

**From:** Mahesh Chawla  
**To:** Joseph.bauer@exeloncorp.com  
**Date:** 4/23/03 4:53PM  
**Subject:** Exelon Submittal dated October 16, 2002- License Amendment for Instrument Bus Inverters

Following is the list of questions we would like to discuss with you on the subject amendment. After your review of these questions, please let me know about your availability to have this telephone conversation. If you have any further questions, please give me a call.

1. What is the risk impact for a loss of an offsite power event with or without a vital AC inverter available? (IPE notes that LOOP contributes 83% to CDF)
2. Based on maintenance history, is one surveillance per year of 14 days consistent with the performance experienced with the instrument bus inverters to date?
3. Do the instrument bus inverters automatically switch to the constant voltage transformers upon loss of the inverter?
4. Provide a discussion of peer review results and comments and indicate whether any of the peer review findings are applicable to the proposed inverter CT request. Indicate what modifications were made to address the peer review comments.
5. Provide additional discussion concerning the tier 2 evaluation including any components that were identified as risk significant with regards to a 14-day completion time for the instrument bus inverters (RAW values greater than two or components whose RAW value increased to 2 based on the proposed 14-day instrument bus inverter CT. In addition are there any maintenance activities that were identified that should not be scheduled during inverter maintenance? Were any compensatory measures identified related to inverter maintenance when a 14-day CT is implemented?
6. Describe how common cause factors were accounted for in the inverter analysis for inverters taken out of service.
7. As suggested by RG 1.174 the licensee should perform sensitivity studies to provide additional insights into the uncertainties related to the proposed CT extension. Provide a discussion that shows the proposed instrument bus inverter CT request results met the acceptance criteria for CDF, LERF, ICCDP and ICLERP when parameters potentially affecting the risk results are changed to reflect the range of uncertainty of the associated parameters.
8. Page 7 of 15 of the submittal states that the proposed 14-day completion time is expected to be used no more than once per inverter per refueling cycle. It is noted that it appears that the estimation of risk impact assumed that each inverter will be taken out of service once per year for 14 days. Clarify the frequency that is intended for inverter maintenance.
9. Page 7 of 15 of the submittal states, "The base CDF values for each unit range from about  $3E-5$ /year to about  $5E-5$ /year based on the average unavailability of the instrument bus inverters using plant specific data. Are these differences in base CDF attributable to the

unavailability of the instrument bus inverters? Should this read, "include the average unavailability?"

10. The IPE for Braidwood states that the pressurizer PORVs depend on 120 VAC power as well as DC and compressed air. Discuss the impact of this dependency on the proposed 14 CT time for the instrument bus inverter.

11. Was the ability to crosstie the emergency busses included in the instrument bus inverter 14 day CT evaluation? Discuss the risk impact this has on the instrumentation bus inverter 14 day CT.

12. Page 12 of 15 of the submittal states that for planned maintenance activities an assessment of overall risk of the activity on plant safety, including benefits to system reliability and performance is currently performed prior to scheduled work. Is this stating that the overall risk of the activity is a combination based on the risk of performing that activity and the risk or performance benefit once the maintenance activity is completed?

13. Page 12 of 15 the last bullet states that as a final check, a quantitative risk assessment is performed to ensure that the activity does not pose any unacceptable risk. The evaluation is performed using the impact of CDF and LERF. Are only CDF and LERF evaluated or are ICCDP and ICLERP metrics used when equipment is taken out of service? Is the contribution from common cause evaluated for maintenance activities for equipment taken out of service?

14. Besides the on-line work procedure what tools are used to monitor plant risk? Discuss available computer models, including risk matrix, shutdown risk, etc. Page 12 of 15.

15. The submittal states that the instrument bus inverters are monitored under the maintenance rule (10 CFR 50.65(a)(2)). Section (a)(2) says that monitoring is not performed - it is assumed that preventive maintenance is adequate. Discuss what performance criterion is in place for the instrument bus inverters. Page 13 of 15.

16. Provide conditional CDF risk results for instrument bus inverters CDFxAOOS, CDFxBOOS, CDFxCOOS, and, CDFxDOOS when each is out of service.

17. For the risk analysis of the inverters, did the analysis assume recovery of the inverter?

18. Was generic data or plant specific data (inverters, transformers) used in the evaluation of the risk impact of the proposed CT?

19. Provide the estimates for CDF, LERF, ICCDP, and ICLERP for the proposed 14-day instrument bus AOT.

20. The submittal states that NUREG/CR-6595, "An Approach for Estimating the Frequencies of Various Containment Failure Modes and Bypass Events," was used to estimate LERF. What method (or definition of LERF) from NUREG/CR-6595 was used to derive the value for LERF? NUREG/CR-6595 states that if the estimated LERF is significantly below (about an order of magnitude or more the acceptance guideline then the expenditure of additional resources to obtain a detailed level 2 model and more accurate estimate of LERF is not warranted." Based on Table A-1 and Table A-3 of the submittal, discuss the results of the LERF calculation and the conformance to the guidelines referenced in NUREG/CR-6595 (page 1-3)

21. With a longer allowed outage time is proposed for the inverters, provide a description of compensatory measures taken before the instrument bus inverter is taken out for service.

22. When an inverter is taken out for service. Upon a loss of offsite power (partial or full), a 120V ac instrumentation bus that is being powered by the constant voltage transformer will be de-energized for 10 seconds until the associated emergency diesel generator re-energizes the emergency bus. Describe any impact on plant operation as a result of momentarily de-energizing vital buses. Also, describe the impact of the RPS and ESFAS logic during this time delay.

**CC:** Clifford Douth; Duc Nguyen; Erastace Fields

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**Creation Date:** 4/23/03 4:53PM

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