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Nuclear

November 26, 2002

RS-02-201

Mr. H. Brent Clayton
Region III Enforcement/Investigations Officer
U. S. Nuclear Regulatory Commission, Region III
801 Warrenville Road
Lisle, IL 60532-4351

Subject: Response to Request for Additional Information Regarding [REDACTED]

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- References:
- 1) Letter from P. R. Simpson (Exelon) to H. B. Clayton (NRC) dated July 12, 2002
 - 2) Letter from H. B. Clayton (NRC) to J. L. Skolds (Exelon) dated May 1, 2002
 - 3) Letter from C. D. Pederson (NRC) to J. L. Skolds (Exelon) dated September 4, 2002

Dear Mr. Clayton:

Reference 1 provided our evaluation of the matters described in [REDACTED] referred to us in Reference 2. Reference 3 requested additional information regarding this subject along with an additional request to address a new concern relating to the same subject. The additional information was requested to be submitted within 30 days of Reference 3. However, following discussions between Kenneth Ainger of Exelon Generation Company, LLC (Exelon) and Roy Canlano of the NRC, it was agreed the additional information would be provided by November 29, 2002.

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The attachments to this letter contain the additional information requested and do not contain any personal privacy, proprietary, or safeguards information. Attachment 1 contains the response to the request for additional information. Attachment 2 contains supporting information regarding our response to Detail 3 that was requested by the NRC during a telephone conference call regarding this matter.

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In summary, and as detailed in our evaluation of the new issue (i.e., Detail 7), none of the concerns identified in Detail 7 could be validated.

Should you have any questions concerning this letter, please contact Mr. Don Cecchetti at (630) 657-2826.

Respectfully,

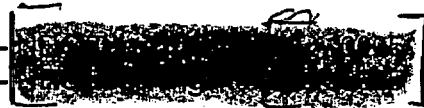
K. A. Ainger

Kenneth Ainger
Manager – Licensing
Mid-west Regional Operating Group

Attachment 1: Response to Request for Additional Information –

Attachment 2: Response to Request for Additional Information –

Supporting Information for Detail 3



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ATTACHMENT 1

Response to Request for Additional Information - [REDACTED]

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Introduction

"Detail 2:

Initial Request: In Reference 1, NRC requested that Exelon identify any work products obtained during the 1997 stop work order against General Electric, Nuclear Engineering (GE-NE).

Initial Response: In its response (Reference 2), Exelon stated that "the procurement process did not allow for procurement of materials or services from a vendor with a stop work order that was specific to a particular task without direct involvement in the process which would ensure adherence to the ComEd procedures and processes."

Additional Response: During a subsequent telephone conversation on August 7, 2002, between D. Cecchetti, et. al. (Exelon), and P. Loughheed (NRC), Exelon employees stated that "No architectural engineering services, no calculational services and no design activities on safety-related work were procured from GE-NE during the time period the stop work order was in effect." Additionally, Exelon employees elaborated that the type of work performed during the outages was only maintenance activities that would not be covered by the stop work order.

Request for Additional Information:

- 1) Please confirm the verbal information provided.
- 2) Please document what work, if any, GE-NE performed on previously let contracts during the time period that the stop work order was in effect and how this work was controlled."

Response:

- 1) The information reviewed and discussed during our telephone conversation on August 7, 2002, between D. Cecchetti, et. al. (Exelon), and P. Loughheed (NRC), where Exelon employees stated that "No architectural engineering services, no calculational services and no design activities on safety-related work were procured from GENE during the time period the stop work order was in effect," is accurate and correct. Additionally, the statement that the type of work performed during the outages was only maintenance activities and was not covered by the stop work order is accurate and correct.
- 2) General Electric Nuclear Energy (GENE), San Jose, did not perform any architectural engineering services, calculational services, design activities on safety related work during the period of the stop work order either from newly let contracts or previously issued contracts. GENE, however was part of an integrated outage at Dresden Nuclear Power Station under Contract 111000, which consisted of maintenance type activities not associated with the stop work order.

ATTACHMENT 1

Response to Request for Additional Information - [REDACTED] 7C

"Detail 3:

Initial Request: In Reference 1, NRC requested that Exelon identify whether monthly updates were issues as required and provide the basis for your determination.

Initial Response: In its response (Reference 2), Exelon stated that, "based on a review of quality assurance requirements in place at the time, the quality assurance program did not require vendors or other auditees to provide monthly updates for corrective actions." The licensee further stated that no monthly updates were supplied.

Additional Response: In follow-up telephone conversations on August 7 and August 14, 2002, between D. Cecchetti, et. al. (Exelon), and P. Loughheed (NRC), Exelon employees stated that monthly status reports were provided by GE-NE from December 1997 until April 1998, in accordance with commitment 3 of the letter lifting the stop work order. During the August 14, 2002, telephone call, the licensee stated that GE-NE had documented that all corrective actions were considered to be completed in a May 1998 letter, at which time Exelon/ComEd scheduled the follow-up audit.

Request for Additional information: Please confirm the verbal information provided."

Response:

The information reviewed and discussed during our telephone conversations on August 7 and August 14, 2002, between D. Cecchetti, et. al. (Exelon), and P. Loughheed (NRC) where Exelon employees stated that monthly status reports were provided by GE-NE from December 1997 until April 1998, in accordance with commitment 3 of the letter lifting the stop work order, is accurate and correct. Additionally, our statement during the August 14, 2002, telephone call, that GE-NE had documented that all corrective actions were considered to be completed in a May 1998 letter, at which time Exelon/ComEd scheduled the follow-up audit, is also accurate and correct.

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ATTACHMENT - 2

**Evaluation Report [REDACTED]
Supporting Information for Detail #3**

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Corrective Action Report G-97-120-03

The provided pages (14 through 28) are part of the follow-up audit report SR-1999-136, performed May 3 through 7, 1999, with a report on this activity issued on June 15, 1999. This report was approved by O. Shirani acting for R. Bastyr, the SES Manager during his absence.

CAR Number:	G-97-120-03	Type Code F	Severity Code II
Vendor Name	GE Nuclear Energy	Audit Coordinator	Shirani, Oscar
CAR Issue Date	9/8/97	COG QA ENG/INSP:	Shirani, Oscar

Next F/U Date 1/10/99

Description

Numerous GENE calculations were found to have design control deficiencies such as unjustified assumptions, references lacking, design input errors and inadequate detailed analysis.

Discussion

Contrary to GENE Procedure EOP 42.1.00 "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° 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 - Pinf = 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° 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 100Hz) 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. 1FQX, Dated 12/1/95.
 - a. Sheet 5, considered 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 Seismic 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 only 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, $sb, int = (MY/I) = (388.538) \times (25.5 - 16.68) / 24.17$. 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).
 - i. Provide the justification of the thermal effect is negligible. (References/Justification)
- 16 "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 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 = $(207.125 - 2) / (2 \times 2) = 51.28$. 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 "K VS 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 + SRVads + 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 ΔK 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 FIV 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 π . For this condition Case 1 should have been used; instead of Case 2. Also several actual P_b stresses tabulated on these sheets are higher than the allowables. (Inadequate Detailed analysis).
- c. Design input data of OD (2") and ID (1.5"), OD (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. Sm value and input value of 0.01 on sheet no. 5c 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. 1EJJ5, 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 Sm 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_{jc} ... The K_{jc} 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 loss 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 "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 HPCS 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. Dingler (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 DBA 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, and 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 ATRAC 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, OPL-3, 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 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 42-6.00 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 Phefferlen on 11/21/95, but the report included and the DRF were approved 9/9/93. It appears that design analyses 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 brings the validity of these design inputs into question.
- 38 DRF B21-00537, RVWLLS Cond. Chamber calculation, the lack of legibility and design verification brings 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 brings 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 brings the validity of these design inputs into question.
- 47 DRF B21-00537, Rx Water & Instr. Nozzle Data calculation, the lack of design verification brings 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.

Commitment

GE Nuclear Energy is required to provide a written response to ComEd/SES, Oscar Shirani by 10/10/97 identifying:

1. Root Cause of the deficiencies
2. Corrective Actions taken
3. Actions to prevent recurrence

CAR Status Report

Status as of 1/7/98:

GENE correspondence dated 11/6/97 received and reviewed. ComEd needs to verify the accuracy and completion of the response.

Status as of 9/9/98:

A follow-up audit is scheduled for December 1998 after the 1998 NUPIC audit. This CAR remains OPEN.

Status as of 6/15/99:

ComEd performed a follow-up audit (SR-1999-136) on May 3-7, 1999. GENE provided their final response in Letter No. 99-25, dated June 1, 1999. The results of the verification by ComEd for the sample review of the corrective actions are stated below. The root cause, corrective actions, and action to prevent recurrence were also verified during the audit. There were some modifications that had to be made to the previous responses by GENE as discussed during the audit. The previous responses as shown in the Reference Section of the subject GENE letter are considered superseded. ComEd/SES now finds the GENE's response, dated June 1, 1999 to be acceptable and this CAR is considered CLOSED and no further action is required.

ITEM # 1:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab B. In this revised DRF, the basis for the finite element modeling is documented in Tab P, dated 5/5/1999. In this analysis, it is shown that the cracking is on the pipe side of the weld, rather than on the tee side. Also it is shown in the analysis that the cracking is within the $(Rt)^{1/2}$, (where R is the outside radius and t the thickness) of the weld centerline. Under these conditions, per ASME Code, Section XI, the modeling of the tee box as the junction of pipe elements is acceptable. Hence this item is acceptable and considered closed.

ITEM # 2:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab B. GE indicated that the assumption of lateral loading gives a conservative way for determining stresses. It is also conservative to assume that all the flow returns as downcomer flow since it gives an upper bound on the velocity. The use of 5 ft./sec velocity was superseded by later analysis described in Index J where the actual velocity was calculated based on the downcomer flow. Hence this item is acceptable and considered closed.

ITEM # 3:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab C. In this revised DRF, reference for the plastic hinge formation methodology is added to DRF Tab C, page C/1 Hence this item is acceptable and considered closed.

ITEM # 4:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab E. The references are provided as GENE 523-27-0393, DRF 137-0010-6 and NEDE 22146. Hence this item is acceptable and considered closed.

ITEM # 5:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab E. A comparison for pipe stiffnesses suggests that the Quad Cities Pipe is more rigid than the Monticello, therefore the expected response is judged by GE to be lower. This reasoning is adequate. Hence this item is acceptable and considered closed.

ITEM # 6:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab F. The reference is provided as GENE 523-27-0393, DRF 137-0010-6. Hence this item is acceptable and considered closed.

ITEM # 7:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab F. In this revised DRF, new analysis is performed (dated 5/5/98) to predict the correct fatigue crack growth rate for the Quad Cities pipe flaw evaluation. Hence this item is acceptable and considered closed.

ITEM # 8:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab G. In this revised DRF, thermal mismatch analysis is not used (deleted -dated 5/6/98) in the crack growth analysis since thermal mismatch stresses are secondary (the evaluation in Tab G is no longer applicable). Hence this item is acceptable and considered closed.

ITEM # 9:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab G. In this revised DRF, write-up is added in Tab G (dated 5/6/98) that supersedes what was there. Issue is not applicable because thermal mismatch stresses are not used to generate results, per Tab A. Hence this item is acceptable and considered closed.

ITEM # 10:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab N. Page N/7 has drawing reference 161F312, Rev. 1 that provides the proper reference for the 64 psid pressure. Hence this item is acceptable and considered closed.

ITEM # 11:

Reviewed revised DRF 137-0010-7, Report # 523-A80-0594 (ISIS No. 1EXB5), Tab M. In this revised DRF, Tab M (dated 5/5/98), the 180 degree crack analysis is included along with all references to the other applicable documents. Hence this item is acceptable and considered closed.

ITEM # 12:

Reviewed revised DRF A-12-00098 (ISIS No 1ESR5), Completion Date September 20, 1998. Evaluation for the SRV and other hydrodynamic loadings was not in the work scope of GENE as defined in the original proposal. Hence this item was not evaluated by GENE. However, further evaluation/discussions with the preparer revealed that there is no change in eigen values after 5 Hz due to fuel channel change. Since SRV and LOCA loads are higher frequency loads and there is no change in the input loads, dynamic response due to SRV and LOCA loads are the same as design basis response even with the new fuel channels. Hence this item is acceptable and considered closed.

ITEM # 13:

Reviewed revised DRF A-12-00098 (ISIS No 1ESR5), Completion Date September 20, 1998. In this revised DRF, applicable reference for the GE in-house non-linear code is added as Ref. 8 on page 129a of the revised DRF. Hence this item is acceptable and considered closed.

ITEM # 14:

Reviewed revised DRF A-12-00098 (ISIS No 1ESR5), Completion Date September 20, 1998. GENE did not revise this complex analysis but provided the following response to justify their analysis:

"The reviewer determined that the GE method of evaluating the potential for control rod interference with the fuel channel was not justified. The reviewer objects to the lack of both experimental data and precise determination of input assumptions. However, GE believes that a worst case approach, as suggested by the reviewer, would result in increased economic costs for utilities in the form of new channels, or thicker less efficient channels, or core design inefficiencies. The key to the GE methodology is a statistical approach to channel conditions, with a conservative interference criteria. It is therefore our conclusion that the design approach is adequate."

Based on the above, this item is acceptable and is considered as closed.

REVIEW OF TWO NEW (MORE RECENT) DRFs:

Two recent DRFs were reviewed during this audit.

- DRF # B11-00823-00, DATED 8/27/98

TITLE: NRC RAI Dresden 3 Core Spray Evaluation. (NOTE: THIS IS AN OPEN DRF)

REVIEW COMMENTS:

This DRF was generated to provide technical support to ComEd pertaining to an NRC RAI (Request for Additional Information) for Dresden Station. The NRC sent to ComEd an RAI on the core spray evaluations submitted by ComEd in 1997 and 1998. ComEd requested support from GENE in responding to RAIs items 1a and 1b, which pertain to Dresden 3. This DRF contains discussion of P9 IGSCC Susceptibility and likelihood/consequences of P8a and P9 complete cracking.

RAI item 1a requested a plant specific discussion of IGSCC susceptibility of the P9 weld, including the influence of the annulus between the collar and pipe and the effect of grinding the weld root.

This DRF was reviewed to determine if CARs 1 to 13 are implemented. Here is the summary:

This recent DRF (DRF # B11-00823-00, DATED 8/27/98) is better organized than the two older DRFs due to the following reasons:

- This DRF has a table of contents.
- The DRF includes a Verification Road Map
- A Work Plan is provided in the DRF.
- The DRF includes P. O. and Proposal.
- The DRF includes Customer Technical Requirements.
- The DRF includes Technical Review Guidelines and Nuclear Fuels Interface.

Regarding corrective actions being in place, following should be noted:

CAR #1: Record identification numbers on each page will be provided when this DRF is closed.

CAR # 2: Sections within DRF need to be signed by the preparer and reviewer.

CAR # 3: Justification for assumptions should be added in the final closed DRF.

CAR # 4: Satisfied. PO is included in Tab 2. Also Customer Technical Requirements are included in Tab 2.

CAR #s 5, 6, 7, Not applicable

CAR # 8: No NDIT received from ComEd – work done without NDIT. After further review, it was determined that the NDIT is not required since this study is not done to support the existing design condition of the plant and the analysis will not support the design basis of the plant.

CAR # 9: No NDIT provided to GE – Not required as stated above.

CAR #s 10, 11,12,13 Not Applicable.

- DRF # B13-01945
(CLOSED DRF: COMPLETION DATE: JUN 23, 1998)

TITLE: BWR Integrated Testing and Surveillance Program, Phase 1.

REVIEW COMMENTS:

This DRF documents the Phase 1 of BWR Integrated Testing and Surveillance Program. EPRI and the BWRVIP Owners requested ATI Consulting and GE to work jointly to develop plans for a BWR Integrated surveillance testing and analysis program incorporating existing capsules and the BWR Supplemental Surveillance Program (SSP) capsules. The purpose of this integrated program is to make the most efficient use of existing capsules and surveillance materials for monitoring and predicting. In this DRF not all the input is verified by GE (only some input is verified). This concern was discussed with the Manager – Tom Caine and the responsible engineer Betty Brantlund. They indicated that this is not a safety-related calculation, however, once this calculation is used in any safety-related application, the applicable input will be verified at that time. Also per page 4 of the DRF, it should be noted that:

“This service is not safety-related. However, the classification of ‘safety-related’ must be addressed when or if results of this work are used for direct or indirect application to a Light Water Reactor (LWR) by a utility applicant or licensee.”

This DRF is well prepared, it satisfies Record Identification Requirement (Page # & DRF #) on each page. It also includes the following items:

- Road Map and Verification Trail
- Work Plan & Contracts
- Work/Quality Plan
- Letter of Agreement, P. O. and Proposal
- Technical Review Guidelines - Nuclear Fuels Interface

The “White Paper for Developing an Integrated BWR Surveillance Capsule Test Program” is the main report in this DRF. This report is signed by the Preparer, Verifier and Approver. Also revision to this report are properly controlled.

Based on the above, this DRF was found acceptable.

Regarding implementation of the CARs 1 to 13, following should be noted:

CAR #1: Acceptable. Record identification numbers are provided on each page. (Complete)

CAR # 2: Sections within DRF need to be signed by the preparer and reviewer.

CAR # 3: Justification for assumptions should be added in the final closed DRF.

CAR # 4: Satisfied. PO is included in Tab 2. Also Customer Technical Requirements are included in Tab 2.

CAR #s 5, 6, 7, Not applicable

CAR # 8: N/A – Input shall be verified for safety-related work. At present not a safety-related document.

CAR # 9: N/A -- Input shall be verified for safety-related work. At present not a safety-related document.

CAR #s 10, 11,12,13 Not Applicable.

ITEM No. 19

- a) DRF B13-01869-009 Volume 3 of 3, Section 23c, pages 23c-10 through 23c-12 assessed all the load combinations required by the UFSAR and determined the bounding load combinations to be assessed in determining the limiting flaw sizes. Not all load combinations were evaluated based on the fact that some combinations produced lower stresses than the ones used in the assessment. Revision 1 of the flaw evaluation handbook documented in Section 25 of Volume 3 has included the revised load combinations.
- b) A separate verification sheet has been completed for Revision 1 of the handbook and is documented in Section 23a of Volume 3, pages 23a-1 and 23a-4. A separate verification sheet has also been prepared for Appendix B of Revision 1 of the handbook, which is documented in Section 23b, pages 23b-1 through 23b-11.
- c) – f) Appropriate references were added to Revision 1 of the handbook, which is found in Section 25b of Volume 3.
- c) Page 14
 - d) Page 15
 - e) Page 9
 - f) Page 13

Based on the information provided above, items 19 a) – f) are considered to be adequately resolved.

ITEM No. 20

Response to this item is provided on page 23c-19 of Volume 3 of the DRF. It correctly states that Tab 9 of Volume 2 calculates the Flow Induced Vibration (FIV) load and stress for each weld. It is not determining any combination of other loads or stress with the FIV load or stress. The load combinations are not documented in this section of the DRF.

Based on the information provided above, item 20 is considered to be adequately resolved.

ITEM No. 23

DRF E51-00178, Supplement 1, Section 2, contains a complete revision of the calculation in DRF No. E51-00178, Volume 1, Section 6, ISIS LS509. The revision was approved October 13, 1997 as scheduled.

- a) The pump test report was identified on page 21 of 30 as being applicable to LaSalle Station Unit 1.
- b) Assumption No. 3 on page 6 of 30, identifies flow losses through the branch line as being outside the scope of this evaluation because valve leakage or a failed open valve would constitute a system failure. This is consistent with the intent of this evaluation.
- c) Reference h, applicable section was included in page 20 of 30, provides appropriate justification for determining pump operating conditions at speeds different from the speed at which the pump was tested.
- d) NEDO- 22034 was added to the references as Reference i.
- e) References f. and g. provided elevation information used in the Input Data section to determine the required elevation heads.
- f) As provided on pages 4 and 5, the assumptions and input data have been separated.

Based on the information provided above, items 23 a) – f) are considered to be adequately resolved.

ITEM Nos. 26-49:

26. Mr. Jose Casilla of GENE was interviewed and was responsible for GENE response items 26-32 (DRF L12-00819, previously identified as L12-00817). The work performed by GENE met the current Dresden design conditions. If the need of a design change arise for Dresden (increased core flow), both ComEd and GE will jointly review the plant design basis and develop analysis strategy.
27. LaSalle recirculation parameters were used for generic study and Dresden/ Quad Cities applications. The data is not important for the TRACG MSLB analysis. The issue of GENE Engineering Data Bank (EDB) control was discussed. The EDB change is controlled by EOPs 40-3.10 and 55-2.00. GENE is evaluating possible change process improvement, under a CAR to address documentation and impact of EDB changes on the affected analyses. ComEd issues a recommendation to GENE on the subject.
28. A paragraph was added in the front of the ISCOR Section to state the purpose of the ISCOR calculation as part of TRACG input to improve organization and clarity of the document.
29. A paragraph was added in the front of the PANACEA Section to state the purpose of the PANACEA calculation as part of TRACG input to improve organization and clarity of the document.
30. A paragraph was added in the front of the ODYN-SS Section to state the purpose of the ODYN-SS calculation as part of TRACG input to improve organization and clarity of the document.
31. A paragraph was added in the front of the ATRAC Section to state the purpose of the ATRAC calculation as part of TRACG input to improve organization and clarity of the document. GE had also added an Introduction section that provides the purpose and roadmap of the project. Bases or justifications of using some specific models (ISCOR, PANACEA, ODYN-SS, etc.) for the MSLB/TRACG analysis were also provided.
32. The decay heat (ANS 1971 + 20%) used for the MSLB/TRACG was identified in the "revised" section.
33. Mr. Brit Grim of GENE was interviewed and responsible for GENE responses for items 33-49 (DRF B21-00537). The bases of design input flow rates of 15 and 19 lb/hr were provided in the DRF supplement (B21-00537-001). The 15 lb/hr is the maximum single failure flow rate and the 4 lb/hr is the design flow rate, and the 19 lb/hr is the total flow rate.
34. The report in question was stated to be an "Interim Report" which was replaced by a final report of GENE 637-031-1093. The design inputs in question were scattered in the original DRF. A cross-reference/road map was provided in the DRF supplement to improve the organization and clarity of the DRF.
35. The heat transfer coefficients were revised and incorporated into the analysis. The DRF was closed on 11/21/95. The preparation and verification were performed according to GENE procedures.
36. The instrumentation bias was determined based on the BWROG-developed guidelines (GENE-637-019-0893). The output (end-point calibration) of this project must be reviewed for plant setpoint applications. The setpoints and setpoint methodology application was ComEd scope. The end-point application of this project was noted in the Section 4.0 (End Point Calibration Bias Analysis) of GENE-031-1093).
37. The legible calculation sheets were made and the signoff sheet are included in the DRF supplement (B21-00537-001).
38. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-24, and 02-06)
39. The legible calculation sheets were reproduced and are filed in the DRF supplement. (Also see CARs 01-25, and 02-07)

40. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-26, and 02-08)
41. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-27, and 02-09)
42. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-28, and 02-10)
43. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-29, and 02-11)
44. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. The EXCEL spreadsheets were in Section 11 of the original DRF. (Also see CARs 01-30, and 02-12)
45. The legible calculation sheets were reproduced and the signoff sheet was completed. All are filed in the DRF supplement. (Also see CARs 01-31, and 02-13)
46. References or pointer to references were added to improve organization and clarity of DRF, and were filed in the DRF supplement.
47. The signoff sheet was completed by the responsible manager and is filed in the DRF supplement. (Also see CAR 02, Item No. 15)
48. The signoff sheet was completed by the responsible manager and is filed in the DRF supplement. (Also see CAR 02, item No. 16)
49. The legible calculation sheets were reproduced and the signoff sheet was completed by the responsible manager. All are filed in the DRF supplement. (Also see CAR 02, Item No. 17)

Resolution: The GENE responses were acceptable and the issues are closed.

Prepared by: Yasub A. Patel, for O. Shivan

Date: 6/15/99

Approved by: Oscar Shivan for
RUSSELL BASTYR

Date: 6/15/99

ATTACHMENT – 2

Evaluation Report – [REDACTED]
Supporting Information for Detail #3

7c

**Metric Reports for GE Nuclear
Issued by R. J. Nicholls**

Identified by letter numbers and dates shown below:

December 16, 1997	RJN 97- 018
January 16, 1998	RJN 98-003
February 18, 1998	RJN 98-006
March 18, 1998	RJN 98-010
April 20, 1998	RJN 98-011



GE Nuclear Energy

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

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December 16, 1997
RJN 97-018

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

Subject: Metrics Report for GE Nuclear Energy.

Dear Mr. Shirani:

Please find attached the first metric report from our functional manager reviews that we have performed on our engineering/technical services products. This report is transmitted in accordance to the agreements made in addressing the removal of the ComEd Stop Work order. This report was also delivered to Mr. Kombiz Salehi of ComEd during the quarterly A/E meeting held in your offices yesterday.

Based on the discussion with Mr. Salehi, we believe this report meets the needs of the EAG for tracking the reported quality of our work, and is compatible with the internal ComEd measurements, both in content and format. If you have comments on this package, or any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

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

cc: Mr. E.R. Netzel - ComEd

GE Nuclear Energy

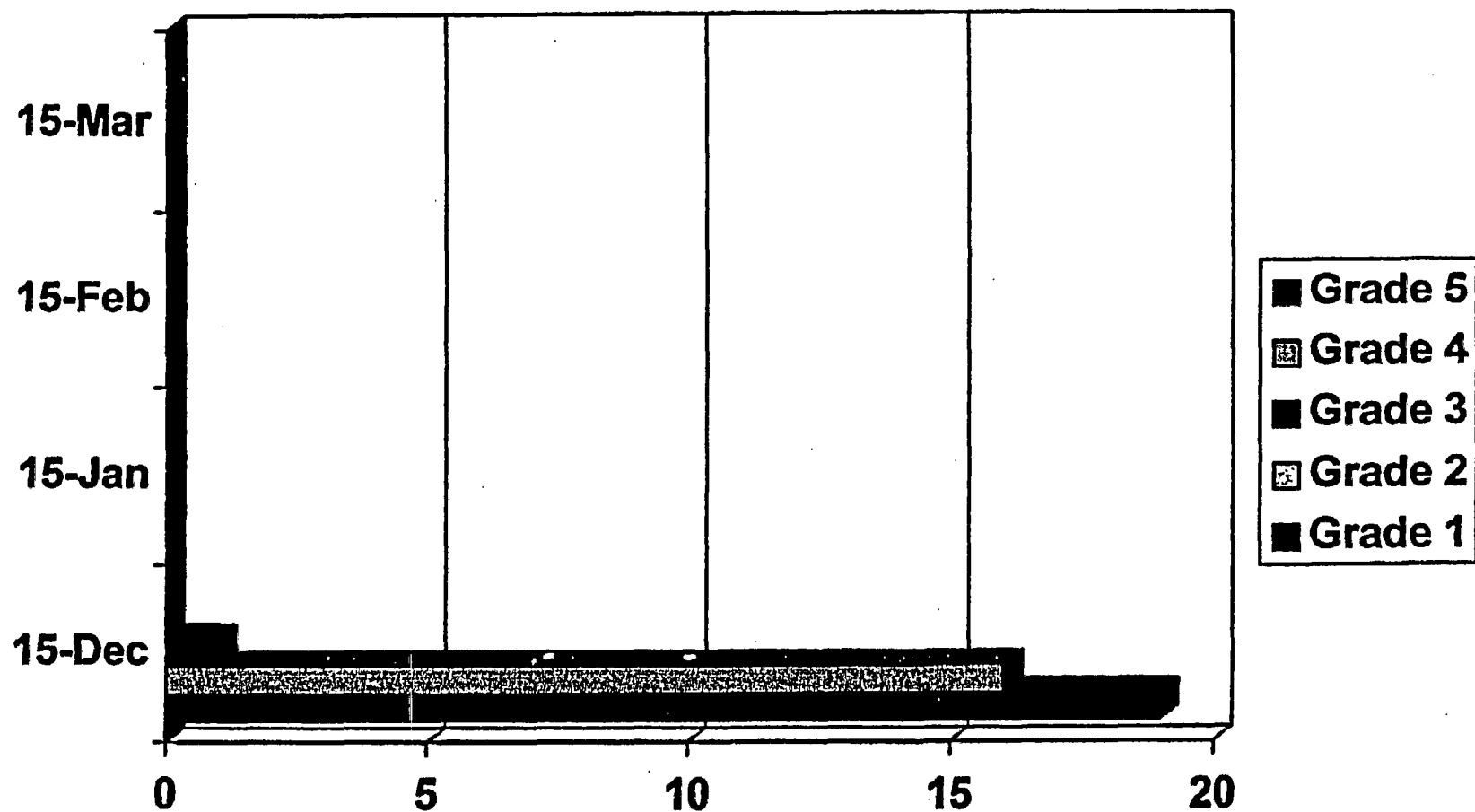
GE Nuclear Engineering Metrics

December 15, 1997





Functional Manager Review Results





Insights/Evaluation

- **No ComEd specific reviews performed**
- **Have incorporated manager feedback into checklist process to improve consistency**
- **Deficiencies primarily in completeness of DRF documentation**
- **Overall quality improving due to established expectations**
- **One PER initiated to develop TDP on calculation method for radiological release calculations**

Good Initial Effort



GE Nuclear Energy

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January 16, 1998
RJN 98-003

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

Subject: Metrics Report for GE Nuclear Energy - January.

Dear Mr. Shirani:

Please find attached the metric report from our functional manager reviews that we have performed on our engineering/technical services products during the period 12/16/97 through 1/15/98. This report is transmitted in accordance to the agreements made in addressing the removal of the ComEd Stop Work order.

If you have comments on this package, or any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

original signed -RJN

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

GE Nuclear Energy

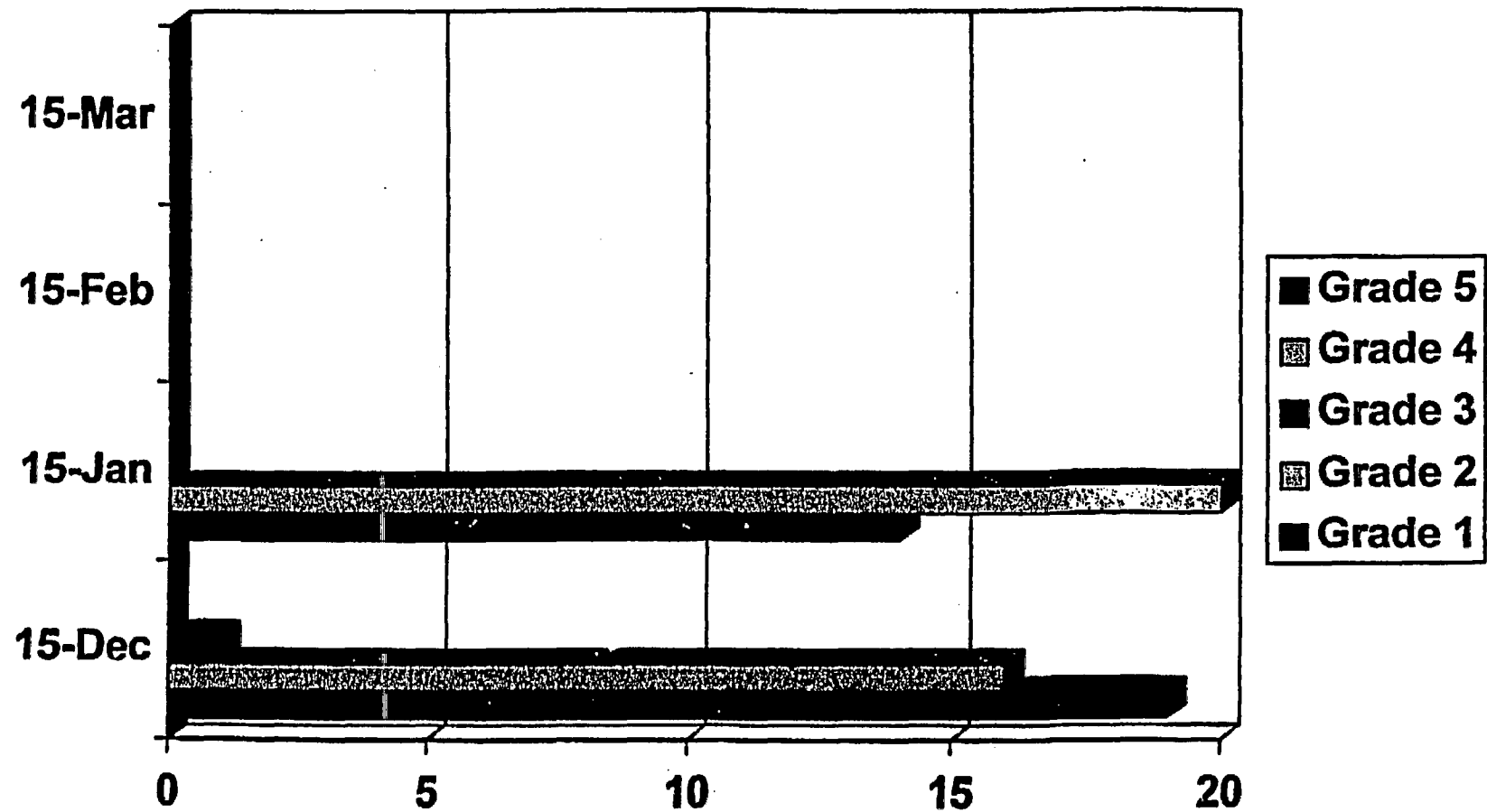
GE Nuclear Engineering Metrics

January 15, 1998





Functional Manager Review Results





Insights/Evaluation

- Defects rate in Quality Plans highest during the period
- Defect rate in technical areas improving
 - documentation of design assumptions area needing largest improvements
- Manager criteria for achieving G1 ranking being raised
 - single defect in any area resulting in more G2s than prior period
- No occurrences of G3 ranking, or PER initiation as a result of the review

*Manager Grades More Consistent
Overall Product Quality Improving*



GE Nuclear Energy

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February 18, 1998
RJN 98-006

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

Subject: Metrics Report for GE Nuclear Energy - February

Dear Mr. Shirani:

Please find attached the metric report from our functional manager reviews that we have performed on our engineering/technical services products during the period 1/16/98 through 2/13/98. This report is transmitted in accordance to the agreements made in addressing the removal of the ComEd Stop Work order.

If you have comments on this package, or any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

original signed - RJN

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



GE Nuclear Energy

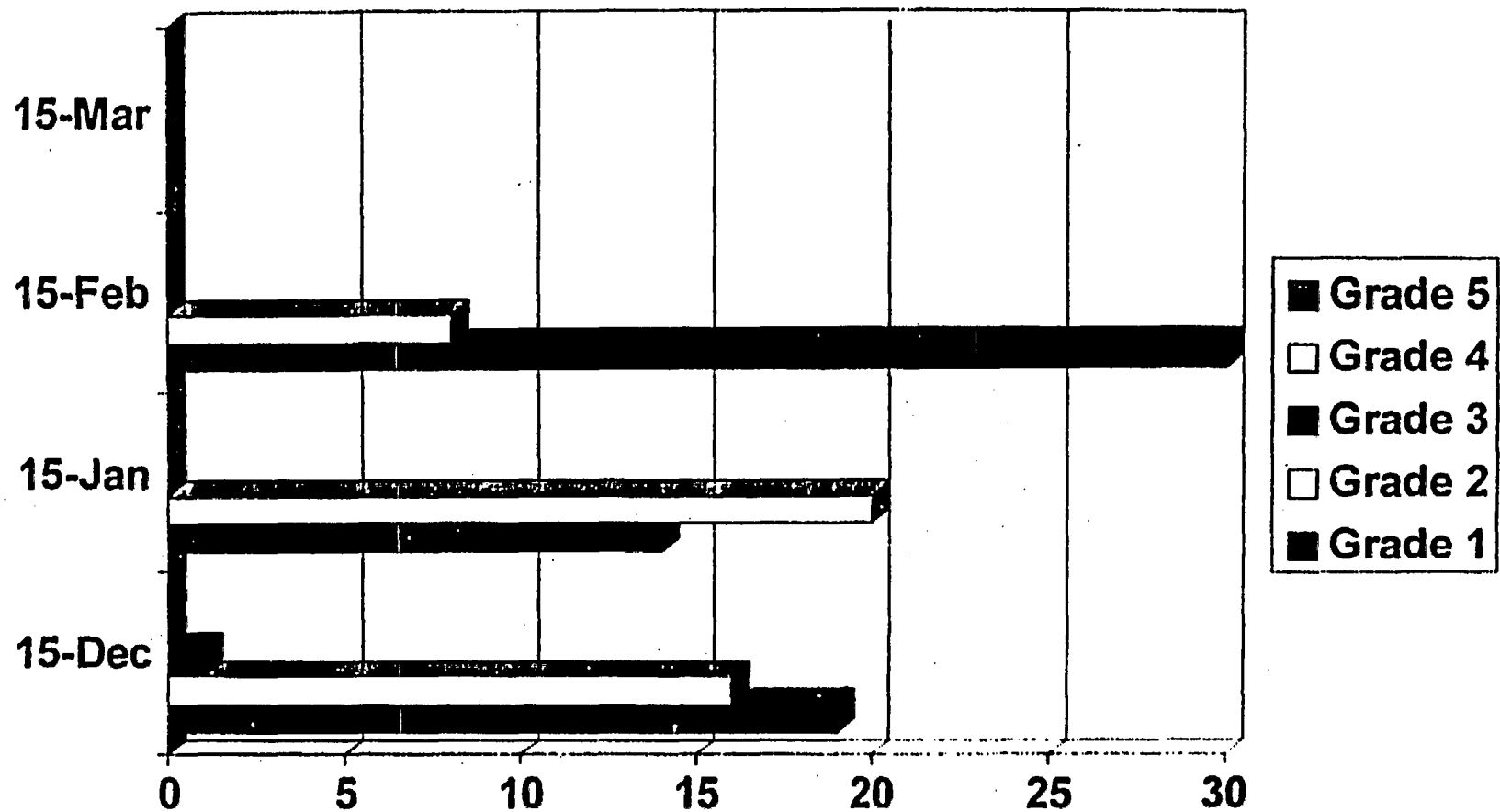
GE Nuclear Engineering Metrics

February 16, 1998





Functional Manager Review Results





Insights/Evaluation

- Defects rate driven by Quality Plan & Project Closure
- Defect rate in technical areas very low in the period
- Manager criteria for achieving G1 ranking being raised
- No occurrences of G3 ranking, or PER initiation as a result of the review

Overall Product Quality Improving



GE Nuclear Energy

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March 18, 1998
RJN 98-010

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

Subject: Metrics Report for GE Nuclear Energy - March

Dear Mr. Shirani;

Please find attached the metric report from our functional manager reviews that we have performed on our engineering/technical services products during the period 2/14/98 through 3/16/98. This report is transmitted in accordance to the agreements made in addressing the removal of the ComEd Stop Work order.

If you have comments on this package, or any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

original signed - RJN

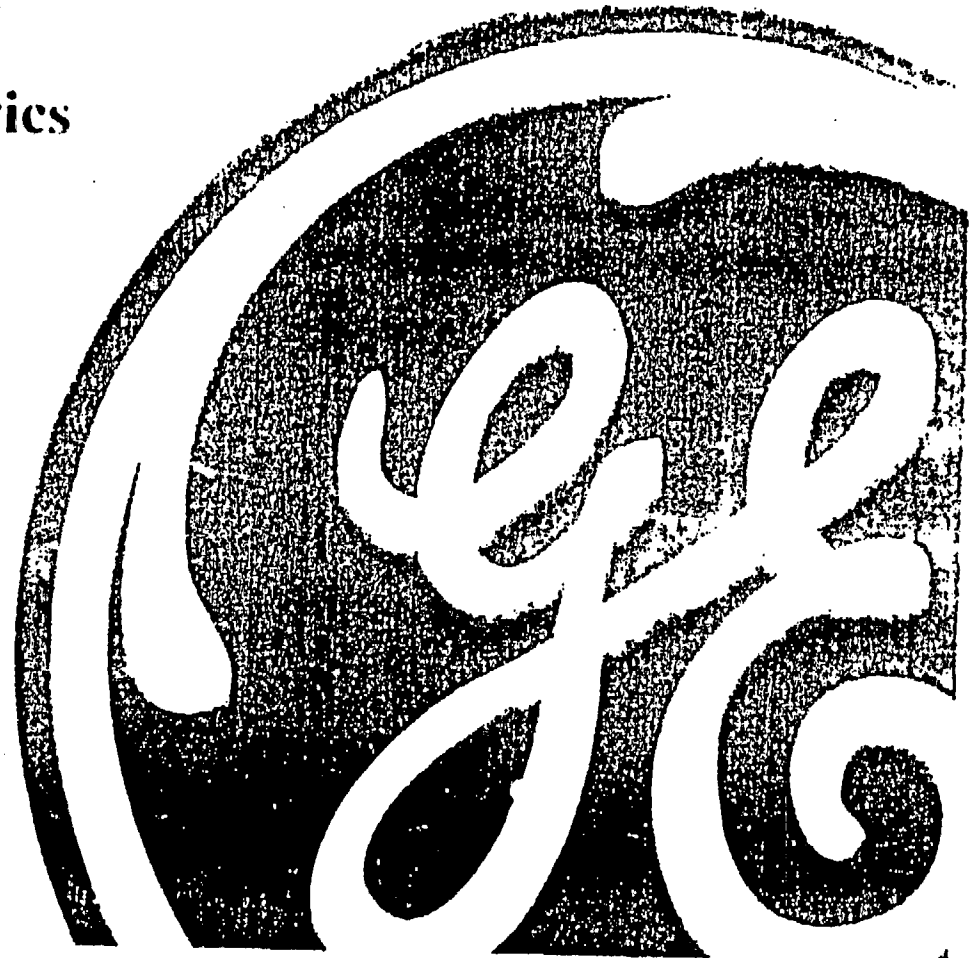
R.J. Nicholls
Manager - Nuclear Services Quality
GE Nuclear Energy



GE Nuclear Energy

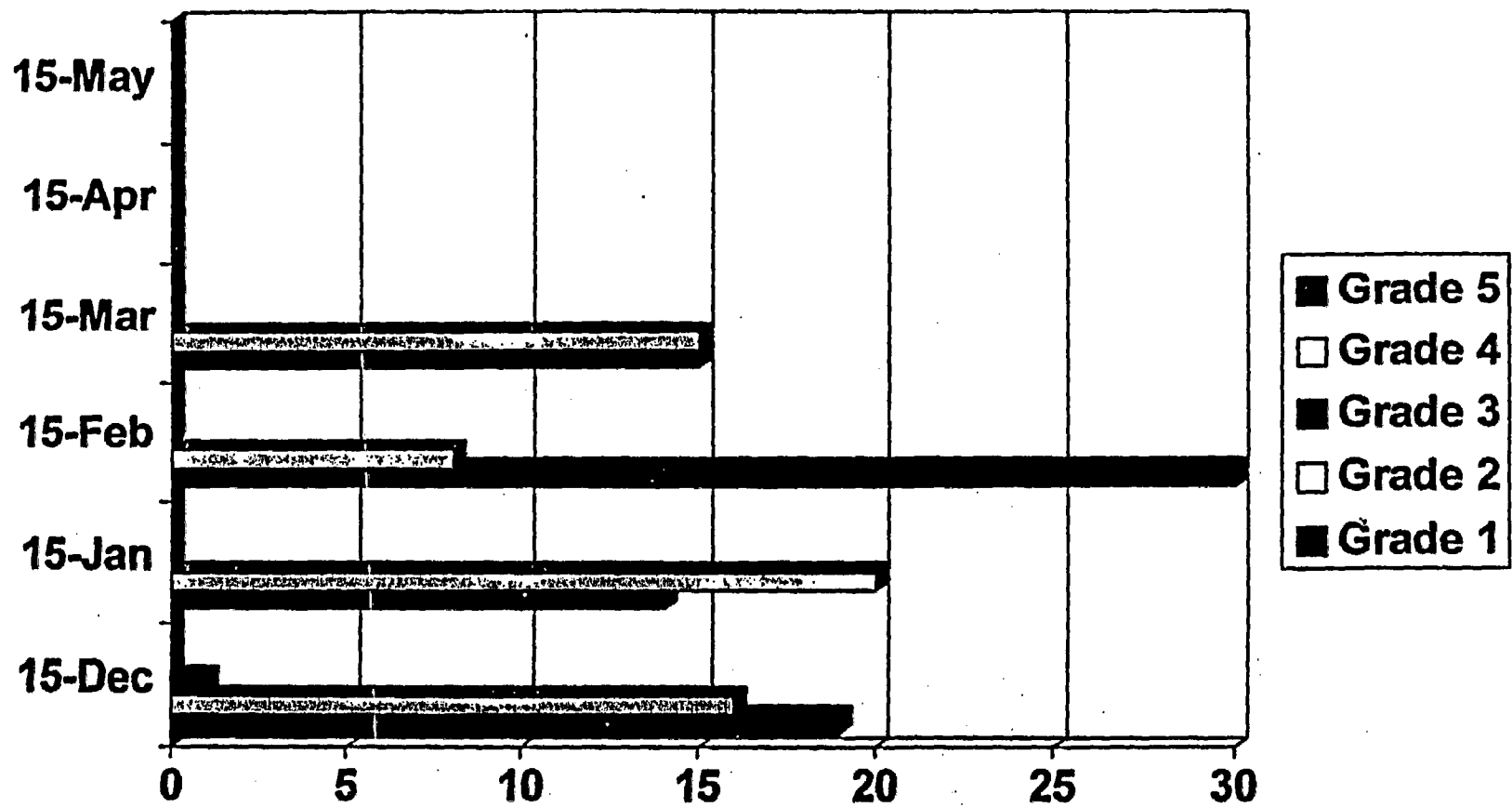
GE Nuclear Engineering Metrics

March 16, 1998





Functional Manager Review Results





Insights/Evaluation

- Significant increase in defects found in project closure area
- Defect rate in analytical areas increased over all prior periods
- Defects appear to be linked to emergency/short cycle analysis projects.
- All errors corrected prior to release of work.
- No occurrences of G3 ranking, or PER initiation as a result of the reviews

Focus Needed on Process for Short Cycle Projects



GE Nuclear Energy

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April 20, 1998
RJN 98-011

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

Subject: Metrics Report for GE Nuclear Energy - April

Dear Mr. Shirani:

Please find attached the metric report from our functional manager reviews that we have performed on our engineering/technical services products during the period 3/16/98 through 4/15/98. This report is transmitted in accordance to the agreements made in addressing the removal of the ComEd Stop Work order.

If you have comments on this package, or any questions on this information, please feel free to contact me at (408) 925-5241.

Sincerely,

original signed - RJN

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

GE Nuclear Energy

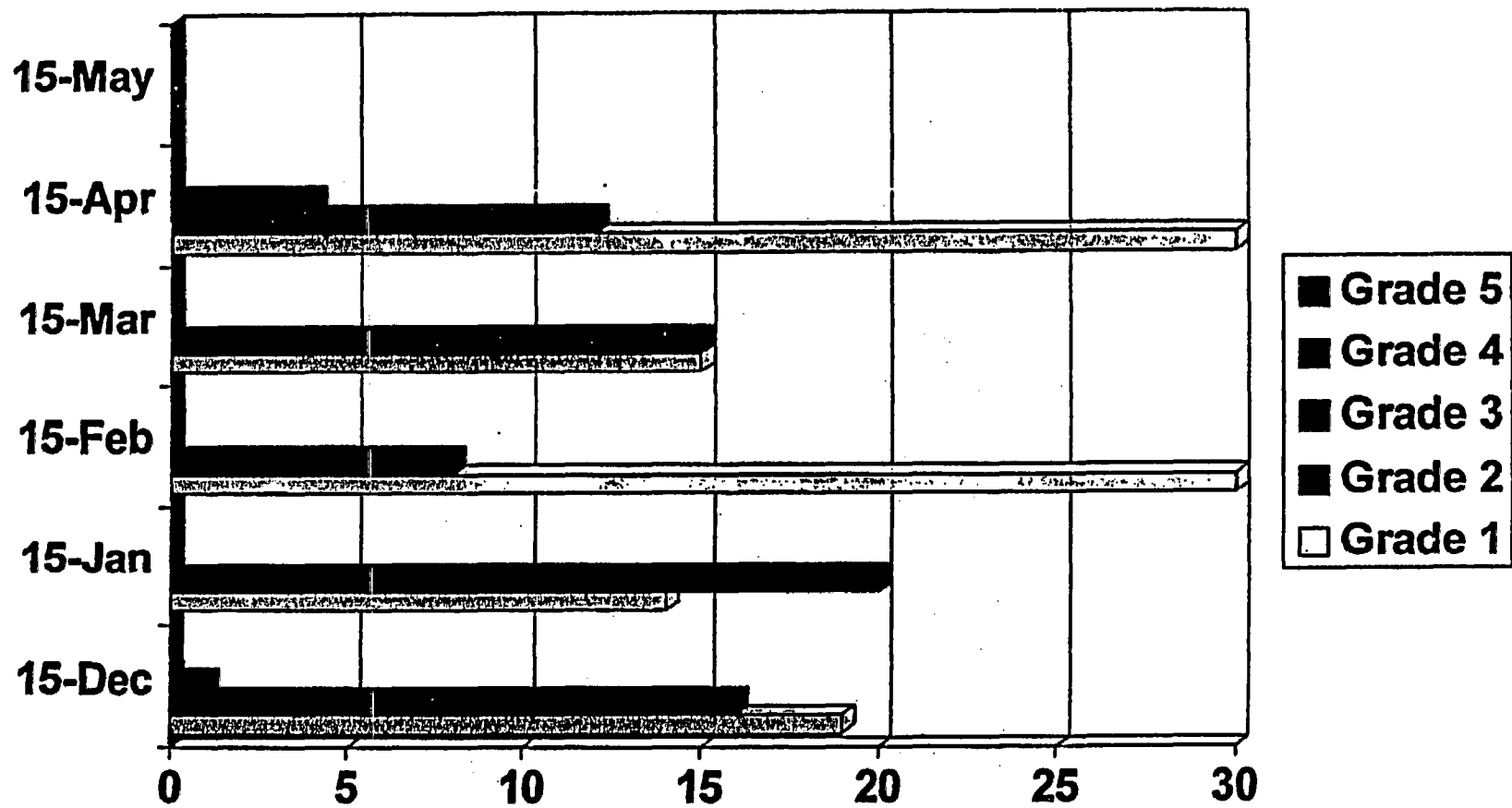
GE Nuclear Engineering Metrics

April 15, 1998





Functional Manager Review Results





Insights/Evaluation

- Defect rate continues to be dominated in closure area - should improve with DRF template
- G3 occurrences driven by design/analysis errors found in review, corrected prior to transmittal
- All errors corrected prior to release of work.
- Ratio of G1 to all other grades improving

Positive trends emerging from use of checklist

FAX

Date 05/11/98

Number of pages including cover sheet 9

TO: Mr. Oscar Shirani
ComEd
555 Joliet Road
Bolingbrook, IL 60440

Phone (630) 783-3273
Fax Phone (630) 783-3570

FROM: Robert J. Nicholls
GE Nuclear Energy
175 Curtner Ave. M/C 117
San Jose CA 95125

Phone (408) 925-5241
Fax Phone (408) 925-1372

CC:

REMARKS: ☒ Urgent ☐ For your review ☐ Reply ASAP ☐ Please Comment

Oscar,
The attached are reprints of my transmittals for March and April. May will be transmitted early next week. I cannot explain the miss (should not be the result of the address mix-up), but have included a complete set of the 5 months of reports in the FedEx package.

I missed the 3PM pickup, but you should receive the package Wednesday.

Regards,
Bob Nicholls

Complete set. Attached.

Bob Nicholls

file
GE Nuclear Energy
SAN JOSE, CA
G-97-120

O. Shirani
9/9/98

ATTACHMENT - 2

Evaluation Report - [REDACTED]
Supporting Information for Detail #3

7C

**GE Letter dated May 15, 1998
Showing GE actions and closure of
Corrective Action Report G-97-120-03.**



GE Nuclear Energy

Nuclear Services Quality

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

May 15, 1998

Mr. Oscar Shirani, PE
ComEd / Supplier Evaluation Services
555 Joliet Road
Bolingbrook, IL 60440

file
GE Nuclear Energy
San Jose, CA
G-97-120

Subject: ComEd Special Audit #G-97-120

Reference:

1. Letter #SES 97-276 to R. J. Nicholls from O. B. Shirani, dated 9/18/97
2. Letter #RJN 97-011 to O. B. Shirani from R. J. Nicholls, dated 10/10/97
3. Letter #SES 97-339 to R. J. Nicholls from R. E. Netzel, dated 11/19/97
4. Letter #SES 97-322 to R. J. Nicholls from O. B. Shirani, dated 11/3/97
5. Fax to O. B. Shirani from R. J. Nicholls, dated 11/13/97
6. Letter #RJN 97-017 to O. B. Shirani from R. J. Nicholls, dated 12/2/97

(C. Shirani)
9/9/98

Dear Mr. Shirani,

As requested in your telephone conversation with Bob Nicholls the attached is a summary of the completed committed actions and location of the objective evidence for the subject audit findings.

In addition, GE requests information on the status of the corrective actions associated with CAR #9, which was issued to ComEd regarding the use of NDITs for the transfer of technical information. To date, we have not seen purchase order requirements that require acceptance on technical information only when transmitted on an NDIT form, as agreed in the October 30/31st meetings.

If I can be of any further assistance please contact me.

Robert J. Nicholls

N. E. Barclay *For NEB*
Manager Audits
Nuclear Services Quality
M/C 117
Phone: (408) 925-5118
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E-Mail: norman.barclay@gene.ge.com
Ltr. #98-17

cc: R. J. Nicholls G. B. Stramback S. S. Dua J. F. Klapproth
Attachment:

004187
211

RESPONSE TO AUDIT G-97-120 FINDINGS

Finding #97-120-01

Corrective Action:

1.

Action Status:

This item was completed on schedule. The review of each detailed item is evidenced by the corrective action plan and feedback from a responsible engineer reviewing each detailed item. This information is collected and available in a binder for ComEd audit review. This review confirmed that no operational or safety impact was introduced as a result of the identified deficiencies in the documentation. Some information added to individual design record files (DRFs) also would technically support this conclusion. (ComEd was previously provided (10-30-97) a draft version of this detailed corrective action plan.)

2. ... 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. A draft of this action plan was provided to the ComEd team during their visit to San Jose on 10-30-97. (Complete implementation of the plan by 12-31-97)

Action Status:

This item was completed on schedule. Where applicable, the additional information has been added to the individual DRFs or supplements and is available for audit.

Preventive Action:

1. Train engineers and management in the DRF process to produce quality documents. (Done on 9/18/97).

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review.

2. Management will be instructed and trained to increase their attention to details before approving DRFs for closure. A check list will be developed and provided to the functional managers as a guidance to systematically review pertinent details on different projects to assure the integrity of the calculations before sending the final report to the customer. This check list will be issued as a part of the "Technical Services Engineering Instructions (001-97) " and the management will be trained on the use of this check list (Completion by 11-17-97)

0107

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review. A copy of the "Technical Services Engineering Instructions (001-97)" with the attached checklist and a copy of the management direction to implement the engineering instruction have been collected and are available in a binder for ComEd audit review.

3. Management will be instructed to establish effective work scheduling consistent with available resources. (Completion by 11-30-97)

Action Status:

This item was completed on schedule. A copy of the management direction is available in a binder for ComEd audit review.

4. We are currently reviewing the EOPs 42-1.0, 42-6.0 and 42-10.0 on design process, independent verification and the DRFs to identify and implement possible improvements in these processes. As a part of this review, we will ensure compliance with the requirements of ANSI 45.2.11-1974. We will also provide training to the engineers on revised EOPs. (Completion by 3-31-98)

Action Status:

This item was completed on schedule. A copy of the revised EOPs on the design process, including independent verification and DRFs are available and the latest controlled electronic version can be reviewed during the ComEd audit. This review resulted in complete revisions to EOP 42-1.00, 42-6.00, 42-10.0, 25-5.00 and introduction of a new EOP 25-5.10, which made more prominent the requirements previously contained in EOP 42-1.00 regarding customer technical requirements and design inputs. The review included participants knowledgeable of both ANSI 45.2.11-1974 and GENE's NEDO-11209-04A *GE Nuclear Energy Quality Assurance Program Description*. A copy of the NEDO will be made available for ComEd audit review. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

Finding #97-120-02

Corrective Action:

Plans have been developed to address items 1 through 17 to document "verification" properly in the Design Record Files (DRFs). For items 5 through 17, all verification sheets will have Preparer, Verifier and Approver signatures. Re-verification will be performed as necessary. A draft copy of this plan was given to the ComEd team during their visit to San Jose on 10-30-97.

(Complete implementation of plan by : 12-31-97)

Action Status:

This item was completed on schedule. The review of each detailed item is evidenced by the corrective action plan and feedback from a responsible engineer reviewing each detailed item. This information is collected and available in a binder for ComEd audit review. Corrections to the "verification" documentation and any re-verifications are contained in the individual DRFs. The DRFs will be made available for ComEd audit review.



Conclusions

- ComEd findings were from same time period as PECO project issues
- Deficiencies identified in ComEd audit were similar to those identified in PECO investigations
- Root causes were same engineering process/organizational deficiencies
- New root cause not initiated due to issue overlap/similarity of deficiencies

Existing Action Plans Being Enhanced to Improve Effectiveness in Prevention

Preventive Action:

1. A training session was held on 9-18-97 for all Technical Services personnel on proper implementation of the verification procedure. (Completion: Done)

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review.

2. A training session was held for all Technical Services personnel on 9-18-97 and in this training session, it was emphasized that the use of a standard, or equivalent, verification sheet requiring the Preparer, Verifier and Approver signatures will be required. (Completion: done)

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review.

3. The most recent revision of the EOP on Independent Design Verification (EOP 42-6.00, Revision 9, dated 9/12/97) now includes a requirement to document all comments and the resolution of comments (to address process deficiency identified in detailed item #3 on this CAR).

Action Status:

This item was completed on schedule. A copy of Revision 9 to EOP 42-6.00, which includes a requirement to document all comments and the resolution of comments, is available in a binder for ComEd audit review.

4. We are currently reviewing the EOPs 42-1.0, 42-6.0 and 42-10.0 on design process, independent verification and the DRFs to identify and implement possible improvements in these processes. As a part of this review, we will ensure compliance with the requirements of ANSI 45.2.11-1974. We will also provide training to the engineers on revised EOPs. (Completion by 3-31-98)

Action Status:

This item was completed on schedule. A copy of the revised EOPs on the design process, including independent verification and DRFs are available and the latest controlled electronic version can be reviewed during the ComEd audit. This review resulted in EOP revisions to EOP 42-1.00, 42-6.00, 42-10.0, 25-5.00 and introduction of a new EOP 25-5.10, which made more prominent the requirements previously contained in EOP 42-1.00 on customer technical requirements and design inputs. This review included participants knowledgeable of both ANSI 45.2.11-1974 and GENE's NEDO-11209-04A *GE Nuclear Energy Quality Assurance Program Description*. A copy of the NEDO will be made available for ComEd audit review. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

Finding #97-120-03

Corrective Action:

1. 6

We have also evaluated the impact of identified input discrepancies (items 15a, 19a, 24) and even though some calculational results have changed as a result of these input deficiencies, there is no safety impact or operability 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 containment analysis issue has been discussed and resolved with the utility. The results of this evaluation have separately been transmitted to ComEd . (Completion: Done)

Action Status:

This item was completed on schedule. The review of each detailed item is evidenced by the corrective action plan and feedback from a responsible engineer reviewing each detailed item. This information is collected and available in a binder for ComEd audit review. This review confirmed that no operational or safety impact was introduced as a result of the identified deficiencies in the documentation. Some information added to individual design record files (DRFs) also would technically support this conclusion. The DRF for item 24 is a case in point. (ComEd was previously provided (10-30-97) a draft version of this detailed corrective action plan.)

2. We have developed an action plan to address all the 49 items listed under this CAR. A draft copy of this plan was given to the ComEd team during their visit to San Jose on 10-30-97. (Complete implementation of the plan by: 3-15-98)

Action Status:

This item was completed on schedule. The review of each detailed item is evidenced by the corrective action plan and feedback from a responsible engineer reviewing each detailed item. This information is collected and available in a binder for ComEd audit review.

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. (Completion: 01-31-98)

Action Status:

This item was completed on schedule. The individual DRFs will be made available for ComEd audit review.

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. (Completion: 01-31-98)

Action Status:

This item was completed on schedule. The individual DRFs will be made available for ComEd audit review.

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. (Completion: 01--31-98)

Action Status:

This item was completed on schedule. The individual DRFs will be made available for ComEd audit review.

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. (Completion: 01-31-98)

Action Status:

This item was completed on schedule. The individual DRFs will be made available for ComEd audit review.

7. In compliance with GENE procedures, the V & V of all non-level 02 codes will be provided in the DRF for each application. (Completion: 02-15-98)

Action Status:

This item was completed on schedule. GENE procedures have been followed for verification of work and this verification has been documented in the DRFs, this includes spreadsheets and other non-level 02 codes. The individual DRFs will be made available for ComEd audit review.

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. (Completion: 11-30-97)

Action Status:

This item was completed on schedule. A copy of the management direction is available in a binder for ComEd audit review.

2. Instruct engineers and managers to increase attention on checking details to ensure compliance with design, verification and documentation procedures. A check list will be developed to provide guidance to the managers to systematically review the pertinent details of the project before the final report is issued to the customer. This check list will be issued as a part of the "Technical Services Engineering Instructions (001-97) " and the management will be trained on the use of this check list.(Completion:11-17-97)

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review. A copy of the "Technical Services Engineering Instructions (001-97) " with the attached checklist and a copy of the

management direction to implement the engineering instruction have been collected and are available in a binder for ComEd audit review.

3. Perform periodic self-assessments and /or technical audits to verify improvement.
(Completion: 3-31-98)

Action Status:

This item was completed on schedule. A copy of the monthly metrics of the checklist results and a copy of the self-assessment plan is available for ComEd audit review. A technical audit will be performed later this year in conjunction with planned internal business audits to assess the adequacy of the corrective action implementation.

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.(Completion: 01-31-98)

Action Status:

This item was completed on schedule. Review with GENE management during the ComEd audit.

5. We are currently reviewing the EOPs 42-1.0, 42-6.0 and 42-10.0 on design process, independent verification and the DRFs to identify and implement possible improvements in these processes. As a part of this review, we will ensure compliance with the requirements of ANSI 45.2.11-1974. We will also provide training to the engineers on revised EOPs. (Completion by 3-31-98)

Action Status:

This item was completed on schedule. A copy of the revised EOPs on the design process, including independent verification and DRFs are available and the latest controlled electronic version can be reviewed during the ComEd audit. This review resulted in EOP revisions to EOP 42-1.00, 42-6.00, 42-10.0, 25-5.00 and introduction of a new EOP 25-5.10, which made more prominent the requirements previously contained in EOP 42-1.00 on customer technical requirements and design inputs. This review included participants knowledgeable of both ANSI 45.2.11-1974 and GENE's NEDO-11209-04A *GE Nuclear Energy Quality Assurance Program Description*. A copy of the NEDO will be made available for ComEd audit review. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

Finding #97-120-06

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.

This audit was completed on 10/10, and the results are documented in audit report NSQ Q9709. The audit will be completed by 10/10, with the audit report and any corrective actions issued by 10/31.

Action Status:

This item was completed on schedule. A copy of the audit report is in the binder and will be made available for ComEd audit review.

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

Results of these audits will be used to confirm the measurement trends defined in the response to CAR G-97-120-13, and based on the trend patterns, the audit frequency will be adjusted (e.g. negative metric trends in a given area or measurement will increase the audit/surveillance frequency)

Action Status:

This item was completed on schedule. A copy of the NSQ 97-3 audit, the Q9709 audit and the 1998 Nuclear Services Quality audit plan will be made available for ComEd audit review. The technical audit for 1998 will be performed later this year in conjunction with planned internal business audits to assess the adequacy of the corrective action implementation.

Finding #97-120-07:

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. (Completion: 01-31-98)

Action Status:

This item was completed on schedule. The applicable DRF(s) will be made available for ComEd audit review.

2. For items 4 and 5, see Preventive Action # 3.

Action Status:

See Preventive Action # 3 (below).

3. For item 6, the verification and validation of the engineering calculation using the SHRD-LIFT2 program will be added to the DRF. (Completion : 01-31-98)

Action Status:

This item was completed on schedule. GENE procedures have been followed for verification of work and this verification has been documented in the DRF(s). The individual DRF(s) will be made available for ComEd audit review.

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. (Completion:01-31-98)

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review. This topic also was covered during the training on the revised EOPs. A copy of this EOP training material and a copy of the training records will be made available for ComEd audit review.

2. Management will be instructed to pay more attention to details before signing off the independent design verification sheet. A check list will be developed to provide guidance to the functional managers to review all pertinent details of the project before the final report is issued to the customer. This check list will be issued as a part of the " Technical Services Engineering Instructions (001-97) " and the management will be trained on the use of this check list. (Completion: 11-17-97)

Action Status:

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review. A copy of the "Technical Services Engineering Instructions (001-97) " with the attached checklist and a copy of the management direction to implement the engineering instruction have been collected and are available in a binder for ComEd audit review.

3. Although our practice of performing Verification and Validation (V & V) through the Design Review Committee provides the most complete evaluation of the software application, we realize that the level of details in the documentation of this review process may not have been as complete as expected by the ComEd audit team. In light of the audit team's comments on the lack of sufficient details with regards to the Acceptance Criteria applied to the V/V process, the GE Design Review Teams will be instructed to clearly document the acceptance criteria used by the team to accept the verification / validation of a Level 02 code.

Completion: 1-31-98)

Action Status:

The requirements for documenting the acceptance criteria already exists in EOP 40-3.00, and were in this EOP prior to the time period of work reviewed during the ComEd audit. Part of the responsibility of the GE Design Review Team(s) is to determine the acceptability and satisfaction of the documented acceptance criteria. The responsibility for documenting the acceptance criteria rests with the responsible engineer working on the code.

To assure complete understanding of this requirement, additional training has been developed to focus on this criteria. An extension of existing EOP training will be made to additional personnel in San Jose and this training will be completed by June 19, 1998. A copy of EOP 40-3.00 and a copy of the training records will be made available for ComEd audit review.

Finding #97-120-08

Corrective Action:

1. Procedure 42-1.00 (step 4.3.2). will be clarified to direct the Project manager to document and obtain customer agreement on the design interface between any agents providing design inputs. (Scheduled for issuance prior to 12/31).

Action Status.

This item was completed on schedule. This clarification has been included in new EOP 25-5.10, which is referenced by EOP 42-1.00. A copy of the revised EOPs on the design process, including independent verification and DRFs are available and the latest controlled electronic version can be reviewed during the ComEd audit. This review resulted in EOP revisions to EOP 42-1.00, 42-6.00, 42-10.0, 25-5.00 and introduction of a new EOP 25-5.10, which made more prominent the requirements previously contained in EOP 42-1.00 on customer technical requirements and design inputs. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

2. Training on the revised procedure will be performed in accordance with the normal training process for Core EOPs after the revision is issued. (3/31/98)

Action Status.

This item was completed on schedule. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

Preventive Action:

ComEd and GE have agreed that future purchase orders will define that the only acceptable method of transmitting design inputs between ComEd and GE is by use of the ComEd NDIT process. This will then become a project requirement via the contract, and will be communicated to the GE project teams through the Customer Technical Requirements (CTR) document process defined in Procedure 42-1.00.

Placing the requirement in the contract is a ComEd action, and was agreed to in the meetings held October 30 & 31, 1997 in San Jose, CA

Action Status.

This item was completed on schedule. The Customer Technical Requirements (CTRs) are now covered in new EOP 25-5.10, which is referenced by EOP 42-1.00. A copy of the revised EOPs on the design process, including independent verification and DRFs are available and the latest controlled electronic version can be reviewed during the ComEd audit. This review resulted in EOP revisions to EOP 42-1.00, 42-6.00, 42-10.0, 25-5.00 and introduction of a new EOP 25-5.10, which made more prominent the requirements previously contained in EOP 42-1.00 on customer technical requirements and design inputs. A copy of the EOP training material and a copy of the training records will be made available for ComEd audit review.

Finding #97-120-11

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.

Action Status.

This item was completed on schedule. Arrangements for auditing these DRFs in Wilmington would be necessary for ComEd to view these DRFs.

Finding #97-120-12

Corrective Action:

Item A: NONE

The DRF was OPENED on 9/6/93 but was not closed 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.

Action Status.

This item was completed on schedule. The individual DRF will be made available for ComEd audit review.

Item B:

The supporting LOCA analysis (DRF 523-A80-0594, Section O, Ref.1) has now been located and can be made available for ComEd's review, when requested.

Action Status.

This item was completed on schedule. The individual DRF will be made available for ComEd audit review.

Finding #97-120-13

Corrective Action:

The corrective actions GE will take, in addition to the existing improvement initiatives, are as follows:

1. Enhance Functional Manager (FM) review checklist to increase focus on technical reviews. This checklist will be issued as part of Technical Services Engineering Instruction #001-97 (Nov. 17).

Action Status.

This item was completed on schedule. A copy of the "Technical Services Engineering Instructions (001-97) " with the attached checklist and a copy of the management direction to implement the engineering instruction have been collected and are available in a binder for ComEd audit review.

2. Provide FM training on revised checklist to ensure consistent reviews (Nov. 17).

Action Status.

This item was completed on schedule. A copy of the training material and a copy of the training records have been collected and are available in a binder for ComEd audit review.

3. Develop review metrics using input from ComEd's engineering assessment oversight report (completed - Nov. 12).

Action Status.

This item was completed on schedule. A copy of the monthly metrics of the checklist results have been periodically sent to and discussed with ComEd.

4. Perform independent QA review (using the FM checklist) of the first six ComEd projects after Nov. 17. Compare with FM reviews and trend results. After first six projects, establish revised QA review frequency based on trends.

Action Status.

This item was completed on schedule. A copy of the results of this review will be made available for the ComEd audit review.

5. Provide a monthly trend report to ComEd starting on Dec. 15. The methods of measurement, and metrics to be trended will be communicated to ComEd by 11/17. Mutual agreement on the metrics and reporting format will be reached by Dec. 5 to allow the initial report to be delivered by Dec. 15.

Action Status.

This item was completed on schedule. A copy of the monthly metrics of the checklist results have been periodically sent to and discussed with ComEd.

6. Issue a Tech Services "Engineering Instruction" to document the interim review process (Nov. 17).

Action Status.

This item was completed on schedule. A copy of the "Technical Services Engineering Instructions (001-97) " with the attached checklist and a copy of the management direction to implement the engineering instruction have been collected and are available in a binder for ComEd audit review.

7. Issue revised responses to the ComEd CARs (Nov. 13 - complete).

Action Status.

This item was completed on schedule.

Completion dates are indicated in parentheses for each action.

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.

Action Status.

This item is receiving continued Services Quality monitoring attention as evidenced by review of the monthly metrics and is one of the areas to be reviewed as part of the 1998 Services Quality audit plan.