

Docket

JUL 09 1981

Docket No. 50-029

Mr. James A. Kay  
Senior Engineer - Licensing  
Yankee Atomic Electric Company  
1671 Worcester Street  
Framingham, Massachusetts 01701



Dear Mr. Kay:

Subject: Information Request Regarding Station Blackout, Unresolved Safety Issue A-44, Yankee Rowe

The NRC staff is currently addressing Unresolved Safety Issue (USI) A-44, Station Blackout. The purpose of this work is to establish the safety significance of an event resulting in a loss of all alternating current power and, if significant, to consider the need for any specific changes. Over the past several years information requests have been forwarded which requested information that is being used in the USI analysis. Your interest and cooperation in the past have been appreciated.

At this time the USI A-44 effort is being directed toward determining the reliability of the onsite standby diesel generators. The enclosed questionnaire has been prepared to provide accurate operating experience to serve as a basis for such a determination. More specifically, its purpose is to obtain more detailed data than were available in previous diesel generator studies such as AEC-00E-ES-002, NUREG/CR-0660, and NUREG/CR-1362.

The questionnaire (enclosure 1) requests information in tabular form and solicits data for the years 1976 through 1980, inclusive. There are four tables enclosed: (1) Diesel Generator Operations Data, (2) Diesel Generator Scheduled Down Time Record, (3) Diesel Generator Unscheduled Down Time Record, and (4) Onsite Emergency Diesel Generator and Auxiliary Equipment Modification Record. Also enclosed are examples of completed tables as well as a clarification of what should be entered. Please note that, although it may appear that only Licensee Event Report (LER) information is sought, data on all diesel generator malfunctions, independent of whether an LER was prepared, is requested.

Please find enclosed LER documentation (enclosure 2) presently docketed for your facility. You are requested to review these and to indicate if there are other reports which have not been enclosed. Finally, please find enclosed a copy of the appropriate portions of your response (enclosure

JUL 14 1981

OFFICE					
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Mr. James A. Kay

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3) to our letter of March 6, 1978 which requested related, but different, information. This is being forwarded for your information only and should aid in preparing Tables 1 through 4.

In consideration of the time and effort necessary to obtain this information, the completion of Table 4 should be considered voluntary. However, it should be noted that if operational and hardware modifications are not identified, the positive or negative influence of these features on emergency alternating current power reliability may be lost in the evaluation of the data. The expected effect is that our generic reliability estimates may be lower than that which actually exists.

The above information is requested in accordance with Sections 103.b.(3) and 161.c of the Atomic Energy Act of 1954, as amended. To meet our schedule requirements for the resolution of USI A-44 and to incorporate as much real experience as possible into the reliability model for emergency power systems, it is requested that your response be provided within 90 days of the receipt of this letter. However, if this schedule is inconsistent with priority requirements for other licensing work, please provide us with your proposed date of response within 30 days. We plan to complete our analysis of this data by February 1982. Your data should be provided by that time so that an accurate assessment of onsite alternating current power sources can be made.

Mr. P. Baranowsky has been designated Task Manager for USI A-44. Should you have any questions, please feel free to contact him at (301) 443-5921. Your time and efforts are appreciated.

DISTRIBUTION  
See attached list

Sincerely,

Original signed by

Dennis M. Crutchfield, Chief  
Operating Reactors Branch #5  
Division of Licensing

Enclosures:  
As Stated

cc: w/enclosures  
See next page

This request for information was approved by the Office of Management and Budget under clearance number 3150-0067 which expires May 31, 1983. Comments on burden and duplication may be directed to the Office of Management and Budget, Washington, D. C. 20503.

OFFICE	DST:GIB	DL:ORB5	DL:ORB5	DL:ORB#2		
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DATE	07/6/81	07/6/81	07/6/81	7/8/81		

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A-44 File

Mr. James A. Kay

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July 9, 1981

cc

Mr. James E. Tribble, President  
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25 Research Drive  
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Agency  
Region I Office  
ATTN: EIS COORDINATOR  
JFK Federal Building  
Boston, Massachusetts 02203

Resident Inspector  
Yankee Rowe Nuclear Power Station  
c/o U.S. NRC  
Post Office Box 28  
Monroe Bridge, Massachusetts 01350





TABLE 3

Diesel Generator Unscheduled Downtime Record  
 Calendar Year 19\_\_

Enclosure 1 - Page 3  
 Plant Name \_\_\_\_\_  
 Unit No. \_\_\_\_\_

LER Abstract No (Refer to attached LER Abstracts)	Downtime Hours				Comments - If any of the reported failures would not have been a failure under emergency conditions, please explain here. Refer to attached LERs or the failures listed in Table 1.
	Total Hours	Trouble-shooting	Parts, Delivery, etc	Repair/Replace	

TABLE 4

Onsite Emergency Diesel Generator and  
Auxiliary Equipment Modification Record

Enclosure 1 - Page 4

Plant Name \_\_\_\_\_

Unit No. \_\_\_\_\_

Equipment or procedure modified	Date of Mod.	Reason for Modification and Desired Improvement	Description of Modification



TABLE ENTRIES  
EXPLANATION/CLARIFICATION

Table 1

Reason for DG Operation and Scheduled Duration of Run: This column contains the different categories of diesel generator operation. The categories are structured such that the start and run conditions are similar for all of the tests in a category. In this column, enter the scheduled run duration for each of the test categories. Also enter the number of diesel generator starts that are done for each type of test. For example, if on the monthly test there is one start from the local controls and one start from the remote controls, the number of starts per test is two. If two or more diesels are started simultaneously for any reason, please record it as a multiple start.

DG No.: Enter each diesel generator's identification number in this column as shown in the example.

Number of Starts: Enter the sum of the successful and unsuccessful start attempts for each category. If there are several starts for each test, include all of them, but be certain to record the number of starts per test in column one.

Number of Failures: Enter the sum of the failures for each category. A failure is counted if the objectives of the test are not achieved. A subsystem failure that does not cause failure of the diesel generator system is not counted as a failure. If the diesel generator did not start, run, and load as required by the test, a failure should be recorded. However, if the diesel generator would have supplied power in some capacity for an emergency, please explain in Table 3. For example, if the diesel started on the second attempt or the diesel was tripped to repair a minor oil leak that would not have been a problem in an emergency, this should be noted in Table 3.

Percent Loading of DG (KW): Enter the percentage that the diesel is loaded for each category. The continuous kilowatt rating is considered to be 100%.

Duration of Run Before Stop for each DG Failure: Record the run-time for each failure. If the diesel failed to start, the run-time would be 0 min.

Identification of Failures: Attached to this questionnaire are abstracts of the LERs related to the diesel generators. The abstracts are numbered starting with one. Refer to this number to identify the failures, but if there was a failure for which there is no abstract, assign the failure a number and include it in Table 3.

Table 2

Reason for Downtime: Enter in this column the categories of schedule maintenance that make the diesel generator unavailable for emergency service. If the diesel generator is unavailable for emergency service during surveillance testing, report that also.

Table 2 (cont'd)

Hours of Downtime: Enter the number of hours that the diesel generator is unavailable for emergency service. Report the hours under the column reactor shutdown or reactor not shutdown as appropriate.

Comments: Comment on time to return to service after maintenance has begun, or other pertinent information.

Table 3

LER Abstract No. (Refer to attached LER Abstracts): The attached LERs are numbered starting from one. Refer to this LER number in column one. Each LER abstract should have an entry in this table. If there was a failure not included in the attached abstracts, please assign it a number and enter it in this table.

Downtime Hours: Enter the number of hours that the diesel generator is unavailable for emergency service. Subdivide these total hours into troubleshooting, parts delivery, and repair or replacement.

Comments: Use this column to comment on the downtime and the failure. If the reported failure was only a technical specification violation, but would not be a complete failure of the diesel generator to supply power or would only be a delay, please elaborate in this column.

Table 4

Equipment or procedure modified: List in this column the equipment or procedures related to the emergency onsite power system that have been modified since the reactor became critical.

Date of Mod.: Enter the date that the modification was completed.

Reason for Modification and Desired Improvement: Report the reason for the modification and the desired or observed improvement in the system.

Description of Modification: Briefly describe what modification was made.

TABLE 1  
(Sample)

Diesel Generator Operations Data  
Calendar Year 1976

Enclosure 1 - Page 7  
Plant Name xxx  
Unit No. 1 & 2

Reason for DG Operation, & scheduled Duration of Run	DG No.	Number of Starts	Number of Failures	Percent Loading of DG (KW)	Duration of Run Before Stop For Each DG Failure	Identification of Failures (Refer to attached LERs or Table 3)
Tech. Spec Req'd Test						
Monthly Surveillance						
(1 hour)	1	12	2	100	30 min; 0 min	LER # 1 & 4
(1 start/test)	2	12	0	100	--	
	3	12	1	100	0 min	LER # 2
Refueling Outage						
(12 hours)	1	1	0	100	--	
(1 start/test)	2	1	0	100	--	
	3	1	1	100	1 hour	LER # 3
Misc. Tech Spec Req'd Tests						
(Start Only)	1	2	0	100	--	Table 3 No. 9
(1 start/test)	2	4	0	100	--	
	3	2	0	100	--	
DG Actual Demand Starts not for Testing						
SIAS Signal						
(1 hour)	1	1	0	0	--	LER # 8 Multiple start of 3 DGs
	2	1	0	0	--	" "
	3	1	0	0	--	" "
Miscellaneous Tests (Specify Type)						
Verify Repairs (not full test)						
(Start Only)	1	6	0	1	0 min	Table 3 # 10
	2	4	0	0		
	3	4	0	0		

TABLE 2  
(Sample)

Diesel Generator Scheduled Downtime Record  
Calendar Year 19\_\_

Enclosure 1 - Page 8  
Plant Name \_\_\_\_\_  
Unit No. \_\_\_\_\_

Reason for Downtime	Hours of Downtime										Comments	
	Reactor shutdown					Reactor not shutdown						
	DC# 1	DC# 2	DC# 3	DC#	DC#	DC# 1	DC# 2	DC# 3	DC#	DC#		
Scheduled Maintenance												
Preventive Maintenance Semi-annual & Annual	24	16	--					16				
Equipment Modification						8	8	8				Modified lube oil on each diesel. Diesels down at different times.
Time DG is unavailable for emergency service because of required tests Down 4 hrs per test		8				48	40	48				Diesel cannot be automatically started during test or for three hours afterwards

TABLE 3  
(Sample)

Diesel Generator Unscheduled Downtime Record  
Calendar Year 19\_\_

Enclosure 1 - Page 9  
Plant Name XXX  
Unit No. 162

LER Abstract No. (Refer to attached LER Abstract)	Downtime Hours				Comments - If any of the reported failures would not have been a failure under emergency conditions, please explain here. Refer to attached LERs or the failures listed in Table 1.
	Total Hours	Trouble-shooting	Parts, Delivered, etc	Repair/replace	
1	4	1	1	2	
2	3	0.5	1	1.5	
3	12	1	10	1	
4	0	0	0	0	Diesel started in 15 sec instead of required 10 sec
5	0	0	0	0	Secondary air pressure low. Primary air satisfactory.
6	0	0	0	0	Secondary air pressure low. Primary air satisfactory.
7	0	0	0	0	Diesel started in 20 sec instead of required 10 sec.
8	0	0	0	0	False DG start signal. DG satisfactory
no LER					
9	0	0	0	0	Required DG starts after the failure of one diesel.
10	0	0	0	0	Starts to verify repairs.

TABLE 4  
(Sample)

Onsite Emergency Diesel Generator and  
Auxiliary Equipment Modification Record

Enclosure 1 - Page 10

Plant Name \_\_\_\_\_

Unit No. \_\_\_\_\_

Equipment or procedure modified	Date of Mod.	Reason for Modification and Desired Improvement	Description of Modification
Lube oil system	2/76	Improve turbo charger lubrication for emergency starts.	Soak-back pump was removed and replaced with a continuous lube oil pump. New pump also continuously lubricates the crankshaft.
Relay cabinets	1/78	Prevent dirt from fouling relay contacts.	Cabinet doors with gaskets were installed.
Instrument Relocation	6/79	Eliminate vibration damage to instruments	Control and monitoring instrument panel was relocated from the engine skids to a free standing panel mounted on the engine room floor.

76/5/0000001-000000377

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ACCESSION NO. 0020143492  
 TITLE DIESEL GENERATOR OVERHEATS AT YANKEE ROWE  
 CORPAUTH YANKEE ATOMIC ELECTRIC CO., ROWE, MA  
 DATE 1977  
 TYPE 0  
 MEMO 2 PGS, LTR W/RO 50-29/77-42/03L 1 NRC OFFICE OF I & E, REGION 1, SEPT. 1, 1977, DOCKET 50-029, TYPE--PWR, MFG--WEST., AE--STONE & WEBSTER

AVAIL AVAILABILITY - NRC PUBLIC DOCUMENT ROOM, 1717 H STREET, WASHINGTON, D. C. 20555 (08 CENTS/PAGE -- MINIMUM CHARGE \$2.00)

ABSTRACT DATE OF EVENT - 080277. POWER LEVEL - 0%. CAUSE - RADIATOR TUBES PLUGGED BY SLUDGE. DURING SURVEILLANCE TESTING, NO. 3 DIESEL GEN. OVERHEATED AND FAILED TO MEET ITS ACCEPTANCE CRITERIA (GRATER THAN OR EQUAL TO 400KW OUTPUT FOR GREATER THAN OR EQUAL TO ONE HOUR). THE DIESEL DID RUN FOR 30 MIN. THE YOUNG RADIATOR CO. RADIATOR FAILED TO SUFFICIENTLY COOL THE GENERAL MOTORS MODEL 7163-7000 DIESEL BECAUSE 72% OF ITS TUBES BECAME BLOCKED BY SLUDGE AND SCALE. THE RADIATOR WAS CLEANED.

COMPONENT CODE HEEXCH-HEAT EXCHANGERS  
 SYSTEM CODE EE-EMERG GENERATOR SYS & CONTROLS

76/5/0000001-000000377

2

ACCESSION NO. 0020135918  
 TITLE DIESEL GENERATOR WATER HEATER FAILS AT YANKEE ROWE  
 CORPAUTH YANKEE ATOMIC ELECTRIC CO., ROWE, MA  
 DATE 1978  
 TYPE 0  
 MEMO 3 PGS, LTR W/RO 50-29/78-8/03L TO NRC OFFICE OF I & E, REGION 1, FEB. 27, 1978, DOCKET 50-029, TYPE--PWR, MFG--WEST., AE--STONE & WEBSTER

AVAIL AVAILABILITY - NRC PUBLIC DOCUMENT ROOM, 1717 H STREET, WASHINGTON, D. C. 20545 (08 CENTS/PAGE -- MINIMUM CHARGE \$2.00)

ABSTRACT DATE OF EVENT - 012878. POWER LEVEL - 0%. CAUSE - END OF LIFE. DURING AN OPERATOR WALK THROUGH INSPECTION, WATER TEMPERATURE ON DIESEL GENERATOR 1 WAS FOUND TO BE BELOW THE MINIMUM INDICATION OF 100 F. ONE OF THE 2 WATER HEATERS HAD AN OPEN CIRCUIT IN ITS ELECTRIC HEATER COIL WHICH WAS ATTRIBUTED TO NATURAL END OF LIFE. THE KIM HOTSTART MODEL 3P3744, 3 PHASE, 440 VOLT, 3750 KWATT HEATER WAS REPLACED IN KIND AND TESTED AND THE DIESEL RETURNED TO SERVICE AFTER A 5 HR 10 MIN OUTAGE.

COMPONENT CODE HEATER-HEATERS, ELECTRIC  
 SYSTEM CODE EE-EMERG GENERATOR SYS & CONTROLS

76/5/0000001-000000377

3

ACCESSION NO. 0020127041  
 TITLE DIESEL GENERATOR STARTER MOTOR FAILS AT YANKEE ROWE  
 CORPAUTH YANKEE ATOMIC ELECTRIC CO., ROWE, MA  
 DATE 1977  
 TYPE 0  
 MEMO 2 PGS, LTR W/LER 77-11/03L TO NRC OFFICE OF I & E, REGION 1, MARCH 31, 1977, DOCKET 50-029, TYPE--PWR, MFG--WEST., AE--STONE & WEBSTER

AVAIL AVAILABILITY - NRC PUBLIC DOCUMENT ROOM, 1717 H STREET, WASHINGTON, D. C. 20545 (08 CENTS/PAGE -- MINIMUM CHARGE \$2.00)

ABSTRACT DATE OF EVENT - 030177. POWER LEVEL - 97%. CAUSE - ARMATURE SHAFT BROKE. DURING NORMAL OPERATION, EMERGENCY DIESEL GENERATOR 1 STARTER MOTOR FAILED DURING A SURVEILLANCE TEST. THE TECHNO-ELECTRIC MOTOR CO. STARTER MOTOR (S1-169-0-2 GROUP 3) ARMATURE SHAFT BROKE. THE STARTING MOTOR WAS REPLACED WITH A SPARE.

COMPONENT CODE MOTORX-MOTORS  
 SYSTEM CODE EE-EMERG GENERATOR SYS & CONTROLS