit meeting that also failed to demonstrate even a compliance review of the design portion of the DRF. GENE admitted that its audits were never intended to be detailed technical reviews, only programmatic. The only audit provided which demonstrated the use of a technical specialist was an audit of a 50.54 (f) letter regarding Millstone licensing reconstitution. GENE's audit did examine other portions of the DRF which are mainly administrative documents. GENE's internal audits were deemed ineffective in overviewing the area of design analysis.

RECOMMENDED ACTION:

CAUSE: The GENE audit program is predicated on the basis that by providing assurance that the applicable design control procedures are followed, the adequacy of the technical work is confirmed through the use of the Independent Design Verification process (EOP 42-6.00). Thus the use of technical specialists to audit the detailed design work has not been a standard practice in the audit program. They have been utilized in specific instances when deemed necessary by the business and/or the lead auditor. Review of the appropriate sections of ANSI N45.2 indicate while this practice is fully compliant with section 12 defining the general requirements of audit performance, it may not meet the full intent of section 11 with respect to the specific area of design analysis.

Thus past interpretation of the requirements, and an implicit assumption of acceptability based on past reviews of the audit program by customers and the regulator have resulted in this deficiency.

EFFECT / EXTENT: The effect of this deficiency is documented in the response to ComEd findings G-97-120-01 through 05, 06 through 08, and 09 through 13.
This deficiency is applicable to the audit program as implemented by the Services Quality organization.

CORRECTIVE ACTION: GE QA is performing a design analysis audit with a team comprised of a qualified lead auditor and technical specialists on recently completed design work. The purpose of this audit will be to assess the adequacy of recently completed design work and determine if additional compensatory measures are necessary to assure compliance to the GE policies and procedures in the area of design.

The audit will be completed by 10/10, with the audit report and any corrective actions issued by 10/31.

PREVENTIVE ACTION: Future audits of the Services business will be planned to include technical specialists where necessary to assure the adequacy of the design analysis area. A minimum of one audit focused on the design analysis area to be performed annually. The combination of the Millstone audit (NSQ 97-3) and the audit in the corrective action (Q9709) will account for

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the 1997 performance of this action. This preventive action will be scheduled for 1998 audits and annually thereafter.

Scheduled Completion Date: 12/31/98

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

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Customer CAR #: G-97-120-06

CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-07

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: A2

Response Due Date: 10/10/97

CAR Type: External

TITLE: Computer software frequently used at GE-NE lacked evidence of being verified and validated.

DESCRIPTION: Computer software frequently used at GENE lacked evidence of being verified and validated. Contrary to GENE Procedure EOP 40-3.00 "Engineering computer Programs", Section 2.4 and Appendix A, section A1.4 and A1.6 revision 18, dated 6/26/96, the following GENE design documents were deficient for verification and validation of computer softwares.

1. "Structural Evaluation of Potential Top Guide & Core Plate Cracking at Dresden 2 & 3", DRF No. 137-0010-8, GE-NE-523-A081-0895, ISIS No. 1FQXX, Dated 12/1/95. a) Sheets 4 & 9, "Critflaw" computer program is used. After discussion with Mr. H. Mehta (the Author of "Critflaw" computer program), this computer program is not verified and validated per GE procedure EOP 40-3.00. Therefore, this computer program should be treated as a hand calculation, i.e., it is necessary to verify and validate every time it is used. In this DRF, the computer program source codes and the references of equations and allowables should be listed, verified and validated.
2. "Response to Commonwealth Edison Technical Audit Questions", DRF No. 137-0010-7, GE-NE-523-A69-0594, ISIS No. 1EXB8, Dated 6/20/94. a) Sheet 15 should indicate that the computer output values were generated from the "Critflaw" computer program. After discussion with Mr. H. Mehta (the Author of "Critflaw" computer program), this computer program is not verified and validated per GE procedure EOP 42-10.00. Therefore, this computer program should be treated as a hand calculation, computer program source codes and the references of equations and allowables should be listed, verified and validated.
3. "Dresden 2 in-Vessel Visual Inspection Flaw Acceptance/Disposition Criteria", GE DRF No. 137-0010-7, ISIS No. 1F3ST. a) Outputs from the program "CRITFLAW" were included in this DRF. Being considered as a hand calculation, the input, the parameters, the equations, and the output shall be included in the DRF and shall be reviewed. Being considered as an in-house program, it needs to be validated, verified and document controlled property. Without performing the above actions, the results are not reliable. Computer software was not verified and validated and not properly documented. GENE shall perform verification and validation of this program or incorporate this program in the DRF and have it reviewed.
4. DRF A00-00648-5, SHEX-04V does not have a complete Software Requirements Description as the guidelines show in EOP 40-3.00, section A1.4, This EOP must match the same experimental test data used for the original SHEX-01 (A00 648) as a validation requirement. Since the SRD did not identify this validation requirement, the Software Test Plan & Test Report has not been validated against the same experimental test data used for the original SHEX-01 (A00 648) despite significant code revisions and enhanced models and capability. It was verified and validated with certain plant specific cases but not to the original code requirements. The Independent Design Verification Packet also did not identify this weakness despite guidance given in EOP 40-3.00, section A1.8 directing comparisons of results with experimental data. The sample plant analysis comparisons used for validation and verification software testing had a detailed discussion but did not have clearly identified nor quantitative acceptance criterion. SHEX-04V cases for validation against the original 4TCO and Monticello SRV data should be run with defined quantitative acceptance criterion for each of the key results, Software testing reviews should include a discussion of the revised code results with respect to a defined quantitative acceptance criterion. Also, the sensitivity of the mixing fraction models that was presented in NEDE-30911, the SHEX04 User's Manual section 4.1 must be verified as applicable to SHEX-04V since the figures presented evidence based on SHEX-01.
5. DRF A00-03049, SAFER-04 does not have a complete Software Requirements Description (SRD) as the guidelines show in EOP 40-3.00, section A1.4. The experimental data, TRAC-G data and sample plant analysis data used for SAFER-04 validation and verification software testing do not have clearly identified nor quantitative acceptance criterion. Acceptance of each code revision was based on the judgement of a review committee. The sample plant analysis comparisons used for validation and verification software testing had a detailed discussion but did not have clearly identified not quantitative acceptance

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criterion. All the constraints applied by the NRC in the SER for the entire SAFER/GESTR-LOCA methodology are not clearly stated, outlined and activities for software changes were not explicitly addressed with respect to the each NRC constraint. For example, this code revision included model enhancements to the Jet Pump entrainment, two phase leakage flow and the minimum core pressure drop. The sections of the Licensing Topical Report where these models were described or defined, which the NRC reviewed and approved, were not explicitly identified as a possible constraint of NRC's approval. Since the SRD did not identify quantitative acceptance criterion or explicit constraints of NRC approved models, the Software Test Plan & Test Report did not address these issues despite significant code revisions, enhanced models and capability. GE should clearly identify and quantify acceptance criterion and NRC approved constraints as part of its SAFER-04-SRD used for software testing validation and verification. GE should explicitly show how each revision of SAFER-04 complies with these requirements in the Software Test Plan & Test Report as guidelines show in EOP 40-3.00, section A1.6. 6. MSLB TRACG analysis-DRF L12-00817, the lift calculation is a key aspect of the calculation. The computer program, SHRD-LIFT2, was used to determine the lift of the shroud. The results of this calculation was provided in the final report to ComEd. There is no documentation of the computer program. There is no documented verification or validation of the computer program.

RECOMMENDED ACTION:

- CAUSE: 1. Failure to follow procedures.
2. Failure of management oversight.

EFFECT / EXTENT:

- CORRECTIVE ACTION: 1. For items 1 through 3, a listing of the program "CRITFLAW" will be added to the DRF along with a manual calculation verifying the correctness of the computer code for these applications.

2. We do not agree with item 4 for the following reason:

Validation against experimental data was performed prior to the SHEX-01 ECP attaining the Level 2 status. A Level 2 status means an ECP has been fully verified and has met all QA requirements including those related to all the necessary documentation. The Level 2 is secured and controlled by the Program Library, and is authorized for design calculations. As part of the Level 2 requirements, a Design Review Committee is formed to review all aspects of the ECP, including QA, technical soundness, and adequacy and acceptability of software testing. SHEX-01 has progressed to SHEX-02, SHEX-03, SHEX-04 and, currently, SHEX-04V. During the progression, additional capabilities of the code, such as adding new auxiliary systems, providing more options for operator actions, making the code more efficient, etc., were added. However, the basic modular structure of the code was not changed. Therefore, testing on the new ECPs was directed toward verifying that the new capabilities were performing as intended, and mass and energy balances of the key control volumes of vessel, drywell, wetwell and suppression pool were performed when necessary. It is the collective judgment of the Design Review Committee, the software developer and the software verifier(s) that validation against the experimental data as performed for SHEX-01 was not necessary for each new version of SHEX. EOP 40-3.00, Section A.1.8 allows for comparison with results from alternate methods and user testing. Therefore, the qualification of each version of SHEX is in full compliance with EOP 40-3.00. The Software Requirements Description document is contained in DRF A00-00648-5. The Design Review Committee has explicitly concluded that the content is adequate and sufficient for the purpose. SHEX-04V (documented in DRF A00-00648-5) is a complex ECP and has many output parameters that are presented in time-dependent profiles. The overall responses of key parameters, such as the suppression pool temperature and the wetwell pressure, must be examined in addition to the peak values. In addition to numerical comparisons, examinations must be made regarding the overall responses of several key parameters in determining the acceptability of the ECP. Also, SHEX-04V is capable of modeling many types of events/scenarios such as DBA-LOCA, small steam line break, isolation event, NPSH evaluation, etc., and that each event may have different emphasis on different key parameter(s). Therefore, establishing pre-specified quantitative acceptance

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criteria is an inadequate and unacceptable method to determine the qualification of an ECP as complex as SHEX. GE has adopted the policy that the best way to determine the acceptability of an ECP is by Design Review with a team of experts on the subject matter.

3. We do not agree with item 5 for the following reason:

The reviewer determined that the method of verifying and validating revisions to the software is inappropriate. However, the GE process of employing a design review committee for verifying and validating revisions to the software is deemed appropriate and satisfies the requirements of EOP 40-3.00. The specification of quantitative acceptance criterion for software testing is not a requirement of EOP 40-3.00, Rev 10, 7-20-87 (in place at the time of level 2). The reviewer noted that the Software Requirements Description (SRD) was not complete. Per EOP 40-3.00, the Software Management Plan (SMP) defines the documentation requirements for the software development. The SAFER04V SMP states that the SRD will address changes to the previous version of the code only. The previous version SRD is referenced in the SAFER04V SRD. The SRD is required by EOP 40-3.00 to contain direction on software validation requirements required to verify the accuracy of mathematical formulations and technical assumptions. These requirements are then independently verified by the design review committee as stated above. Section 5 of the SRD dated 1/19/88 contained in the DRF fulfills this task as required by the procedures in place at that time. The reviewer noted that enhancements had been made to NRC approved models without explicit identification. The enhanced models are described in the SAFER04 SRD. The verification of these optional models and the impact on calculations are documented in the SAFER04 Software Test Report and were presented to the review committee. The model enhancements were reviewed with the NRC (7/13/88) prior to application.

4. For item 6, the verification and validation of the engineering calculation using the SHRD-LIFT2 program will be added to the DRF.

- PREVENTIVE ACTION:**
1. Engineers will be trained to follow procedures to independently verify the non-level 2 computer programs by alternate methods for each application.
 2. Management will be instructed to pay more attention to details before signing off the independent design verification sheet.

Scheduled Completion Date: 12/31/97

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-08

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: A1

Response Due Date: 10/10/97

CAR Type: External

TITLE: GENE was provided design input data by Sargent & Lundy for ComEd projects without a formal design interfa

DESCRIPTION: GENE was provided design input data by Sargent & Lundy for ComEd projects without a formal design interface. Contrary to GENE NEDO-11209-04A, rev. 8, dated 3/31/89, Section 3.2 "Design Interface Control", a design interface with S & L did not exist. ComEd is the design holder and contracts GENE to perform specific analysis. ComEd is responsible for the design inputs utilized by GENE and has a formal NDIT process for controlling design inputs to external design vendors. There were several cases where GENE has received design inputs from S&L for ComEd work without evidence of authorization by ComEd or a formal design interface with S&L which details how inputs are authorized by the owner (ComEd). 1. Part of the input data for the analysis performed in DRF A12-00098 (ISIS No. 1ESR5), were transmitted to GE by a letter from Sargent & Lundy (Reference 7: Letter from S. Singh of S&L to P. Shah of GE dated July 26, 1994). No NDITs were used, as such the validity of the input-and consequently the output (final analysis results)-is questionable. (Missing NDITs). 2. MSLB TRACG amajusos-DRF L12-00817, A Sargent and Lundy engineer provided design information and input to General Electric. A GE engineer indicated that ComEd told him, verbally, that the Sargent and Lundy engineer represents ComEd. In the input section, design input was sent from Sargent and Lundy directly to General Electric without design review by ComEd.

RECOMMENDED ACTION:

CAUSE: 1. NDIT process not used by ComEd.

EFFECT / EXTENT:

CORRECTIVE ACTION: We do not agree with the finding. ComEd verbally authorized GE to accept the inputs from Sargent and Lundy for both items 1 and 2. According to our contract, it is the responsibility of ComEd to ensure that the inputs being given to GE by S&L, on ComEd's behalf, are properly verified. GE recognizes ComEd's verbal directions as part of a continuing agency relationship of S&L for ComEd. Therefore, GE does not agree with this finding.

PREVENTIVE ACTION: ComEd should utilize the NDIT process in the future to transmit the design inputs. This is ComEd's action.

Scheduled Completion Date:

Actual Completion Date:

Close Date:

Closed By:

Verification Statement:

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Customer CAR #: G-97-120-08

CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-10

Assigned to: R. Nicholls

Send Response to: O. Shirani

M/C:

Issue Date: 9/8/97

Category: Concern

AR Code:

Response Due Date: 10/10/97

CAR Type: External

TITLE: P&P 10-27 needs to reference 10CFR50 Appendix B since its scope includes safety related work.

DESCRIPTION: GENE NEDO-31744, Procedure No. 10-27 needs to reference 10CFR50 Appendix B since its scope includes safety related work. The scope of the Policy & Procedure NEDE-31744, Procedure No. 10-27, issued 9/94 "Proposal & Sales Contract" references ISO-9001 and it is being utilized for safety related contracts. 10CFR50 Appendix B needs to be references in the procedure.

RECOMMENDED ACTION:

CAUSE: The GENE program for implementing the requirements of ISO-9001 applies to all work, safety related and non-safety related, performed by the Services organization, and as such is applicable to all proposals and sales contracts prepared and accepted by the busienss. This is the basis for referencing the ISO-09001 requirements in the "Purpose" section of GENE Procedure 10-27. Since the requirements of 10 CFR 50 Appendix B may or may not apply to a given proposal or sales contract based on the safety classification of the work, GENE has chosen not to reference those requirements in the "Purpose" section of procedure 10-27.

The requirements of 10 CFR 50 Appendix B will be invoked as required for safety related proposals under the requirements of section 1.1 of the procedure which states:

"the Business Manager shall ensure that each proposal conforms to the following criteria:

a. The product or service offering includes all appropriate elements of an offering including scope of supply, schedules, ..., QA requirements, safety classification of the work,"

At this point, the applicability of safety related requirements is determined within this procedure, and the requirements of 10 CFR 50 Appendix B will be applied, if required to perform the specific scope of work. The Quality requirements are then reviewed again at the time of order acceptance to assure the proper quality and safety classification requirements are included in the sales contract.

EFFECT / EXTENT: The current controls and requirements are adequate. These controls apply to all GENE sales proposals and contracts.

CORRECTIVE ACTION: GENE believes the appropriate controls are in place within the "Application and Responsibilities" section of the of Procedure 10-27 to assure the proper application of the requirements of 10 CFR 50 Appendix B. We do not believe these requirements should be applied to all proposals and sales contracts, similar to our application of ISO -9001, as they are not routinely applicable to the non-safety related worksopes we provide.

Therefore, we believe there are no changes required to our current procedures to assure the requirements of 10 CFR 50 Appendix B are appropriately applied to safety related work.

PREVENTIVE ACTION: Not Applicable

Scheduled Completion Date: 10/10/97

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-11

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Concern

AR Code:

Response Due Date: 10/10/97

CAR Type: External

TITLE: Documentation for computer programs were unavailable for review during the audit.

DESCRIPTION: Documentation for computer programs were unavailable for review during the audit. Validation documents for SAP4G07, SPECA05C, SEOSM02 and CHANL01V programs used in the DRF A12-00098 (ISIS No. 1ESR5) were not available for review during the audit. GENE indicated that these software programs have a complete documentation package, but the cognizant individual was not available to retrieve these documents for review. GENE needs to provide this validation documentation to the audit team leader for review by ComEd.

RECOMMENDED ACTION:

CAUSE: The Responsible Engineer (RE), the Design Record File (DRF) number and the DRF for SAP4G07, SPECA05C, SEISM02 and CHANL01V were not readily available during the audit. The individuals, the DRF numbers and the DRFs were not the original focus of the audit; therefore, no provisions were made to make these files easily available, especially late in the week of the audit.

EFFECT / EXTENT: None

CORRECTIVE ACTION: The DRFs and their supplements have been located and are available for audit in San Jose. For computer code CHANL01V, the level 1 qualification of the code is in closed DRF J11-01131 and Sten Akerlund would be the RE. The DRF for this specific application of the code is contained in closed DRF J11-02453 Study 23, with Ric Longren the RE. Both of these REs are in Wilmington for any follow-up auditing interface.

PREVENTIVE ACTION: No Preventive Action. Immediate access to records and personnel is not a regulatory requirement.

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CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-12

Assigned to: J. Klapproth
G. Stramback

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Concern

AR Code: C2

Response Due Date: 10/10/97

CAR Type: External

TITLE: The cognizant engineer was unavailable to answer questions regarding specific design documents.

DESCRIPTION: The cognizant engineer was unavailable to answer questions regarding specific design documents. A. DRF B21-0537 was approved on 9/8/93. The sign off sheet for this design document changing the heat transfer coefficient was approved on 11/21/95. Why wasn't the design document revised for this change, which constitutes a need for revision? Were the preparer and design verifier of this design document aware of this change to reevaluate the impact? B. DRF 523-A80-0594, Section O, supporting LOCA analysis is missing reference No. 1. This reference should have been available for review, but the cognizant engineer was unavailable to retrieve the reference. GENE needs to provide an explanation regarding the above DRFs with supporting documentation to the ComEd audit team leader.

RECOMMENDED ACTION:

CAUSE: QC less than adequate

EFFECT / EXTENT: Random, possible but not likely safety impact (to be evaluated if the supporting analyses are not found)

CORRECTIVE ACTION: Item A: NONE

The DRF was OPENED on 9/6/93 and was not approved until November 1995. The revised heat transfer coefficients showed that the results of the original analysis were conservative and no change was needed to the report. This conclusion was developed by Joe Darr and verified by D.K. Rao in November 1993. The original preparer and verifier were not notified since their original work was still used. This is documented in section 11.5 of the DRF.

Item B:

Search missing "supporting LOCA analysis" (DRF 523-A80-0594, Section O, Ref.1)

PREVENTIVE ACTION:

Scheduled Completion Date: 12/31/97

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Customer CAR #: G-97-120-12

CUSTOMER CORRECTIVE ACTION REQUEST

From: ComEd

Customer CAR #: G-97-120-13

Assigned to: R. Nicholls

Send Response to: O. Shirani
M/C:

Issue Date: 9/8/97

Category: Nonconformance

AR Code: E4

Response Due Date: 10/10/97

CAR Type: External

TITLE: GENE Nuclear Services has not effectively implemented its Quality Assurance Program in the area of design.

DESCRIPTION: GENE Nuclear Services has not effectively implemented its Quality Assurance Program in the area of design. The GENE Nuclear Energy Quality Assurance Program Description Manual (NEDO-11209-04A) describes that the design control process are documented in practices and procedures which establish the responsibilities and interfaces of each organizational unit. Also, the design requirements are defined and design activities are carried out in a planned, controlled, and orderly manner. Contrary to the above, numerous design control deficiencies were identified during this audit which reveal ineffective implementation of the GENE QA Program requirements in the area of design and independent oversight. Due to this failure, a stop work order was issued by ComEd to gENE Nuclear Services on 8/29/97, GENE is required to examine its design control process to determine what processes failed to allow the nature of the deficiencies in this audit in the areas of design and independent audit oversight to occur.

RECOMMENDED ACTION:

CAUSE: The primary causes for the deficiencies identified in the audit are summarized as follows:

1. Management Oversight - finding 1,2,3,7
2. Procedural Non Compliance - findings 2,3,7
3. QC Less than adequate - Findings 3,6,12
4. Lack of effective work and resource planning - finding 1,3
5. Attention to detail - finding 2.

EFFECT / EXTENT: The combined effect of the identified deficiencies has been evaluated to have no significant impact on the results of the work performed, and thus no identified impact on safety. The areas of deficiency were widely prevalent, but appeared to be randomly occurring and not assignable to a single cause or performer.

CORRECTIVE ACTION: Corrective actions to address the identified deficiencies are documented in the responses to Findings G-07-120-01 through 08, and 09 through 12.

These actions will compliment and improve the effectiveness of ongoing programs currently in place to improve the effectiveness of our engineering processes. Specific actions will be taken to improve the effectiveness of the management reviews through changes to the checklist utilized and additional training in the performance/expectations of the managers performing these reviews. These improvements will be completed by 12/1/97.

The compilation of this action, and those of the other finding, are considered appropriate to address the issue identified in this finding. No additional GENE actions are considered necessary to correct the identified deficiencies.

PREVENTIVE ACTION: GENE Services Quality will monitor the completion of the identified corrective and preventive actions. As part of the normal audit program for the business, the effectiveness of these actions will be assessed after implementation, and documented in the audit reports, which will be made available to ComEd during future audits/surveillances in San Jose.

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