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U.S. Nuclear Regulatory Commission
Mail Station P1-37
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Docket No. 50-416
License No. NPF-29
Partial Response to Containment Systems and Severe Accident Branch Request for Additional Information Concerning Request for Exemption from 10CFR Part 50, Appendix J

GNRO-94/00064

Gentlemen:

Additional information concerning our request for an exemption to the requirements of 10CFR50 Appendix J was requested by letter dated April 6, 1994. The information provided here is a partial response to that request. Additional information will be provided as soon as it is available.

We appreciate your efforts to review the submittal on a timely basis and will be glad to assist in that effort in any way possible. If you have any questions or require additional information, please contact this office.

Yours truly,

DGPace

CRH/WBB/mtc
attachment: Response to Draft Questions Regarding the GGNS Application for Exemptions from 10CFR50, Appendix J
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PARTIAL RESPONSE TO CONTAINMENT SYSTEMS AND SEVERE ACCIDENT BRANCH REQUEST FOR ADDITIONAL INFORMATION CONCERNING REQUEST FOR EXEMPTION FROM 10CFR PART 50, APPENDIX J

7. **Figure 2-2 does not appear to be consistent with Figure 2-1. We understand that a corrected version of this figure will be provided.**

   The corrected version is included as part of this attachment.

8. **As part of its request, Grand Gulf proposes that if a component is repaired for reasons other than excessive leakage, no re-baselining of the component would be performed. Since maintenance errors are likely causes of near term failures following maintenance, this aspect of the proposal needs further justification.**

   As stated on Page 11 of the application, ALL maintenance or modifications that could affect the components leak tightness is followed by a post-maintenance type B or C test which would prove the quality of the maintenance. This post-maintenance test is not considered rebaselining per the application. Rebaselining is required only if the test following maintenance is > +5% of the pre-maintenance test (as-found).

   > **Example**: Prior to repacking a valve, a premaintenance LLRT would be performed. After the repack was completed, a post maintenance LLRT would be performed. If the LLRT leakage results was > +5% of the pre-maintenance LLRT the valve would require rebaselining by placing the valve on a 2 year interval until performance is restablished.

10. **§3.3, pg 13. Describe in more detail the "evaluations performed to determine which components are required to be Type B/C tested".**

    The evaluations were performed per the requirements of 10 CFR 50 Appendix J. However, the fluctuation in the total number of components Type B & C tested was mainly due to a conservative interpretation of Appendix J. Past evaluations included components such as manual instrumentation valves.

11. §3.3, pg 16. **Describe how the criteria of §3.2 were applied where a component was adjusted to a 2- to 5-year interval from a 10-year interval based on performance. Use a specific example.**

The evaluations would be performed based on sound engineering judgment using the guidelines as specified on Page 12.

Example: 1E12F044A valve is assigned an owners allowable leakage rate of 1040 sccm. The last 3 LLRT leakage rates were 500, 880 & 101 sccm. This was considered erratic leakage and the valve was placed on a 5 year test interval. The component will be tested in 5 years and re-evaluated based on the test data.

Example: 1E12F028 valve is assigned an owners allowable leakage rate of 4680 sccm. The last 3 LLRT leakage rates were 140, 1805 and 2311 sccm. This data is an indication of a degrading trend and the valve was placed on a 5 year interval. The component will be tested in 5 years and re-evaluated based on the test data.

12. §3.4, pg 19, #7. **Describe how a "surveillance" could detect a "valve failure to close at system pressure". What kinds of surveillance would be involved?**

Various system surveillances are run quarterly which require operation of pumps and valves. In a typical ECCS pump surveillance, when the pump starts the min-flow valve (CTMT isolation valve) goes open and is closed as the test return valve is opened (CTMT isolation valve). The test return valve is closed once required data is taken and the pump is stopped. The failure of either of these valves to open or close would be identified during the performance of the surveillance.

13. **From the information on current numbers of Type B and C components tested and the preliminary interval assignments, the estimated reduction in Type B and C testing for the proposed performance-based exemption can be calculated to be about 60 percent. However, the cited cost saving of $7.3 million represents more than 80 percent of the remaining costs that would be incurred under the current requirements. Explain this discrepancy.**

The total reduction of tests with the exemption is 64% and the total reduction of cost with the exemption is 64%. The following provides the rationale for the conclusions:

TOTAL TESTS
The current 2 year program requires testing the 383 components in the program 6,894 times in the next 30 years.

383 Components X 6 Test Every 10 Years X 3 Ten Year Intervals = 6,894 Tests

The proposed program would require testing the 383 components in the program 2,454 times in the next 30 years.

2 Year Interval Components 82	X 6 Outages	X 3 Intervals	=	1,476	Tests
5 Year Interval Components 25	X 2 Outages	X 3 Intervals	=	150	Tests
10 Year Interval Components 276	X 1 Outage	X 3 Intervals	=	828	Tests
			Total =	2,454	Tests

% of Total Test Savings: 1- (2.454 ÷ 6.894) = 64%

COST SAVINGS
The cost savings was calculated by multiplying the total number of contractor man hours 20,000 X $30 per hour divided by 383 total number of test = $1567 per test. The following provides the total program implementation cost for 10 years (10 years = 6 outages).

Current 2 year program implementation cost is 6 outages X 383 components X 1567 = 3,600,966.

The proposed program cost is based on the following:

2 Year Interval Components 82	X 6 Outages	X $ 1567	= $	770,964
5 Year Interval Components 25	X 2 Outages	X $ 1567	= $	78,350
10 Year Interval Components 276	X 1 Outage	X $ 1567	= $	432,492
			Total = $	1,281,806

The total program cost savings for 10 years is $ 3,600,966 - 1,281,806 = $2,319,160. The estimated cost savings for the remaining 30 years of commercial life is 3 X $ 2,319,160 = $6,957,480.

% of Cost Savings: 1- (1,281,806 ÷ 3,600,966) = 64%

14. Type B and C testing, under current requirements, requires about 20,000 labor hours per refueling outage. As there are currently 92 Type B and 297 Type C components being tested, the average number of labor hours

per component is about 51. At the PWR used in a separate analysis, an average of about 2,500 labor hours are spent in testing 130 Type B and 196 Type C components, or about 8 labor hours per component. Can Entergy offer any insights into why the labor hours spent per component differ between the two plants by almost a factor of 7? The estimate for the PWR is derived from a matrix showing Departmental Totals (e.g., Engineering, Health Physics, QA) by Activity (e.g., Planning, Long-Term Preps, Conducting Tests). Can a similar matrix be provided to show what labor hours are included in the Grand Gulf estimate?

The PWR appears to only include the man hours involved with conducting a specific test where Grand Gulf's man hour estimate is based on project cost. GGNS would agree with the 8 labor hours per test for the average time actually conducting the test.

The man hour estimate for LLRT's was calculated by dividing the total number of hours spent during an outage to support LLRT's by the total number of LLRT's required to be performed. Contractors are hired specifically to perform LLRT's during outages. Recognizing that when LLRTs are not being conducted for various reasons, such as system availability and maintenance, the cost of the contractors is still being absorbed.

The following is a generalized list of required contractor activities which is included in the man hour estimate for performing LLRT's.

- General Employee Training
- LLRT Training Class
- Contractor Certification Program
- Testing preparation which consists of gathering material, general maintenance on test equipment and test package development.
- Pre-outage LLRT's
- Outage LLRT's which includes, testing, trouble shooting and re-tests of components after maintenance.
- De-mobilization

Additional details on the man hours spent performing Type B/C testing is provided in the following table. In addition, an LLRT work flow sequence table is provided which explains the work sequencing when performing LLRT's.

LLRT Personnel Table

Position	Activity	Quantity	(1)Hours Per Test	(2)(3)Total Man/Hours For Project
Scheduler	Schedules test for outages.	1	NA	200
Surveillance Coordinator	Plans work order packages.	1	.5	129
Health Physics	Review work orders and monitor opening of system valves.	1	.5	129
Engineer 1	Responsible for data package development, RWP's, performing required calculations, oversees testing, trouble shooting, parts, test equipment, ect.	2 (1 per shift)	NA	1630
Engineer 2	Review test data, assist in testing and maintain containment leakage logs.	1	NA	815
Operation Coordinator	Coordinates testing sequence and directs LLRT operators.	1	NA	600
LLRT Operator	Performing system draining, filling and venting valve line-ups for tests and restoration of systems.	8 (4 per shift)	NA	3456
Pipefitter	Performing LLRTs	18 (9 per shift)	NA	12,588
Training Instructor	Instructing LLRT training class.	1	NA	94
Surveillance Coordinator	Reviews work orders and update surveillance records.	1	.5	129
Work Close Out	Review and microfilm work orders.	1	2	516
TOTALS				20,285

Notes:
1- Hours per test that are NA indicates position is held through project and is not based on hours per test.
2- Total man/hours for project is based on hours per test multiplied by 258 (total LLRT's) or the total duration of project.
3- The total man hours reflect the reduction of components required to be tested.

LLRTs Work Flow Table

Position	Activity
Outage Scheduler	Schedules LLRTs
Planner	Plans Work Orders
Engineer 1	Develops data sheets. performs required test pressure calculations and verifies valve line-up configuration against latest P&ID.
Operations Coordinator	Reviews system status and coordinates draining, filling & venting and valve line-ups.
LLRT Operators	Obtain Shift Supv. approval to start test, and perform draining, filling & venting and valve line-ups.
Engineer 1	Performs final test pressure calculation.
Pipefitters	Perform LLRT
Engineer 1	Preliminary review of data, trouble shoot test ect.
LLRT operators	Perform restoration of system.
Engineer 1	Review test data and return system to operations.
Engineer 2	Performs final review for surveillance work order and enters component leakage into CTMT leakage log.
Surveillance Coordinator	Reviews work order and updates surveillance record.
Work close out	Final review and microfilms work order.

15. **In estimating the potential costs savings from the elimination of Type A tests, Grand Gulf considers labor hours and replacement power costs. The estimate does not include any equipment rental charges for compressors and air dryers of the services of a specialty consultant to conduct the Type A test. Does Grand Gulf rely on rental equipment and/or a consultant? If so, these costs should be provided.**

    GGNS does rely on rental equipment, instrumentation and consultants. The cost for those services during the last ILRT was approximately $ 50,000. Multiply the $50,000 by the 6 ILRT's which would be reduced over the remaining plant life would add $300,000 to the cost savings for the exemption.

16. **In Section 4.6, the labor hour estimate for a Type A test is given as 2,000 per refueling outage. As the dollar estimate uses 2,000 hours per test, is it correct to assume that the "per refueling outage" is simply a typographical error?**

    Yes, this was a typographical error per refueling outage should read per test.

19. **It is indicated on p. 12 that, "A portion of the components that are on 5 and 10 year intervals will be scheduled for testing each outage to assist in identifying common mode failures". How large a portion will this be? How will the components to be tested be selected?**

The population of components tested each outage will be distributed as evenly as practical through the 5 or 10 year time frame. For example, on page 14 there were 276 components assigned a 10 year interval. With 6 outages in 10 years, each outage would have approximately 46 components assigned.

The components will be selected based on component type and service, scheduled maintenance and electrical division. All components in a penetration will be tested during the same outage.

20. **"An as-found Type B/C test, as appropriate will be performed prior to any maintenance or modification activity performed on a component if the activity could affect the component's leak tightness. Components remaining ... 2 year intervals will not require as-found testing during outages during which a Type A test is not performed". (p. 12) What will be the basis for determining when an as-found test is appropriate? If as-found testing is not performed under either of the above conditions, how can the performance history of components be determined?**

All components, other than those assigned fixed 2 year intervals, would be as-found tested. The basis for determining when an as-found test is appropriate has been established in our existing program. For example, any valve body disassembly, replacement of the sealing material in penetrations, replacement of valve packing and replacement of a valve operator would require as-found testing. For less generic type activities, each type of component and the type of maintenance or modification activity would be evaluated on an individual basis. If it was determined that the maintenance or modification activity would not affect performance of the component, an as-found test would not be required. Therefore, the next scheduled test would still be considered an as-found test and will allow determination of valve performance.

23. **Although the probability of containment leakage other than through Type B and C components is low, there are documented cases of leakage through the containment structure that could only be found by a Type A test. In view of this, Entergy should propose a program to assure, through appropriate testing, that gross leakage through the containment structure would be discovered prior to startup following every extended outage during the 10-year period between Type A tests. The staff does not**

consider it necessary that the leakage be quantified, nor that the leakage be demonstrated to be less than L_a, but the test should provide an appropriate level of assurance that excessive, or gross, leakage would not occur following a postulated design basis accident.

While we agree that leakage through the containment structure can currently only be detected by a Type A test, Entergy does not believe that testing following every extended outage is justified. The leak test program proposed by the staff would have the same characteristics and flaws associated with continuous monitoring systems. Such a program would by its nature require valves to be realigned in a configuration similar to the configuration required by the ILRT to be meaningful. Without a realignment, only those leakage paths that are open to the containment atmosphere during normal operation would be detectable. These valves represent only a small portion of containment isolation valves. This type of testing would not only require significant resources and extended critical path outage time, but is not justifiable based on risk considerations. Several of the findings documented in draft NUREG-1493 support this conclusion. Specific findings include:

- On-Line Monitoring (OLM) does not significantly reduce the risk to the public from nuclear plant operation and, thus, cannot be justified solely on risk considerations.

- The potential risk benefit of on-line monitoring appears to be quite limited.

- OLM cannot be considered as a complete replacement for Type A test since it cannot challenge the structural and leak-tight integrity of the containment system at elevated pressures.

- ILRTs also test the strength of the containment structure. No alternative to ILRTs has been identified to provide assurance that the containment structure will withstand pressures during design-basis accidents.

- Reducing the frequency of Type A test (ILRTs) from the current three per 10 years to one per 20 years was found to lead to an imperceptible increase in risk.

Given the apparent superiority of ILRT testing to other identified alternatives, and given the insensitivity of risk to containment leak rate, additional testing is not considered cost beneficial. However, we recognize that this issue is the subject of continuing discussion with NEI as a prelude to generic rulemaking.

Grand Gulf intends to endorse and adopt the final generic resolution into our Type A testing program.

24. **Justify why those valves which are to be excluded from the performance-based program and leak tested every two years should not be listed in the technical specifications.**

The Technical Specification was changed to include all 10CFR50 Appendix J components in the performance based testing program. The performance of each componen(will determine the testing frequency for that component. While it seems unlikely that test intervals can be extended for certain components, significant changes to the component or advancing technologies may provide significant performance improvements. Of course, any component that had not been a reliable performer in the past would require careful scrutiny before an increase in the test interval would be considered. Past component performance will be appropriately weighted in any evaluation of components with poor performance histories. Sound engineering judgment coupled with appropriate performance criteria will ensure that poor performers will retain appropriate testing intervals.

30. **Resilient seals have limited lifetimes. Does the proposed program take this into account?**

Components with resilient seals with limited lifetime are in GGNS repetitive task program for seal replacement. The program does not specifically address components with resilient seals. However, seal replacement would be performed under normal maintenance which would require an as-found LLRT, with the proposed program, and as-left LLRT.

34. **How do the submitted probability calculations account for human error?**

Human error is one element of the probability calculations performed in the GGNS IPE, which was used as a basis for the calculations reported in the exemption request. The impact of human error associated directly with Appendix J testing is addressed in section 3.5.3.2 item 2. Other human errors are included in the IPE, and are therefore implicitly included in the calculations reported in the exemption request. Since these other errors were not directly affected by the proposed changes, they were n t discussed.

38. In Section 6.0, under the heading "50.12(a)(2)(ii)", it says that this exemption provides "alternative means" to achieve the underlying purpose of the rule. The means are, in fact, the same, except that the tests will be performed less frequently. How does this comply with 50.12(a)(2)(ii)?

The current and proposed programs, while similar, are fundamentally different. The proposed alternative is performance-oriented and risk-based. One of the underlying principles of the NRC's CBLA program is to eliminate or relax requirements that are marginal to safety and yet impose a significant regulatory burden on licensees. The proposed alternative to the requirements of Appendix J will provide a cost-effective method of meeting regulatory safety objectives. An overall net increase in safety can be achieved by focusing resources in areas that are more safety significant.

We now have, by the use of probabilistic risk assessment, tools that provide insight into the relative risk significance of our safety related activities (including containment leak testing). We also have operating experience and performance histories that provide a means to justify an increase in testing intervals on a component specific bases. GGNS has used these tools to create a workable and cost effective way to achieve the purpose of Appendix J. Additionally, the proposed alternative is consistent with the alternatives identified in draft NUREG-1493. It is therefore reasonable to conclude that the proposal does in fact represent an "alternative means" to achieve the underlying purpose of the rule.

39. The proposed Technical Specification changes delete 4.6.1.2.d.2 and 4.6.1.2.f. These passages cover the main steam isolation valves (MSIVs) and require them to be leak tested at least once per 18 months. Since the MSIV testing interval would not be changed under the proposed program, explain the reason for the proposed deletions.

As discussed in the answer to Question 24 above, performance criteria coupled with sound engineering judgment will ensure that poor performers will retain appropriate testing intervals. As stated above, it seems unlikely that the testing intervals for these valves will ever be changed but, the proposed program itself will control which valves are kept on restricted testing intervals and which can have less restrictive intervals. Therefore, it is not necessary to point out specific valves in the Technical Specifications.

Figure 2-2
Performance-Based Testing Program
Contament Penetration Leakage Probability