A 07/05/7

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)
DISTRIBUTION FOR INCOMING MATERIAL 50-313

REC: GOLLER K R
NRC

ORG: WILLIAMS D H
AR PWR & LIGHT

DOCDATE: 06/23/78
DATE RCVD: 07/03/7

DOCTYPE: LETTER NOTARIZED: NO
SUBJECT:
RESPONSE TO NRC LTRS DTD 12/15/77 & 01/03/78. . FORWARDING COMPLETED
QUESTIONAIRE FOR NRC RELIABILITY STUDY OF STANDBY DIESEL GENERATOR UNITS.

COPIES RECEIVED
LTR 1 ENCL 40

PLANT NAME: ARKANSAS - UNIT 1

REVIEWER INITIAL: XJM
DISTRIBUTOR INITIAL: MZ

********** DISTRIBUTION OF THIS MATERIAL IS AS FOLLOWS **********

RELIABILITY OF STANDBY DIESEL GENERATOR UNITS.
(DISTRIBUTION CODE A014)

FOR ACTION: BR CHIEF ORB#4 BC**W/3 ENCL

INTERNAL: REG FILE**W/ENCL
I&E**W/2 ENCL
HANAUER**W/ENCL
F CLEMENSON**W/ENCL
NRC PDR**W/ENCL
OELD**W/ENCL
POWER SYS BR**W/ENCL
DIS SER BR-MC**W/ENCL

EXTERNAL: LPDR'S
RUSSELLVILLE, AR**W/ENCL
TIC**W/ENCL
NSIC**W/ENCL
ACRS CAT B**W/10 ENCL

DISTRIBUTION: LTR 25 ENCL 25
SIZE: 1P+22P

CONTROL NBR: [illegible]

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SIDENT		CS 1
TGOMERY	AL 36130	

HELPING BUILD ARKANSAS

ARKANSAS POWER & LIGHT COMPANY

9TH & LOUISIANA STREETS • LITTLE ROCK, ARKANSAS 72203 • (501) 372-4311

June 23, 1978

1-068-12

Director of Nuclear Reactor Regulation
ATTN: Mr. Karl R. Goller, Assistant Director
Operating Reactors
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Nuclear One-Unit 1
Docket No. 50-313
License No. DPR-51
Diesel Generator Questionnaire
(File: 1510)

Gentlemen:

In response to your letters of December 15, 1977 and January 3, 1978, requesting information concerning the reliability of standby diesel generators, please find attached the questionnaire with our responses.

Very truly yours,

Daniel H. Williams

Daniel H. Williams
Manager, Licensing

DHW:REI:tw

Attachments

~~7818180006~~

A014
S
1/40

Questionnaire

for

NUCLEAR REGULATORY COMMISSION
RELIABILITY STUDY

of

Standby Diesel Generator Units

Date Questionnaire Completed: June 2, 1978

Plant Name: Arkansas Nuclear One Unit No. 1

Diesel Manufacturer: Stewart & Stevenson Model: 20-645 V6D-2750

Number of Units: 2

Size Kw/Unit: 2750 Rated Speed: 900 RPM

Average Operating Hours Per Unit to Date: _____

DIESEL GENERATOR STATUS

A. Engine:

1. Problems are caused chiefly by (give estimated number)

   a. Defective parts NA
   b. Installation errors: _____
   c. Failure of system to respond properly in function or sequence: _____
   d. Faulty adjustment: _____

2. Would more stringent inspection and testing requirements during acceptance or preoperational tests significantly improve the diesel-generator power plant performance?
   Yes _____ No ✓

B. Starting Systems (indicate which):

1. Air-to-cylinder cranking.
   Air cranking motor ✓ Mfr. Ingersoll Rand Model No. D-89-RH-46
   Electric cranking motor _____ Mfr. _____ Model No. _____

2. If air cranking, then:

Give size of starting air tank: Length 7' Diameter 30"

Normal standby air tank pressure 250 psi.

Is pressure reducer used? Yes ✓ No ____
Reducer pipe size? ____ inches. REDUCES PRESSURE TO 150 psi, 40 scf

Starting air control admission valve pipe size in air piping system, 1½ inches.

Minimum air tank pressure for engine cranking 140 psi.

Number of five-second cranking periods between above pressures with no tank recharging 5.

Number of air tanks per engine 4.

Can starting air tanks serve more than one engine?
Yes ____ No ✓

Is air pipe to engine from top of air tank? Yes ____ No ✓

Does starting air tank have water condensate drain?
Yes ✓ No ___

Does starting air pipe have water condensate trap and drain near engine? Yes ✓ No ___

Is starting air piping horizontal? Yes ___ No ✓

Does it slant toward drain? Yes ___ No ✓

If water condensate drains are provided, then is draining:

a. Automatic through float valve? Yes ✓ No ___
b. Manual by hand valve? Yes ___ No ___
c. If manual, then is draining water condensate done:

daily? ___
weekly? ___
monthly? ___
before each start if manual? ___
no procedure? ___

Is dirt and rust filter provided in starting air pipe?
Yes ✓ No ___

If provided, where installed? BETWEEN THE REGULATOR AND THE AIR START SOLENOID VALVE

How is it cleaned? REPLACED

How often and when? ANNUALLY

Give pipe size of filter: 1½ inches.

How is it known whether filter is plugged or has high pressure drop? NO AUTOMATIC ALARMS ARE PROVIDED

Is starting air pipe to engine positioned:

a. Below floor? ___
b. On the floor? ✓
c. Overhead? ___

What is air pressure drop from air tank to engine during cranking 30-50 psi

Give approximate length (nearest ten feet) of starting air pipe for individual engine or all engines from air tank to:

a. Nearest engine 40 feet
b. Furthest engine ___ feet

Diameter of starting air pipe from:

a. Air tank to starting valve 1½ inches
b. At air starting valve 1½ inches
c. At engine 1 inches

What is the primary source of power for the starting air system? AC ELECTRIC

Is there a duplicate and redundant motor and air compressor set? Yes ✓ No ___

What is the time required to recharge one air tank? 71 minutes

Does starting air supply system have independent secondary power supply for compressor? Yes ___ No ✓

If yes, then by:

a. Gasoline engine? ___
b. Motor driven? ___
c. Other? (Specify) ___

3. If electric (Battery powered) cranking, then: NA

a. Battery charging: Continuous trickle charger ___
Intermittent charging ___

If so, how is charging requirement determined?

Time cycle ___
Test ___
Other ___

b. Battery used: Common Plant ___
Individual Unit ___
Other ___

Starting cable size ___ ; Length: Battery to engine (longest) ___

C. Fuel Oil System: Bulk Tank to Day Tank

1. Does the bulk tank to day tank fuel supply system (viz: pump, motor, etc.) have redundant independent power supplies? Yes ✓ No ___

   Does this system have a hand-operated emergency fuel pump? Yes ___ No ✓

   If yes, is this hand-operated pump and piping in immediate operating condition? Yes ___ No ___

2. Is there a water and sediment drain from the very bottom of the:

   a. Bulk tank? Yes ✓ No ___
   b. Day tank? Yes ✓ No ___

3. Is the regular functional fuel oil outlet slightly above (two to three inches) the bottom of the:

   a. Bulk tank? Yes ✓ No ___
   b. Day or integral tank? Yes ✓ No ___

4. Is bottom of day tank and/or integral tank above all parts and piping of the engine fuel injection systems? Yes ___ No ✓

   If yes,

   Give approximate amount inches ___ feet ___

5. Does the engine fuel system have a fuel bleed return line to the fuel day tank and/or integral tank? Yes ✓ No ___

   During extended operation, such as more than two to three hours, does the fuel in the day tank become: (yes or no)

   a. Warm? Yes
   b. Hot? NO (above 130°F)

What is fuel oil return line size (nominal)?

a. Pipe size 3/4 inches
b. Tubing size ____ inches

6. Do engine fuel oil filters have air bleed or vent valves readily accessible? Yes ____ No ✓

7. How is fuel transferred from day tank to engine fuel system?

a. By gravity ____
b. Engine driven pump ✓
c. Electric motor driven pump ✓
d. Is a manual pump also provided for injection system filling and/or air venting after servicing or replacement of parts in the fuel injection system? Yes ✓ No ____

If yes, is the manual pump in immediate operating condition? Yes ✓ No ____

8. Type of fuel (e.g., #1, #2, #3, JP-4, etc.) # 2 .

9. Approximate bulk tank capacity, 185,000 gallons.

10. Typical frequency of refilling (weekly, monthly, etc.) AS NEEDED .

11. Typical refill (gallons), VARIES .

D. Lube Oil System

1. Lube oil

a. Type GOLF 493
b. Viscosity 190 CENTISTROKES @ 40°C
c. Specification number MILL-L-21047B
d. Oil change determined by:

Time interval: Yes ✓ No ____
Give interval YEARLY monthly, yearly
By oil analysis: Yes ____ No ____

2. Lube oil filters are:

   a. Full flow ✓
   b. Bypass _____
   c. Combination _____

3. Interval and/or basis for changing filter cartridge:

   a. Monthly _____
   b. Yearly ✓
   c. By running time _____ hours
   d. By oil analysis. Yes ___ No ___
   e. By pressure drop. Yes ✓ No ___
   f. Does provisions exist for changing cartridges during engine operation? Yes ___ No ✓

4. Oil Pressure Monitoring

   a. Normal operating pressure 30 psi
   b. Alarm 26 psi
   c. Shutdown 17 psi

5. Oil temperature control:

   a. By standby heater in engine sump 125?7 °F.
   b. Heating means for maintaining standby temperature:

      Direct in oil ✓
      Oil-to-water heat exchanger _____
      Other (Specify) 15 KW RESISTANCE HEATING ELEMENT

E. Cooling System - Engine Water

1. Temperature control by:

   a. By thermostat in water? Yes ✓ No ___

      If yes, then:

      Bypass thermostat? Yes ✓ No ___
      Throttle thermostat? Yes ___ No ✓

b. By radiator shutter:

Automatic ____
Manual ____
Other (give type) _____

2. Corrosion control (water additive)? Yes ✓ No ____

If yes, give chemical additive or name of compound.

CALGON CORROSION CS

Proportion or concentration control:

a. By additive measurement? Yes ____ No ✓
b. By water coolant analysis? Yes ✓ No ____

3. Engine cooling water cooled by:

a. Radiator? NO
b. Heat exchanger from sea, river or other water? YES
c. Other? (give type) SERVICE WATER

4. Engine cooling water temperature-monitoring

a. Standby temperature 125 °F
b. Normal operating temperature 180 °F
c. Alarm temperature 195 °F
d. Shutdown temperature NA °F
e. Water circulation during standby:

Thermo-syphon ✓
Pump ____

5. Water Pressure Monitoring: Yes ✓ No ____

a. Alarm 10 Psi
b. Shutdown NA
c. Both NA

6. Water temperature Sensor Position:

   a. In piping from engine ✓
   b. In engine piping ____
   c. In engine direct ____

7. Water surge or supply tank in system. Yes ✓ No ____

   If yes, then bottom connected to:

   a. Water pump suction? Yes ✓ No ____
   b. Top of system? Yes ____ No ✓
   c. Both of above? Yes ____ No ✓
   d. Is bottom of surge tank above top of engine system? Yes ____ No ✓
   e. Does engine have constant air bleed from top of engine water piping to surge or supply tank? Yes ✓ No ____
   f. Give size of bleed or vent line, 5/8 inches.
   g. Manual air bleed only? Yes ____ No ✓

F. Governor - Speed Control

Manufacturer WOODWARD VG-8
Electric (speed sensing) ____
Hydraulic ISOCHRONOUS
Type or code (such as EGB-35, LSG-10, etc.) COMPLIES WITH SEC III OF IEEE SPEC #606
Automatic load sharing? Yes ____ No ✓

1. Is compensation or stability control and/or speed of response manually adjustable? Yes ✓ No ____

   If yes, adjusted by:

   a. Eye and ear?
   b. Test and specification? ✓
   c. Other? (Specify) ____.

2. Engine - generator normal shutdown or stopping means and method.

Is the engine stopped:

a. Manually? Yes ✓ No ___

If yes, then:

Directly at engine? Yes ✓ No ___
Through local control panel? Yes ✓ No ___

b. Automatically through the controls in the control room? Yes ✓ No ___

c. By setting governor to "fuel-off" position? Yes ✓ No ___

d. By over-ride of governor settings and control position directly to fuel injection pumps? Yes ___ No ✓

e. Other means. Describe briefly. _____

_____

3. When engine is stopped, is fuel control in:

a. Full fuel or maximum fuel position? ___
b. Full off or no fuel position? ✓
c. Intermediate? _____
d. Random? _____

(If not consistent and typical in above, then give the usual.)

4. When starting from the standby condition after shutdown for at least 24 hours, give number of seconds from start-to-crank to full fuel or maximum fuel position of governor and fuel control, 12 seconds.

G. Governor - Overspeed (shutdown)

1. Speed sensing?

   a. Electrical ____
   b. Flyball ✓
   c. Other (Specify) ____

2. Fuel shutoff force generated by:

   a. Spring? ____
   b. Air? ____
   c. Hydraulic? ✓
   d. Electrical? ____
   e. Other? (Specify) ____

3. Overspeed sensing setting? (in terms of full speed)

   a. 115% ____
   b. 110% ✓
   c. Other (Specify) ____

4. Is overspeed tripping set point tested periodically?
   Yes ✓ No ____

   If yes, then how often? 18 MONTHS (yearly, monthly, etc.)

H. 1. Generator Mfr. ELECTRIC PRODUCTS Model No. 20-645 VGD-2750
   Single bearing or two bearings? SINGLE
   Does generator have damper windings? Yes ____ No ✓

2. Does generator have any obvious fault or difficulty?
   Yes ____ No ✓

   Is problem repetitive? Yes ____ No ____

   If yes, then describe briefly. ____

I. Exciter and Voltage Regulator

1. Exciter Manufacturer: BASLER ELECTRIC Model SBHU #90-73500-101

   Type: Rotating _____ Static ✓

   If rotating drive? Direct _____
   Belt or Chain _____
   DC with field control _____
   Brushless with rectifier _____

2. Voltage Regulator: Manufacturer BASLER ELECTRIC Model SVR 01A03B2B1B

   Type: Mechanical _____ Static ✓

3. Are paralleled units of automatic load sharing control of fully automatic type? Yes ___ No NA

   If yes, has any obvious influence or interrelationship been noted between the stability and response time of the engine governor and the stability and voltage control of the generators? Yes ___ No ✓

4. Have engine governor and voltage regulator/exciter adjustments been made on the site or under any conditions since any of the units have been placed in service? Yes ___ No ✓

   If yes, by means of what tests and what standards? Give name or very brief description. NA

   _____

5. If any difficulties have occurred, give approximate number of problems.

   a. Components NA
   b. Wiring _____
   c. Other (damage in service or dropping of miscellaneous hardware into switchboard, etc.) _____.

J. Paralleling: Engine-Generator Units NA

1. Do all units consistently have the proper voltage output? Yes ____ No ____ NA

2. Do all units automatically share both the "real" or in-phase load and also the reactive load reasonably well? Yes ____ No ____ NA

3. At the same Kw load, are both the field and the armature line currents of the several units consistently close to the same value? Yes ____ No ____ NA

   If no, approximate percent difference. _ _____

4. Synchronizing

   a. In automatic synchronizing do circuit breakers close immediately after reaching full synchronous speed? Yes _____ No _____ NA

   b. If "no" above then, does speed of some units drift slowly while failing to synchronize and close circuit breakers?

      How many seconds? _____ NA

      Occasionally _____
      Always _____
      Never _____ NA

K. Switch Gear and Electrical Controls (other than exciter/voltage regulator)

1. If any difficulties have occurred, then give approximate number of problems.

   a. Components NA
   b. Wiring NA
   c. Other (damage in service or dropping of miscellaneous hardware into switchboard, etc.) NA
   d. Design concept faults. That is, does the switch gear and its controls perform the proper functions and in proper sequence and timing. yes

2. a. Do the on-site diesel generator units and related support equipment have any storage battery power systems for any service whatsoever? Yes ✓ No ___

b. Identify each storage battery power system associated with the on-site diesel generator unit and its function. DC Power comes from SAFEGUARD BATTERIES

c. Does each system identified above adequately fulfill the service requirements for which it is intended? Yes ✓ No ___

If no, briefly describe. ___

d. Is there a DG battery maintenance program? Yes ✓ No ___

L. Safety Shut downs

Give safety shut down settings compared to equilibrium operating conditions.

1. Engine and generator speed. Give rpm or hertz:

a. Synchronous and usual 900 rpm or 60 Hz
b. Overspeed shutdown setting 980 rpm or ___ Hz

2. Engine cooling water (see E.4)

a. Equilibrium 180 °F
b. Alarm 195 °F
c. Shut down NA °F

3. Lube oil pressure (see D.4)

a. Equilibrium 30 psi
b. Alarm 26 psi
c. Shut down 17 psi

4. Lube oil temperature

   a. Equilibrium 180 °F
   b. Alarm 240/124 °F
   c. Shutdown NA °F

5. Indicate all other protective interlocks (give name and;)

   a. Usual or proper condition GENERATOR DIFFERENTIAL OVERCURRENT RELAY, LOSS OF FIELD RELAY, MOTORING, ENGINE TRIP

   b. Shutdown condition GENERATOR DIFFERENTIAL CURRENT, RELAY OVERSPEED, LOW OIL PRESSURE

6. a. What source of power is provided to operate alarms and shutdown controls? (See G.2) BATTERY D-11, D-21

   b. Do the generator units automatically shutdown in case of the electrical power loss to its control system? Yes ____ No ✓

M. Emergency or Alert Conditions

1. Are all safety shutdown and safety interlocks bypassed during emergency conditions? Yes ____ No ✓

2. If "no" above, then which are not bypassed. Name items.

   OVERSPEED, HOW LUBE OIL PRESSURE, DIFFERENTIAL CURRENT RELAY

3. For each interlock not bypassed is coincident logic used? Yes ✓ No ____

   If yes, is it testable? Yes ____ No ✓

N. Maintenance

1. Does plant have regularly scheduled maintenance procedures? YES

   If so, return copy of these procedures with questionnaire.

   PROCEDURE OP 1405.02 RC01 – ATTACHED

2. When need for minor adjustments obviously exists, then:

   a. Is remedial action taken immediately or at earliest practical opportunity? Yes ✓ No ___

   b. Is remedial action taken only at periodic prescheduled or programmed times and conditions? Yes ___ No ✓

   c. For best performance record which of above appears better:

      immediate or early action? ✓
      as scheduled only? ___

   d. Must permission for minor maintenace be obtained from some higher out-of-plant authority? Yes ___ No ✓

   e. Is maintenance referred to above allowed and encouraged? Yes ✓ No ___

   f. In periodic surveillance tests, simulated alert standby tests, etc., is the criteria "pass/not pass" the test used? Yes ___ No ✓ DONE IN OPERATING PROCEDURE

   g. Is there a conscious continuing policy to detect and remedy marginal conditions or imminent trouble: for examples: lube oil pressure shutdown only two to five psi below operating pressure or, perhaps overspeed governor setting only one or two percent above starting speed surge or etc.? Yes ✓ No ___

   h. Are efforts to remedy marginal or questionable conditions as mentioned above encouraged by plant management? ___

      Yes ✓ No ___

   i. Are remedial steps on items similar to the above taken or allowed when the unit has started and operated satisfactorily within specified limits or conditions? Yes ✓ No ___

O. Starting Conditions

1. Give starting or necessary cranking time as experienced.

   a. Starting time per specification 15 seconds
   b. Usual starting time 12 seconds
   c. Maximum starting time observed 12 seconds

2. Give usual time intervals as follows:

   a. Time from start-to-crank to first firing of any cylinder. 4 10 seconds

   b. Time from start-to-crank to approximate full firing of all cylinders. 10 seconds

3. Give maximum speed surge when starting; use both tachometer and frequency meter if possible.

   a. Usual conditions 900 rpm
      60 Hz
   b. Maximum observed 927 rpm
      _____ Hz

4. During a surveillance test, give time from start-to-crank to when steady synchronous speed is attained and maintained.

   a. Usual 12 seconds
   b. Maximum 12 seconds
   c. As specified 15 seconds.

5. Give briefly the most troublesome problems in starting.

   a. Most troublesome NA.

   b. Next to most troublesome NA.

P. Air Cleaner or Air Filter - Combustion Air

1. Combustion air source: taken from engine room or inside the building, or from outdoors?

   a. Indoors ✓
   b. Outdoors _____

2. Give type and make of air cleaners or air filters:

   a. Oil bath ✓ Make HARNOMY 493
   b. Oil wetted screen _____ Make _____
   c. Paper _____ Make _____
   d. Other _____ Make _____
   e. Precleaner: Yes ____ No ____

3. Excessive air flow restriction and servicing need determined by?

   a. Instrument such as:

      manometer _____
      If other give type _____
   b. Personal judgement by appearance, etc. _____
   c. By smoking exhaust _____
   d. Time schedule ✓
   e. Other (Specify) _____

4. Are climatic extremes normally experienced such as:

   a. Air heavily loaded with water mist, high humidity and low temperature? Yes _____ No ✓
   b. Blowing sand and dust? Yes _____ No ✓
   c. Blowing snow (blizzards)? Yes ____ No ✓
   d. Other-Name _____

5. Are climatic extremes potentially possible such as:

   a. Air heavily loaded with water mist, high humidity and low temperature? Yes _____ No ✓
   b. Blowing sand and dust? Yes _____ No ✓
   c. Blowing snow (blizzards)? Yes ____ No ✓
   d. Other-Name _____

Q. Temperature Conditions

1. Ambient outside hottest 113 °F.

2. Ambient outside coldest -15 °F.

3. Engine-generator room hottest 123 °F.

4. Engine-generator room coldest 60 °F.

5. Inside switch gear hottest 133° F

6. INSIDE VOLTAGE REGULATOR : 133°F

7. AMBIENT AT EXCITER HOTTEST : 123° F

R. Operator Qualifications (as presently exists, and suggested minimums if different)

1. Minimum education required (check)

	Existing	Suggested
a. High School	ANSI-N 18.1	
b. Trade School		
c. Technical School		
d. No minimum		

2. Minimum Years of operating experience (diesel electric generator)

	Existing	Suggested
a. 0-3		
b. 3-6		
c. 6-10		
d. 10-15		

3. Operator training

	Existing	Suggested
a. Military		
b. Industrial		
c. On-the-job		
d. Combination of a, b, and c (indicate which)		

4. Licensing required

	Existing	Suggested
a. State		
b. Federal		
c. Utility or self		
d. None	✓	

S. Are any foreign gases such as propane, freon, halon, carbon dioxide, etc. stored in the: Diesel Engine room? Yes _____ No ✓ or adjacent buildings? Yes ___ No ✓

If yes, (other than hand portable fire extinguishers), then identify gases and give approximate tank size.

Gases	Volume (ft^3)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

T. Does control system automatically bypass, in emergency starting, any engine temporarily out of service for maintenance? Yes _____ No ✓

If yes, then how many failures to bypass have occured?

_____

U. Does the control system automatically override the test mode under emergency conditions? Yes ✓ No _____

V. Have repetitive mechanical failures occurred in any component part or subsystem of the engine, generator, or switch gear, etc.? Yes ____ No ✓

If yes, then which part or subsystem? _____

How many failures? _____

Give nature of failure. _____

_____

_____

W. Would periodic (yearly or other) evaluation and/or testing by "outside experts" contribute significantly to the diesel-generator reliability? Yes _____ No ✓

Give brief reasons for the answer. ON SITE TESTING AND SUFFICIENT AND NO AVAILABLE OPERATING EXPERIENCE

_____

_____

X. 1. Give the accumulated time-load operating record for each diesel-generator unit from installation to the present (Running Hours):

Preoperational test Date APRIL, 1978

	Engine Serial No.	Surv. Testing & Maintenance Hrs. No Load	Loaded	Emergency and Other Service Hrs.	Total Hours
A	71-A1-1117		410.4		410.4
B	71-A1-1130		399.7		399.7

2. Surveillance test load (percent of continuous rating) 100%

3. Give the projected or planned time-load operation for each diesel-generator unit during the next 12 months.

Surveillance & Maintenance Hrs.	Emergency and other Service Hrs.	Total Hours	
12	NONE	12	

4. Provide the following summary of the periodic surveillance testing experience:

a. Starting date of surveillance testing (OL date) MAY 21, 1974
b. Periodic test interval MONTHLY
c. Total number of surveillance tests performed 125 (63-A, 62-B)
d. Total number of test failures 4 (3-A, 1-B)

failure to start 2-A failure to accept load NONE
failure to carry load NONE failures due to operator error 1-A
failure due to equipment not being operative during emergency conditions NONE

e. Supply a copy of the surveillance test procedures with this completed questionnaire.

TEST 1104.36 SUPPLEMENTS 1-4 — ATTACHED —

Additional Comments

THERE WAS TROUBLE WITH ONE OF THE UNITS TURBO-CHARGER BUT WAS FIXED (UNIT B)

Y. General Suggestions

Briefly give constructive criticism or suggestions as to improvement in reliability of the diesel generators. These remarks may cover tests, maintenance, practices, orders, policy, adjustments, etc.

THE EMERGENCY GENERATORS HAVE NEVER BEEN USED IN AN ACTUAL EMERGENCY SITUATION. FROM THE MONTHLY TEST, THE GENERATORS ARE KEPT IN THE BEST OPERATING CONDITION POSSIBLE.