

October 6, 1992

Memorandum To: Mr. Stewart Ebnetter

Through: E. Merschoff

From: Pierce H. Skinner

Subject: Analysis of EDG Information Provided By GPC in the Original and Revised Responses to LER 90-06 and the Confirmation of Action Letter Associated with Vogtle Site Area Emergency of March 20, 1990

I was recently requested to review the subject material to attempt to determine the significance of the differences in the information provided. The following is a summary of my analysis:

1. LER 90-06, Rev.0 - This identified that EDG 1A and 1B had been started at least 18 times each subsequent to the test program and no failures or problems occurred during any of these starts.

NOTE: "Starts" used in this context, were a start of the DG for any reason.

2. LER 90-06, Rev. 1 provided clarification of information related to the number of successful starts as discussed in Rev. 0 of the LER and the GPC response to the CAL dated 4/9/90.
 - The cover letter stated that the original LER number of successful starts included some of the starts that were a part of the test program.
 - The cover letter also identified that since the completion of the test program there had been 10 successful starts of EDG 1A and 12 successful starts of EDG 1B as of 4/19/90.
 - Additionally the cover letter provided information that identified that information was added to address VALID testing as defined in RG 1.108. This data covered the period from 3/21/90 through 6/7/90.

I visited Vogtle 9/23/92 and 9/24/92. During that period I reviewed the data associated with DG 1A and DG 1B for the period between 1/1/89 through 1/1/91. The following is a compilation of this data:

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions 5
FOIA- 94-208

B/8

EDG 1A

From 1/1/89 through 1/1/90

- No Valid Failure occurred
 - test frequency was every 31 days
 - 21 start attempts occurred
 - 16 valid tests
 - 5 non valid test
- (3 of the test were classified as non valid failures - 1 due to spurious HJWT, 1 due to no NSCW available, and 1 due to a barring pin out of position)

NOTE: I did not do an investigation into the non valid failures at this time.

From 1/1/90 through 3/19/90

- No valid failures occurred
- Test frequency was every 31 days
- 17 start attempts occurred
 - 8 valid tests
 - 9 non valid tests

From 3/19/90 through 4/9/90

- 2 valid failures occurred on 3/20/90
 - test frequency was increased to every 7 days
 - 31 start attempts occurred
 - 6 valid tests
 - 25 non valid tests
- (22 of these were a part of the test program which complete on 3/31/90)

From 3/19/90 through 4/9/90

- No valid failures
- test frequency every 31 days
- 29 start attempts
 - 2 valid test
 - 27 non valid tests (performed during test program and during maintenance)

From 4/9/90 through 12/31/90

- 2 valid failures occurred - 1 on 5/23/90 due to newly installed HJWT sensor - 1 due to sticking air start valve
- test frequency - 31 days - (4/10/90 to 5/23/90)
 - 7 days - (5/23/90 to 11/15/90)
 - 31 days - (11/15/90 to 12/31/90)
- 65 start attempts occurred
 - 40 valid test
 - 24 non valid test

I have included 5 attachments to this memo to help clarify this information. Enclosure 1 is a copy of RG 1.108.

Enclosure 4 is a chart showing EDG 1A and 1B testing from 1/1/89 through 6/7/90. Enclosure 5 is a chronology of EDG information associated with EDG 1A that was developed based on information received and generated by NRC.

From 4/9/90 through 12/31/90

- 1 valid failure occurred on 8/29/90 due to voltage regulator
- test frequency - 7 days (4/9/90 to 6/27/90)
 - 31 days after 6/27/90
- 49 start attempts occurred
 - 34 valid test
 - 14 non valid test
 - (3 non valid failures)

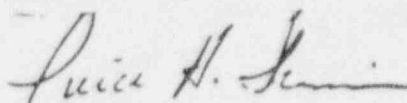
EDG 1B

From 1/1/89 through 1/1/90

- 1 valid failure occurred (This was as the result of a regulator problem)
- Test frequency was every 31 days
- 19 start attempts occurred
 - 17 valid test
 - 2 non valid test (1 was due to an air leak on the intercooler and the other was due to the operator shutting down the DG due to various annunciator alarms)
 - This DG had had 4 valid failures in the last 100 valid tests as of 12/6/89

From 1/1/90 through 3/19/90

- No valid failures
- test frequency every 31 days
- 10 start attempts occurred
 - 4 valid test
 - 6 non valid tests (one due to a failed turbo oil pressure switch sensor and five during maintenance)

A handwritten signature in dark ink, appearing to read "Pierce H. Skinner". The signature is fluid and cursive, with a prominent initial "P" and a long, sweeping underline.

Pierce H. Skinner

cc: File
L. Robinson, OI
J. Vorse, OI
L. Reyes



REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 1.108

PERIODIC TESTING OF DIESEL GENERATOR UNITS USED AS ONSITE ELECTRIC POWER SYSTEMS AT NUCLEAR POWER PLANTS

A. INTRODUCTION

Criterion XI, "Test Control," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Licensing of Production and Utilization Facilities," requires that a test program be established to ensure that systems and components perform satisfactorily and that the test program include operational tests during nuclear power plant operation.

Criterion 17, "Electric Power Systems," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50 requires that onsite electric power systems have sufficient independence, capacity, redundancy, and testability to perform their safety functions, assuming a single failure.

Criterion 18, "Inspection and Testing of Electric Power Systems," of Appendix A to 10 CFR Part 50 requires that electric power systems important to safety be designed to permit appropriate periodic inspection and testing to assess the continuity of the systems and the condition of their components.

This regulatory guide describes a method acceptable to the NRC staff for complying with the Commission's regulations with regard to periodic testing of diesel electric power units to ensure that the diesel electric power systems will meet their availability requirements. The Advisory Committee on Reactor Safeguards has been consulted concerning this guide and has concurred in the regulatory position.

B. DISCUSSION

The purposes of onsite electric power systems are (1) to provide power promptly to engineered safety

features if a loss of offsite power and an accident occur during the same time period and (2) to provide power to equipment needed to maintain the plant in a safe condition if an extended loss of offsite power occurs. Diesel generator units are the most common source of onsite electric power.

High reliability must be designed into the diesel generator units and maintained throughout their service lifetime by appropriate testing, maintenance, and operating programs. Branch Technical Position EICSB 2, "Diesel-Generator Reliability Qualification Testing," dated 11/24/75, of the Standard Review Plan (Appendix 7-A of NUREG-75/087) establishes a reliability goal of 0.99 (at a nominal 50% confidence level) and an acceptable qualification testing program for diesel generator units of a type or size not previously used as standby emergency power sources in nuclear power plants. The preoperational and periodic testing provisions set forth in this guide have been designed to provide a basis for taking those corrective actions needed to maintain high inservice reliability of installed diesel generator units. In addition, the data developed will provide an ongoing demonstration of performance and reliability for all diesel generator units after installation and in service. Reliability objectives concerning the entire onsite electric power system's probability of failure depend on the interconnections among the system's components and are not within the scope of this guide. "Failure" is taken here to mean the failure to start, accelerate, and assume the design-rated load within and for the time prescribed during an emergency or a valid test.

¹ NUREG-75/087, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," U.S. Nuclear Regulatory Commission. Copies may be purchased from the National Technical Information Service, Springfield, Virginia 22161.

* Lines indicate substantive changes from previous issue

USNRC REGULATORY GUIDES

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Comments and suggestions for improvements in these guides are encouraged at all times, and guides will be revised, as appropriate, to accommodate comments and to reflect new information or experience. This guide was revised as a result of substantive comments received from the public and additional staff review.

Comments should be sent to the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch.

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- | | |
|-----------------------------------|------------------------|
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| 2. Research and Test Reactors | 7. Transportation |
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| 5. Materials and Plant Protection | 10. General |

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The testing of the diesel generator unit should simulate, where practicable, the parameters of operation (automatic start, load sequencing, load shedding, operation time, etc.) and environments (temperature, humidity, etc.) that would be expected if actual demand were to be placed on the system.

This guide provides design and operational provisions for the performance of periodic testing of diesel generator units used for onsite electric power for nuclear power plants. A "diesel generator unit" consists of the engine, generator, combustion air system, cooling water system up to the supply, fuel supply system, lubricating oil system, starting energy sources, autostart controls, manual controls, and diesel generator breaker.

C. REGULATORY POSITION

1. General

a. The design of a diesel generator unit should be such that it can accommodate diesel generator testing as defined in Regulatory Position C.2.

b. Diesel generator units should be designed to be testable during operation of the nuclear power plant, as well as while the plant is shut down. The design should include provisions so that the testing of the units will simulate the parameters of operation (outlined in Regulatory Position C.2) that would be expected if actual demand were to be placed on the system.

(1) Capability should be provided to test each diesel generator unit independently of redundant units. Test equipment should not cause a loss of independence between redundant diesel generator units or between diesel generator load groups.

(2) Testability should be considered in the selection and location of instrumentation sensors and critical components (e.g., governor, starting system components). Instrumentation sensors should be readily accessible and designed so that their inspection and calibration can be verified in place. Testability should be considered in selecting critical components, and the overall design should include status indication and alarm features.

(3) Periodic testing of diesel generator units should not impair the capability of the unit to supply emergency power within the required time. Where necessary, diesel generator unit design should include an emergency override of the test mode to permit response to bona fide signals.

(4) A surveillance system should be provided with remote indication in the control room as to diesel generator unit status, i.e., under test, ready-standby, lockout. A means of communication should

also be provided between diesel generator unit testing locations and the main control room to ensure that the operators are cognizant of the status of the unit under test.

(5) The surveillance system should indicate which of the diesel generator protective trips is activated first in order to facilitate trouble diagnosis.

(6) All diesel generator protective trips should be in force during diesel generator unit testing.

c. Detailed step-by-step procedures should be provided for each test under Regulatory Position C.2. The procedures should identify those special arrangements or changes in normal system configuration that must be made to put the diesel generator unit under test. Jumpers and other nonstandard configurations or arrangements should not be used subsequent to initial equipment startup testing.

d. Subsequent to any failure, the cause should be determined and corrective action taken in a timely manner, with emphasis on preventing recurrence of the failure.

2. Testing

a. Testing of diesel generator units during the plant preoperational test program and at least once every 18 months should:

(1) Demonstrate proper startup operation by simulating loss of all a.c. voltage and demonstrate that the diesel generator unit can start automatically and attain the required voltage and frequency within acceptable limits and time.

(2) Demonstrate proper operation for design-accident-loading-sequence to design-load requirements and verify that voltage and frequency are maintained within required limits.

(3) Demonstrate full-load-carrying capability for an interval of not less than 24 hours, of which 22 hours should be at a load equivalent to the continuous rating of the diesel generator and 2 hours at a load equivalent to the 2-hour rating of the diesel generator. Verify that voltage and frequency requirements are maintained. The test should also verify that the cooling system functions within design limits.

(4) Demonstrate proper operation during diesel generator load shedding, including a test of the loss of the largest single load and of complete loss of load, and verify that the voltage requirements are met and that the overspeed limits are not exceeded.

(5) Demonstrate functional capability at full-load temperature conditions by rerunning the test phase outlined in Regulatory Positions C.2.a.(1) and (2) above immediately following (3) above.

(6) Demonstrate the ability to (a) synchronize the diesel generator unit with offsite power while the unit is connected to the emergency load, (b) transfer this load to the offsite power, (c) isolate the diesel generator unit, and (d) restore it to standby status.

(7) Demonstrate that the engine will perform properly if switching from one fuel oil supply system to another is a part of the normal operating procedure to satisfy the 7-day storage requirement.

(8) Demonstrate that the capability of the diesel generator unit to supply emergency power within the required time is not impaired during periodic testing under Regulatory Position C.2.c.

(9) Demonstrate the required reliability by means of any 69 consecutive valid tests¹ (per plant) with no failures, with a minimum of 23 or 69/n tests, whichever is the larger, per diesel generator unit (where n is equal to the number of diesel generator units of the same design and size).

b. Testing of redundant diesel generator units during normal plant operation should be performed independently (nonconcurrently) to minimize common failure modes resulting from undetected interdependences among diesel generator units. However, during reliability demonstration of diesel generator units during plant preoperational testing and testing subsequent to any plant modification where diesel generator unit interdependence may have been affected or every 10 years (during a plant shutdown), whichever is the shorter, a test should be conducted in which redundant units are started simultaneously to help identify certain common failure modes undetected in single diesel generator unit tests.

c. Periodic testing of diesel generator units during normal plant operation should:

(1) Demonstrate proper startup and verify that the required voltage and frequency are automatically attained within acceptable limits and time. This test should also verify that the components of the diesel generator unit required for automatic startup are operable.

(2) Demonstrate full-load-carrying capability (continuous rating) for an interval of not less than one hour. The test should also verify that the cooling system functions within design limits. This test could be accomplished by synchronizing the generator with the offsite power and assuming a load at the maximum practical rate.

d. After completion of the diesel generator unit reliability demonstration under Regulatory Position

C.2.a.(9), the interval for periodic testing under Regulatory Position C.2.c (on a per diesel generator unit basis) should be no more than 31 days and should depend on demonstrated performance. If more than one failure has occurred in the last 100 tests (on a per nuclear unit basis), the test interval should be shortened in accordance with the following schedule:

(1) If the number of failures in the last 100 valid tests is one or zero, the test interval should be not more than 31 days.

(2) If the number of failures in the last 100 valid tests is two, the test interval should be not more than 14 days.

(3) If the number of failures in the last 100 valid tests is three, the test interval should be not more than 7 days.

(4) If the number of failures in the last 100 valid tests is four or more, the test interval should be not more than 3 days.

e. Valid tests and failures (under Regulatory Positions C.2.a.(9) and C.2.d) should be based on the following criteria:

(1) All start attempts (automatic, including those from bona fide signals, or manual) that result in a failure to start, except as noted in (2) below, should be considered valid tests and failures.

(2) Unsuccessful start and load attempts that can definitely be attributed to operating error, to spurious operation of a trip that is bypassed in the emergency operating mode, to malfunction of equipment that is not operative in the emergency operating mode (e.g., synchronizing circuitry) or is not part of the defined diesel generator unit design should not be considered valid tests or failures.

(3) Successful starts, including those initiated by bona fide signals, followed by successful loading (sequential or manual) to at least 50% of continuous rating and continued operation for at least one hour should be considered valid successful tests.

(4) Successful starts that are terminated intentionally without loading, as defined in (3) above, should not be considered valid tests or failures.

(5) Successful starts followed by an unsuccessful loading attempt should be considered valid tests and failures, except as noted in (2) above.

(6) Tests that are terminated intentionally before completion as defined in (3) above because of an alarmed abnormal condition that would ultimately have resulted in diesel generator damage or failure should be considered valid tests and failures.

¹ Valid test as defined in Regulatory Position C.2.e.

(7) Tests performed in the process of troubleshooting should not be considered valid tests. Tests that are performed to verify correction of the problem should be considered valid tests and successes or failures, as appropriate.

(8) Cranking and venting procedures that lead to the discovery of conditions (e.g., excessive water or oil in a cylinder) that would have resulted in the failure of the diesel generator unit during test or during response to a bona fide signal should be considered a valid test and failure.

3. Records and Reports

a. All start attempts, including those from bona fide signals, should be logged. The log should describe each occurrence in sufficient detail to permit independent determination of statistical validity in accordance with Regulatory Position C.2.e. Maintenance, repair, and out-of-service-time histories, as well as cumulative maintenance and operating data, should also be logged. Cumulative statistical analyses of diesel generator unit test results, together with results of operation of the diesel generator unit when required by actual demand, should be maintained. These analyses should include examination of the trend of critical failure mechanisms, human errors, and common mode failures.

b. All diesel generator unit failures, valid or invalid, should be reported¹ consistent with the licensee's reporting requirements. This report should (1) identify the diesel generator unit involved, (2) identify the failure as being the nth failure in the last 100 valid tests, (3) describe the cause of failure, (4) describe the corrective measures taken, (5) indicate the length of time the diesel generator unit was unavailable, (6) define the current surveillance test interval, and (7) verify that the test interval is in conformance with the schedule of Regulatory Position C.2.d. If the number of failures in the last 100 valid tests is seven or more, the reliability of the diesel

¹ See Regulatory Guide 1.16, "Reporting of Operating Information."

generator units requires special evaluation, and the information provided on the report form should be supplemented, as needed, by additional narrative material that:

(1) Identifies the reported failure as the 7th or greater failure in the last 100 valid tests,

(2) Describes corrective measures, taken or planned, to increase the reliability of the generator units,

(3) Provides an assessment of the existing reliability of electric power to engineered-safety-feature equipment,

(4) Provides the licensee's basis for continued plant operation if that is planned, and

(5) Provides a summary of all tests (valid and invalid) that occurred within the time period over which the last 100 valid tests were performed, and verifies that surveillance testing during this period was in conformance with the schedule of Regulatory Position C.2.d.

Invalid failures experienced during troubleshooting should be included in the report of the failure (valid or invalid) that made the troubleshooting necessary.

D. IMPLEMENTATION

The purpose of this section is to provide information to applicants regarding the NRC staff's plans for using this regulatory guide.

This guide reflects current NRC staff practice. Therefore, except in those cases in which the applicant proposes an acceptable alternative method for complying with the specified portions of the Commission's regulations, the method described herein is being and will continue to be used in the evaluation of submittals for construction permit applications until this guide is revised as a result of suggestions from the public or additional staff review.

ENCLOSURE 2

ENCLOSURE 3

Notes:

1. In LER 90-06, GPC identified that both DG1A and DG1B had started at least 18 times each with no failures or problems.
Rev. 1 changed this to 12 valid tests with 1 failure on DG1B and 16 valid tests on DG1A with no failures.
2. LER 90-06 addressed a successful test of DG1A via an undervoltage start without air roll.

This statement was not in the revised LER. (This test was performed -why they removed it in the revision is unknown.)

5. In the corrective actions addressed in revision 1, GPC identified that DG1A had 4 valid failures in 69 valid starts.

	1/1 to 12/31 1989	Jan 1990	Feb 1990	MAR 1990	APR 1990	MAY 1990	JUNE 1990	
				2/20	4/9 4/19		6/7	
EDG 1A								
START ATTEMPTS	21	← 17 →	17	→ 13	→ 18			4/1 - SURV. TEST (OPERABLE)
VALID TESTS	16	← 8 →	8	→ 6	→ 10			4/6 - 3 START (MODS)
NON-VALID TEST	5	← 9 →	9	→ 25				4/6 - SURV. TEST
FAILURES	0	← 0 →	0	→ 2				4/9 SURV. TEST
TEST FREQ	31 days	← 31 →	31	→ 7				
TEST PROGRAM	-	(3/20 - 4/1)			18			
LER 90-06	(SUCCESSFUL STARTS)				18			
LER 90-06 Rev. 1	(SUCCESSFUL STARTS)				10			
	(VALID TEST)				10			
						16 VALID TEST NO FAILURES		
EDG 1B								
START ATTEMPTS	19	← 10 →	10	→ 29				3/28 SURV. TEST
VALID TESTS	17	← 4 →	4	→ 2				3/28 - 2 STARTS (Non-Val. Test)
NON-VALID TEST	2	← 6 →	6	→ 27				4/4 - ESPAS TEST
FAILURES	1	← 0 →	0	→ 0				4/5 1 START (Non-Val.)
TEST FREQUENCY	31	← 31 →	31	→ 31				4/5 SURV. TEST
TEST PROGRAM		(3/20 - 4/5)			2			
LER 90-06	(SUCCESSFUL STARTS)				18			
LER 90-06 Rev. 1	(SUCCESSFUL STARTS)				12			
	(VALID TEST)					12 MOD TESTS		

LOG 1A	1/1 to 1/14 1990	Jan 1990	Feb 1990	MAR 1990	APR 1990	MAY 1990	JUNE 1990	
START ATTEMPTS VALID TESTS NON-VALID TEST FAILURES TEST FREQ	21 16 5 0 31 days	← ← ← ← ←	17 8 9 0 31	31 6 25 2 7	4/9 4/9 4/9 4/9 4/9	4/9 4/9 4/9 4/9 4/9	4/9 4/9 4/9 4/9 4/9	STARTS BETWEEN END OF TEST PROGRAM (4/1) and 4/9 4/9 4/9 4/9 4/9
TEST PROGRAM LER 90-06 LER 90-06 Rev. 1	- (SUCCESSFUL STARTS) (SUCCESSFUL STARTS) (VALID TEST)	(3/20-4/1)				18 10 16 VALID TEST NO FAILURES		STARTS BETWEEN END OF TEST PROGRAM (3/20) and 4/9 4/9 4/9 4/9 4/9
LOG 1B START ATTEMPTS VALID TESTS NON-VALID TEST FAILURES TEST FREQ	19 17 2 1 31	← ← ← ← ←	10 4 6 0 31	29 2 27 0 31	4/9 4/9 4/9 4/9 4/9	4/9 4/9 4/9 4/9 4/9	4/9 4/9 4/9 4/9 4/9	STARTS BETWEEN END OF TEST PROGRAM (3/20) and 4/9 4/9 4/9 4/9 4/9
TEST PROGRAM LER 90-06 LER 90-06 Rev. 1	(3/20-3/28) (SUCCESSFUL STARTS) (SUCCESSFUL STARTS) (VALID TEST)					12 VALID TEST NO FAILURES		STARTS BETWEEN END OF TEST PROGRAM (3/20) and 4/9 4/9 4/9 4/9 4/9

ENCLOSURE 5

EDG 1A CHRONOLOGY FOR VOGTLE

<u>DATE</u>	<u>REMARKS</u>
-	EDG 1A being tested monthly per TS
Feb. 1990	Vogtle Unit 1 entered 2nd refueling outage
3/1 - 3/12	EDG 1A - various maintenance during outage
3/13 (OPERABLE)	EDG 1A tested and returned to service
3/20	Loss of offsite power occurs. EDG 1A started and tripped after 1 minute 20 seconds. Engine was restarted and tripped again after 1 minute 10 seconds. EDG was then started in the emergency start condition and ran satisfactory for approx. 4.5 hours. (See LER 50-424/90-05 and NUREG 1410)
3/20	1st failure during SAE
3/20	2nd failure during SAE
3/20	Manual/emergency start for SAE
3/20 (INOPERABLE)	After SAE - EDG declared inoperable
3/20	Started EDG 3 additional times (No problems observed) 1st - manual start and tied to bus for aux. power alignment - 47 minutes 2nd - attempt to get EDG to repeat failure - no load - 5 min. 3rd - as above - 21 min.
3/23	EDG 1A started for air system leak test - 12 leaks found
3/23	EDG 1A inadvertently started in lieu of EDG 1B - Shutdown without being closely monitored within 1 min.
3/29	EDG 1A started for undervoltage testing (simulate LOOP condition as closely as possible) - operated 16 min. and then was manually stopped. (NOTE: GPC correspondence dated 8/30/90 shows this start as 50 min.)
3/30	EDG 1A started for bubble testing - EDG tripped when installation of bubble tester occurred.

3/30 EDG 1A started with test gages installed (started 4 times)

3/30 - 3/31 Multiple start testing (4 times) - no problems observed

3/31 Trip timing testing (4 times)

3/31 EDG 1A Jacket water temperature test (1 min. run - rest 19 min. and restart for 1 min.)

3/31 EDG 1A jacket water temperature test for 35 min.

3/31 Undervoltage test #2 (app. J states this was conducted on 4/7)

4/1 Operability test - normal Surveillance Test - (ASSUMED THAT THIS PLACED THE EDG BACK INTO SERVICE)

4/6 3 starts for jacket water testing (1 min., 1 min. and 10 min.)

4/6 EDG 1A started for LOSP trip modification functional testing - 2.5 hrs.

4/9 EDG 1A started for normal Surveillance testing

- App. J to NUREG 1410 states that after the 6 month operability testing, GPC resumed TS testing - for 1st 2 weeks operability testing was conducted resulting in 6 additional starts.

4/9 GPC Letter dated 4/9/90 - Stated EDG 1A testing

Extensive testing of controls and sensor calibration

EDG 1A STARTED 18 TIMES WITH NO FAILURES OR PROBLEMS

An undervoltage test without air roll was conducted with no problems

4/9/90 Meeting summary for the 4/9/90 meeting with NRC dated 5/4/90

showed a chart that discussed Special Testing of EDG 1A - chart showed 18 SUCCESSFUL STARTS

4/19/90 LER 50-424/90-06, Rev. 0 - identified

EDG 1A STARTED AT LEAST 18 TIMES WITH NO FAILURES OR PROBLEMS

An UV start test without air roll was conducted on 4/6/90 - started and loaded properly

6/19/90 LER 50-424/90-14 dated 7/19/90 - Identified that EDG 1A failed twice during a surveillance attempt due to masking tape being installed on the fuel racks for painting.

6/29/90 LER 50-424/90-06, Rev. 1 - identified

In the cover letter clarified that the previous LER number of starts was erroneous - the new information states that from the completion of the test program (i.e., 1 st successful test) 10 successful STARTS of EDG 1A had occurred between the completion of the test program and 4/19/90

Under "ROOT CAUSE" - a change was made to specify that Since 3/20 through 7/7 EDG 1A had received 16 VALID TESTS with no failures

Under "CORRECTIVE ACTIONS" - a statement was made that "Up to and including the 2 VALID FAILURES on 3/20/90 there were 4 VALID FAILURES in 69 VALID TESTS of EDG 1A."

8/29/90 Special Report 1-90-6 dated 9/24/90

EDG 1A had a valid failure due to erratic swings on MVARs

6/4/91 Special Report 1-91-1 - identified conditions of INVALID FAILURES based on discussions with Region II. These failures had never been previously reported.

3/15/89 EDG 1A tripped due to barring device lock pin vibration problem - attributed to personnel error

6/20/89 EDG 1A manually stopped when operators noticed that no NSCW was available to the EDG

8/20/89 EDG 1A stopped due to spurious HJTW alarm

6/14/90 Inspection Report 90-10 issued - closed LER 90-06, Rev. 0

7/8/91 Special Report 1-91-3 dated 7/31/91 - EDG 1A experienced a failure due to a failed amplifier card

7/23/90 Inspection Report 90-13 issued - addressed calcon switches on EDG 1B

9/20/90 Inspection Report 90-17 issued - addressed starting air valve problems on all EDGs

10/19 & 10/20 Special Report 1-91-6 dated 11/12/91 - 2 INVALID FAILURES of EDG 1A occurred

10/19/91 Failure during testing due to manually drooping speed too low causing a trip due to low turbocharger lube oil pressure

10/20/91 Manually tripped EDG 1A due to an exhaust leak

10/25/90 Inspection Report 90-20 issued - addressed calcon switch calibrations

11/21/90 Inspection Report 90-25 issued - addressed Part 21 on EDG air start valves

4/16/91 Inspection Report 91-05 issued - addressed LER 91-05 transfer relays and Part 21 on air start valves

8/1/91 Inspection Report 91-19 issued - addressed EDG TS review

10/31/91 Inspection Report 91-26 issued - addressed Design Change Package review associated with jacket water temperature trip and EDG shuttle valve modification

11/1/91 Inspection Report 90-19, Supplement 1 issued - addressed ESFAS outages and EDG air quality

11/25/91 Inspection Report 91-28 issued - addressed a trip on EDG 1B and an unplanned EDG start for 2A and 1A (see IR 91-05)

8/4/92 Inspection Report 92-13 issued - addressed review of IN 89-87, Disabling of Emergency Diesel Generators by their Neutral Ground-Fault Protection Circuitry

Case Brief - Plant Vogtle False Statements/Conspiracy Re Diesel Generator Reliability

**For
Senator Joseph I. Lieberman & Staff
April 29, 1993**

**NRC
Office of Investigations**

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Act, exemptions 5
FOIA- 94-209

B19

PRESENTATION OUTLINE

INTRODUCTION/PURPOSE

BACKGROUND

Vogtle Site Area Emergency
Complainant/Alleger

TIME FRAME/CHRONOLOGY

ORGANIZATIONAL STRUCTURE

CASE THEORY/VIOLATION FLOW CHART

SUMMARY OF VIOLATIONS

MAIN PLAYERS

SUMMARY OF VIOLATIONS VS. TIME

DISCUSSION/QUESTIONS

SYNOPSIS OF ISSUES

-
-
- NRC Must be able to Rely on Complete and Accurate Information from Licensees
- [REDACTED]

VOGTLE SITE AREA EMERGENCY

March 20, 1990

- Vogtle in Refueling Outage
- Switchyard Accident Causes Loss of Offsite Power
- Offsite Power required for Core Heat Removal Systems
- Emergency Diesel Generator Fails to Perform Until Manually Started After 36 Min. w/o Power
- Diesel Generator Reliability Important for Core Heat Removal in Event of Loss of Offsite Power

COMPLAINANT/ALLEGED ALLEN L. MOSBAUGH

- Formerly Asst. General Manager at Vogtle
Employed w/GPC at Vogtle 8/84 - 10/90
Prior Nuclear experience at Plant Zimmer
[REDACTED]
- Graduate of Univ. of Cincinnati, Ohio
[REDACTED]
- Has Made Prior allegation against Vogtle Operations
[REDACTED]
- Was OI Confidential Source until fired by GPC for
non-consensual audio taping at Vogtle without GPC or
NRC knowledge
- Went public with 2.206, Confidentiality terminated
Has pending Whistleblower Actions w/DOL
- Volunteered tapes to OI for review prior to GPC
Assisted OI with many hours of tape review

3/20/90 VEGP SAE "A" EDG fails; "B" out for maint
 3/22/90 HI Lube Oil Temp Trip-EDG "B"
 3/23/90 Low Jckt Wtr Press Trip-"B"
 NRC holds critically; COA Ltr issued
 3/27/90 Successful UV Run EDG "B"
 3/28/90 EDG "B" Declared Operable
 4/7-8/90 VEGP Prep Oral EDG Present
 GPC COA Response Letter to NRC
 4/10/90 Scheduled VEGP Return to Mode 1
 4/12/90 NRC Authorizes Restart
 4/19/90 LER re: VEGP SAE issued to NRC
 6/11-29/90 GPC QA Audit of EDG Starts
 6/29/90 Rev to LER issued
 8/30/90 GPC Ltr corr
 COA Response

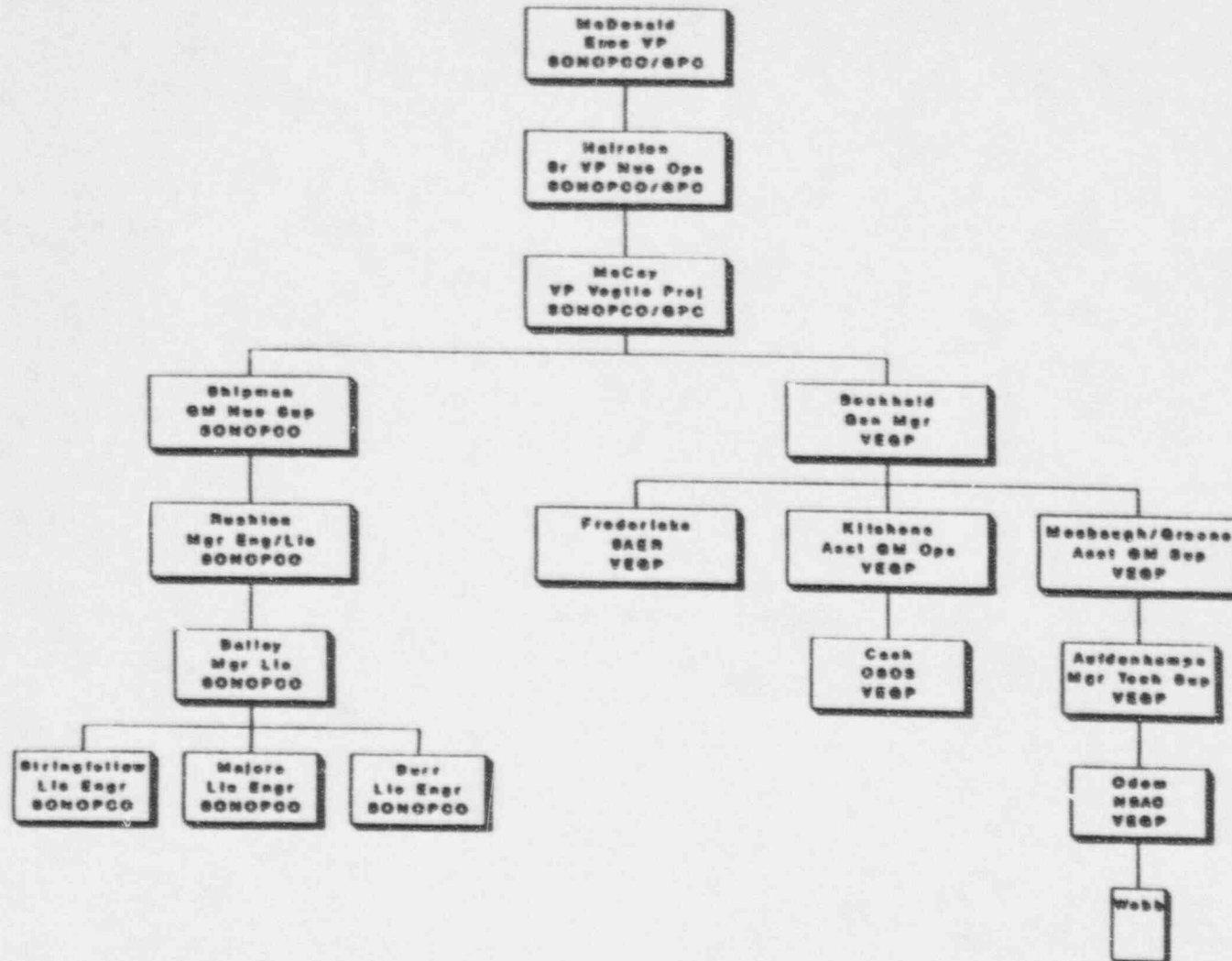


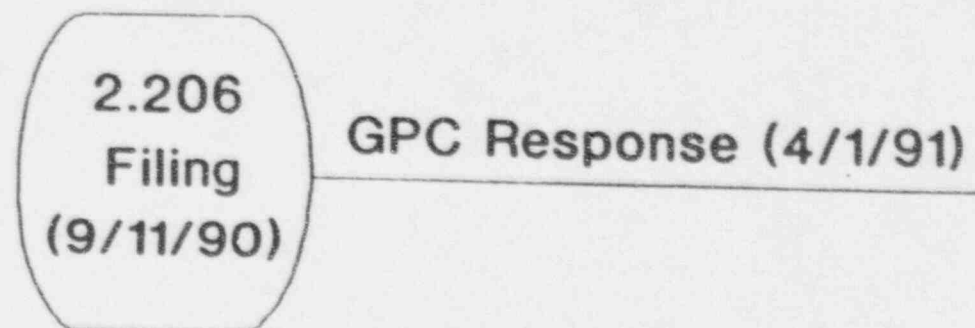
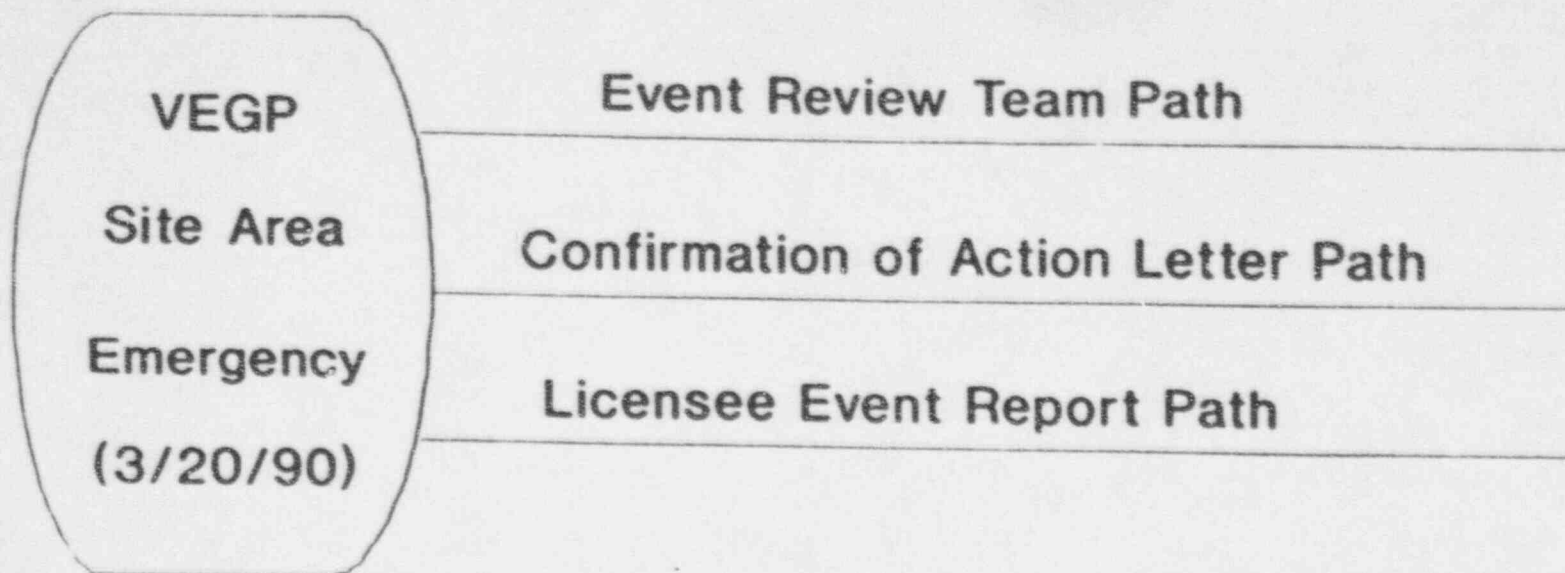
NRC AIT/IIT
 3/20/90-4/2/90

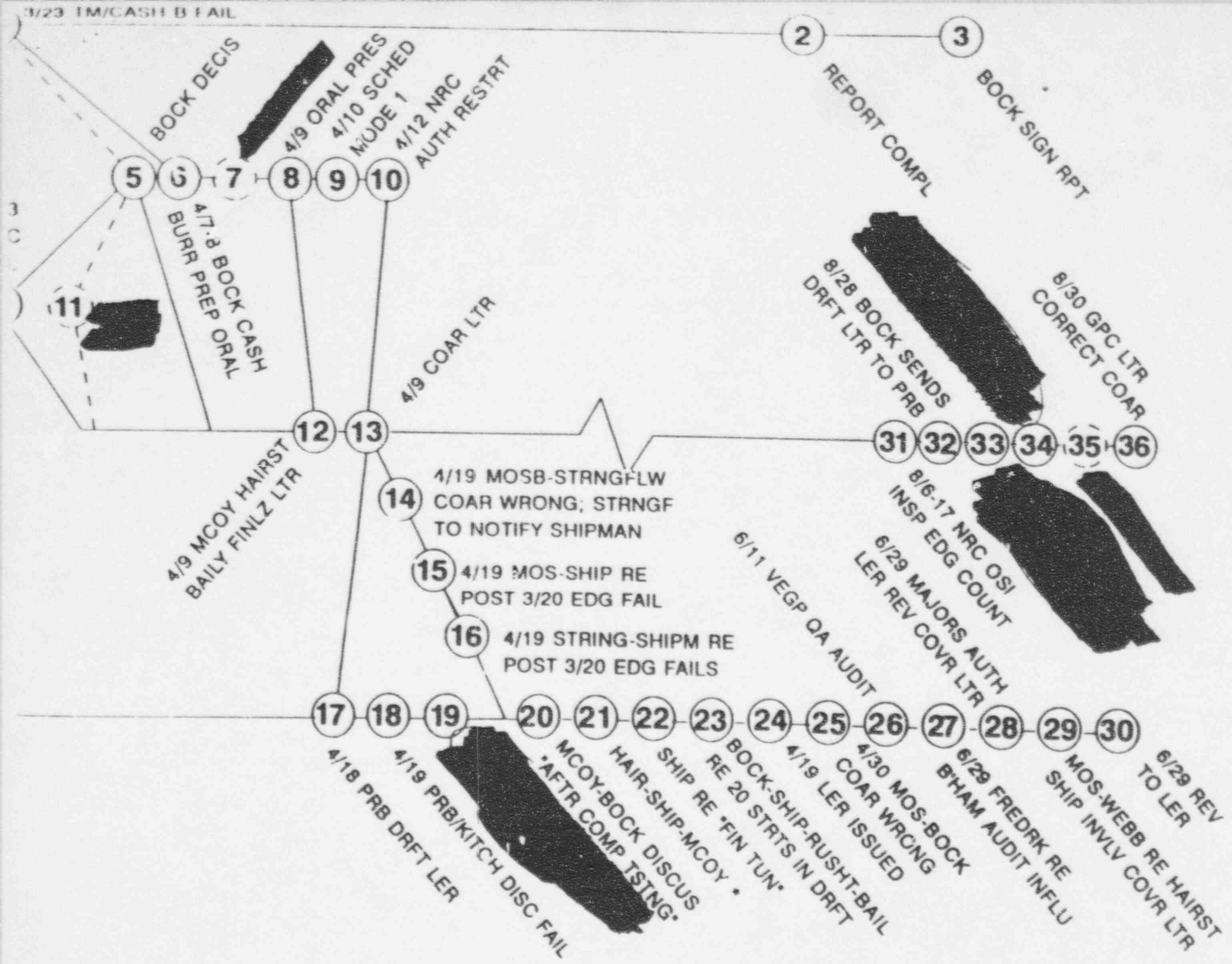
NRC OSI
 8/6-17/90

RII OPBLTY OBSRV
 "A" & "B"
 3/26/90-4/7/90

Key Management Structure Early-Mid 1990







EMERGENCY DIESEL GENERATOR RELIABILITY

2-90-020

- [REDACTED] 4/9/90 oral presentation re: Successful Starts.
- [REDACTED] 4/9/90 COAR letter re: EDG starts w/o failures.
- [REDACTED] 4/19/90 LER re: comprehensive test program/starts.
- [REDACTED] 6/29/90 letter of transmittal to the Rev to 4/19/90 LER.
- [REDACTED] 8/30/90 letter correcting 4/9/90 COAR letter and LER.
[REDACTED]
- [REDACTED] 2.206 Response re: HAIRSTON'S participation in conference call regarding wording of LER.
- [REDACTED] 2.206 Response re: HAIRSTON'S belief in accuracy of LER.
[REDACTED]

DIESEL TESTING

* NORMAL 36 MONTH OVERHAUL AND INSPECTION

* SPECIAL TESTING

1A

3/20 EVENT
5 STARTS, TROUBLESHOOTING

UV RUN TEST
SENSOR CALIBRATION
LOGIC TESTING
E-RUN BUBBLE TESTING
MULTIPLE START (5)
UV RUN TEST
6 MONTH SURVEILLANCE
DIESEL OPERABLE
HI JACKET WATE RUNS (3)
DCP UV RUN TEST

18 SUCCESSFUL STARTS

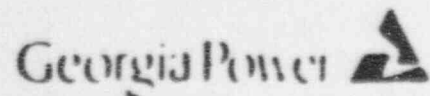
1B

IN OVERHAUL

SENSOR CALIBRATION
LOGIC TESTING
E-RUN BUBBLE TESTING
MULTIPLE STARTS (10)
UV RUN TEST
6 MONTH RUN SURVEILLANCE
DIESEL OPERABLE

LUBE OIL DCP RUN
DCP UV RUN FUNCTIONAL

19 SUCCESSFUL STARTS



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ELV-01516
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- g. Since March 20, 1990, GPC has performed numerous sensor calibrations (including jacket water temperatures), extensive logic testing, special pneumatic leak testing, and multiple engine starts and runs under various conditions. Since March 20, the 1A DG has been started 18 times, and the 1B DG has been started 19 times. No failures or problems have occurred during any of these starts. In addition, an undervoltage start test without air roll was conducted on April 6, 1990 and the 1A D/G started and loaded properly.

Numerous sensor calibrations (including jacket water temperatures), special pneumatic leak testing, and multiple engine starts and runs were performed under various conditions. After the 3-20-90 event, the control systems of both engines have been subjected to a comprehensive test program. Subsequent to this test program, DG1A and DG1B have been started at least 18 times each and no failures or problems have occurred during any of these starts. In addition, an undervoltage start test without air roll was conducted on 4-6-90 and DG1A started and loaded properly.

The number of successful starts included in the original LER included some of the starts that were part of the test program. The difference is attributed to diesel start record keeping practices and the definition of the end of the test program.

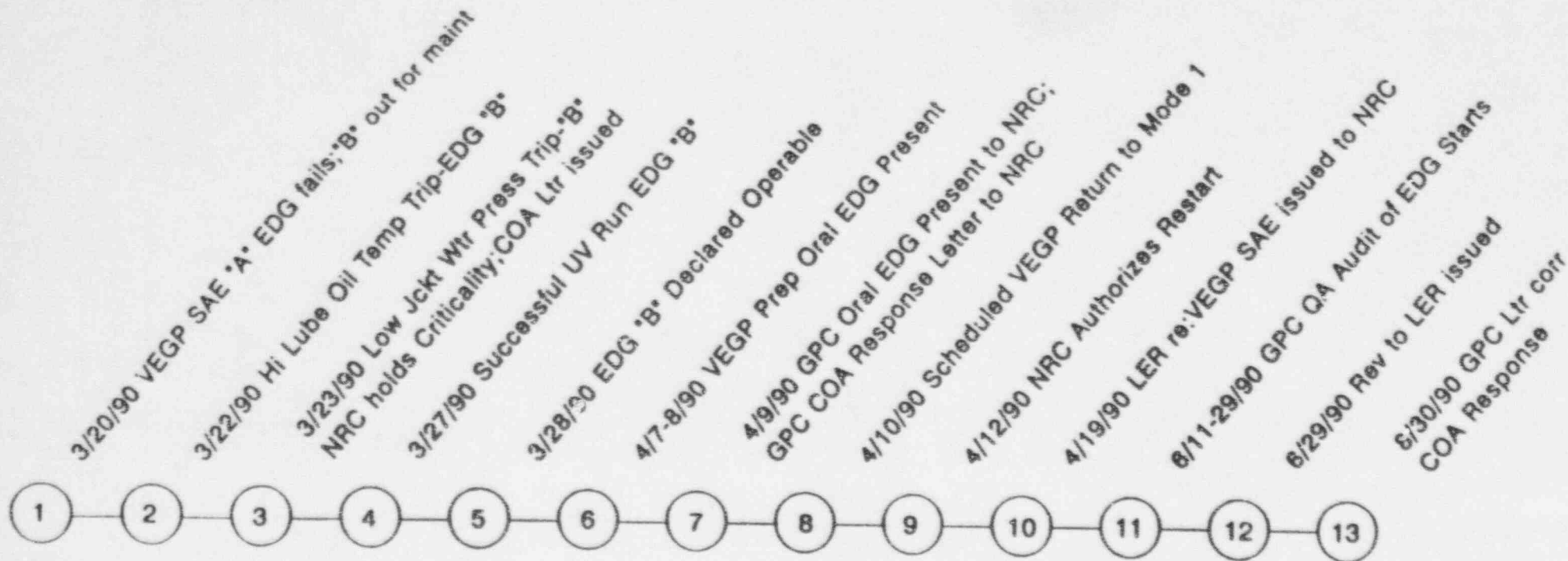
The confusion in the April 9th letter and the original LER appear to be the result of two factors. First, there was confusion in the distinction between a successful start and a valid test. For the purpose of this letter, a start was considered successful when the DG was started and either ran or was intentionally shut down due to testing in progress, as identified on the attached tables. Our use of the term "successful" was never intended to imply a "valid successful test" in the context of Regulatory Guide 1.108. Many start attempts were made to test the DG's 1A and 1B using applicable operating procedures. These procedures and data sheets do not contain criteria for determining if a start is successful which resulted in determinations of success which were inconsistent with the above definition. Second, an error was made by the individual who performed the count of DG starts for the NRC April 9th letter.

³The wording was reviewed by corporate and site representatives in a telephone conference call late on April 19, 1990. Although Mr. Hairston was not a participant in that call, he had every reason to believe the final draft LER presented to him after the call was accurate and complete.

The June 29, 1990 0755 (Exhibit 18) draft and 1142 draft (Exhibit 19) of the same date are each longer than the preceding draft, accurately describe the substance of the April 9, 1990 letter and focus on the wording "subsequent to the test program" in the original LER. In both instances, the draft transmittal letter explains that if the report had stated "subsequent to the event," rather than "subsequent to the test program," the LER would have been consistent with the April 9 COAR and the "18" and "19" numbers included in the transparencies provided by GPC to the NRC on April 9. This is a correct statement of fact.

MAIN PLAYERS

<u>NAME</u>	<u>POSITION Mar-Aug '90</u>	<u>POSITION Current</u>
HAIRSTON	Sr. V-P, Nuc., GPC	Same
McCOY	V-P, Vogtle, GPC	Same
SHIPMAN	GM, Nuc Suprt, SNPCO	GM, Vogtle, GPC
BOCKHOLD	GM, Vogtle, GPC	EPRI
CASH	Ops. Supt., Vogtle, GPC	Strategic Analysis, GPC, B'ham
STRINGFELLOW	Llc. Engr., SONOPCO	Same
MAJORS	Llc. Engr., SONOPCO	Same
GREENE	Asst. GM, Plnt. Supp Vogtle, GPC	Mgr., Nuc. Suppt., SONOPCO
BAILEY	Mgr. Llc., SONOPCO	Same
FREDERICKS	QA Mgr., Vogtle, GPC	Ops., Vogtle, GPC
RUSHTON	Mgr, Llc/Engr SNOPCO	Same
BURR	Sr Proj Engr SONOPCO	Same



18&19 Successful Starts (oral).

Started 18&19 times. No problems or failures
assoc. with any of these starts (COA Response Ltr).

After complet of comprehen test program, at least
18 starts on each diesel. No problems
or failures. (LER)

The difference (between COAR Ltr and LER) is attributed to EDG
start record keeping practices and defin of end of test program.
(Cover Letter to Rev to LER)

Confusion between
succ vs valid starts.

Mistake by
individual who
did counts.

GUS WILLIAMS

() 7C

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c/1
~~B/1~~

7C follows

CO IN CHARGE OF
ESSI PROJECT

12/3/90

12/86-5/87 (

IN AT VEGP SITE
REG COMPLIANCE GROUP

BECHTEL
QUADREX
AIDA

LOOKING AT
REG GUIDES

BULLETINS, CIRC'S
NOTICES & GENERIC
LETTERS.

FILLED OUT
FORMS
ON

([REDACTED]) 7C
DAVID YOUNG
WIFE BRENDA YOUNG
15 DEC
([REDACTED])

GLEN DAVIES, ESSI
LOOKED @ LER'S ^{NATIONWIDE} TO
@ VEGP

([REDACTED]) LOOKING
F

@ HOM ([REDACTED]) 7C

LEAVING 12/26

CAL TEST - SON
START UP
NU

([REDACTED])
CHRIS RICH

SUN -
PROJECT REP

7C returns

11/1/91

FRANK TIMMONS

(~~REDACTED~~)

7C

LEFT VOGTLE JUNE 1989

~~GREENE'S~~

~~BELLAMY~~
SYSTEM

WAS DONE FOR
PRIMARYLY
CRANK CALLS &
THREATS.

BOCKHOLD MAY HAVE STILL
HAD HIS 15 SVC WHEN
~~STILL HAVE~~
TIMMONS LEFT.

ONE OF
MAY HAVE BEEN ~~THE~~ S IN BD LINES

TRAPPED FOR #S

OR
POTENT. TAPE

GREENE & BELLAMY
DIDN'T LIKE
VOICE ACTIVATED
TURNED IN HOME
UNITS.

==
11 MICROCASSETTE ==

.. PROCEDURE ON SAVING
TAPES - THINKS THEY JUST
RECORDED OVER. -
INSTALLED BY SECURITY
ELECTRONICS PEOPLE

DOUG. HIKE WOULD

KNOW ABOUT

7C ~~PROBING~~ SITUATION NOW

FRANK
TIMMONS

([REDACTED])7C

7C portraits

(~~REDACTED~~) 7C

MR. YOUNG
leaving for Death
Canyon.

7C portions