



Because there is no specific requirement that all diesel generator starts or attempted starts be entered in the NCCO log, it is possible that all such events have not, in fact, been recorded. This is especially true in the case of successful attempts.

In a case of a failure, a diesel generator may be removed from service for a finite period until the cause has been identified, corrected, and the set has been tested. The removal of a diesel generator from service in such a case would almost certainly appear in the NCCO log. A successful attempt, on the other hand, might not be logged at all; perhaps on the basis that proper operation of the diesel generators is not an off-normal condition and, hence, not of such significance as to require recording. As a result, Attachment A is likely to understate diesel generator reliability.

Using the existing data, a more accurate appraisal of diesel generator performance under emergency conditions can be achieved by eliminating unsuccessful start attempts that occurred during maintenance and troubleshooting, or that can definitely be attributed to spurious operation of a trip that is bypassed in the emergency mode, to a malfunction of equipment that is not operative in the emergency operating mode or is not part of the present diesel generator unit design, and to operating conditions which would not be present in an emergency, e.g., a diesel generator output buss already energized by offsite power. (See also Reg: Guide 1.108, Rev. 1, 11C.2.e(2), C.2.e. (7).) Applying this guideline, the diesel generator units failed to operate a total of 10 times.

Because of the incompleteness of the data base, discussed above, a valid statistical analysis is impossible. However, the data reveals a total of 10 failures of interest out of a total of 375 attempts. Since the failures are evenly divided between the diesel generators (5 for A and 5 for B), and attempts

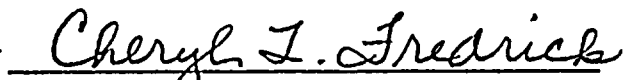
are also approximately equal (197 for A and 178 for B), it is appropriate to calculate a combined diesel generator unreliability of  $7 \times 10^{-4}$ . This compares well with the  $9 \times 10^{-4}$  combined unreliability figure used by the NRC Staff during the hearing in prepared testimony concerning the period of time a total loss of AC power was likely to occur at St. Lucie. (Fitzpatrick, Fol. Tr. 624, p. 17).

  
GEORGE E. LIEBLER

STATE OF FLORIDA    )  
                          )  
COUNTY OF DATE    )        SS.

Subscribed and sworn to before me this 14th day of March, 1980.

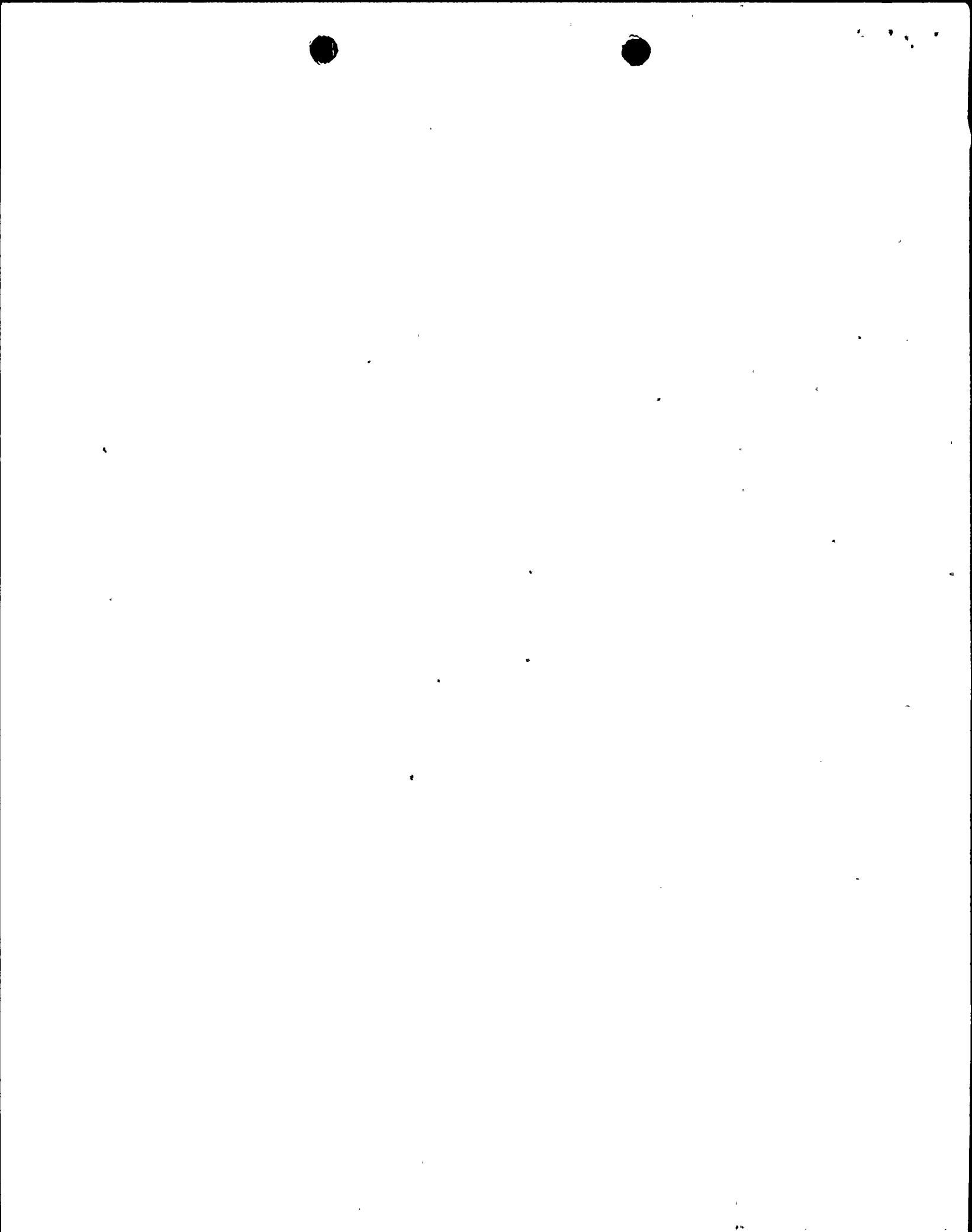
My commission expires: Notary Public, State of Florida at Large  
My Commission Expires October 30, 1983  
~~Bonded thru Maynard Bonding Agency~~

  
NOTARY PUBLIC

St. Lucie 1 Diesel Generator Data

Abbreviation Key:

C.I.S.	--	Containment Isolation Signal
C. R.	--	Control Room
D/G	--	Diesel Generator
Maint.	--	Maintenance
Op Check	--	Operational Check
Op Test	--	Operational Test
P. M.	--	Preventive Maintenance
P. W. O.	--	Plant Work Order
Surv. Run	--	Surveillance Run
S. U. T.	--	Startup Transformer
Tech. Rep.	-	Technical Representative

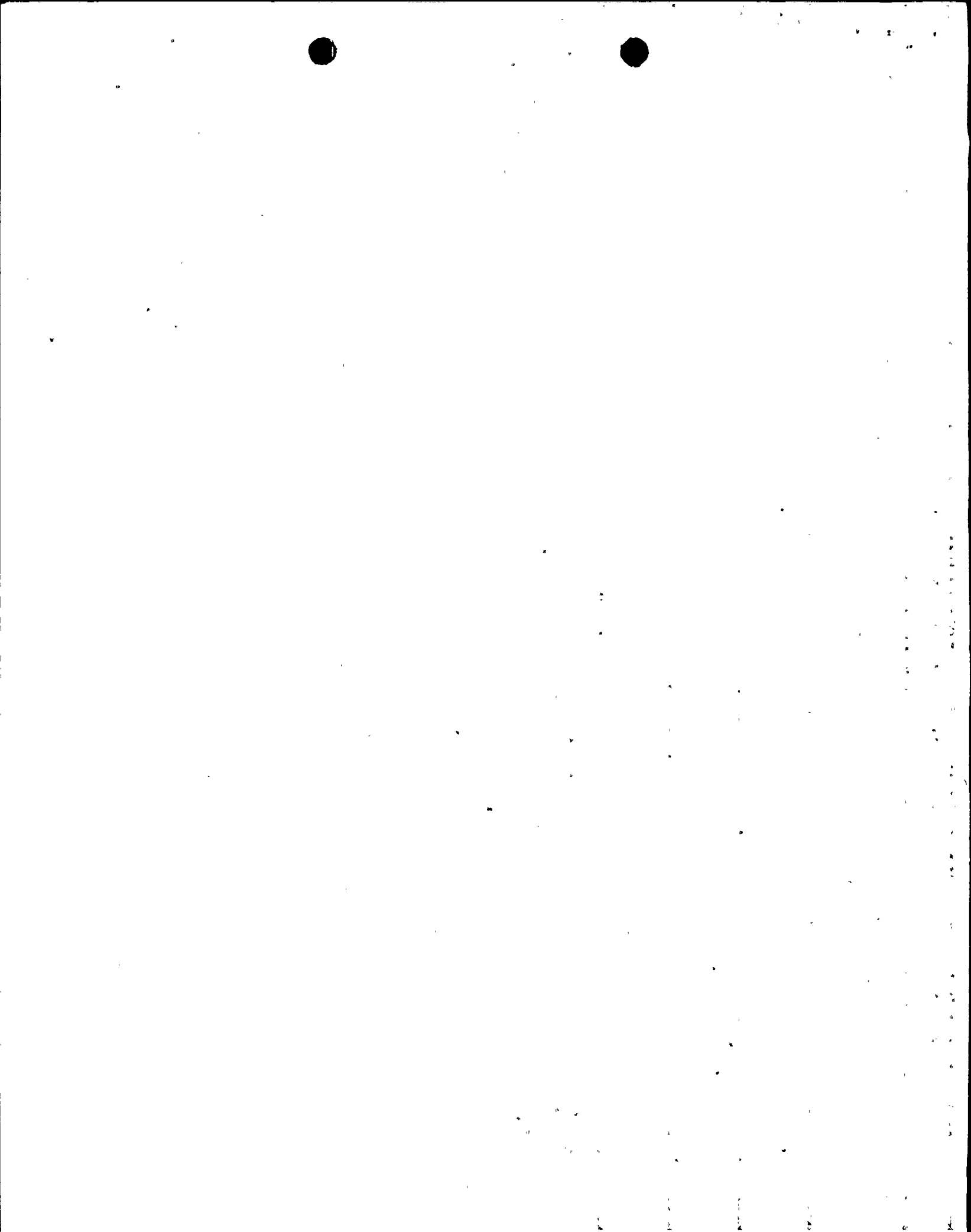


SET	DATE	START	LOAD	FAIL	REMARKS
B	1/18/80	Y	N		Op check prior to removing SUT
B	1/18/80	Y	N		Op check prior to removing SUT
B	1/16/80	Y	Y		Periodic surv. run
A	1/16/80	Y	N		Op check
B	1/8/80	Y	N		Op check to return to service
A	1/8/80	Y	N		Op check-B out of service
A	1/8/80	Y	N		Op check
A	1/7/80	Y	N		Op check to return to service
B	1/7/80	Y	N		Op check-A out of service
B	1/7/80	Y	N		Op check-A out of service
A	1/2/80	Y	Y		Surv. run
B	12/19/79	Y	N		Tripped due to reverse current while trying to load
B	12/19/79	Y	Y		Surv. run
B	12/5/79	Y	N		Op check-A out for maint.
B	12/5/79	Y	N		Op check
A	12/5/79	Y	Y		Periodic test
B	11/21/79	Y	Y		Periodic test
A	11/7/79	Y	Y		Periodic test
B	11/2/79	Y	N		Op check
A	11/1/79	Y	N		Op check prior to A SUT out of service
A	11/1/79	Y	N		Op check
A	10/31/79	Y	N		Op check prior to A SUT out of service
A	10/31/79	Y	N		Op check
B	10/18/79	Y	Y		Surv. run-24 hrs.
A	10/18/79	Y	Y		Op check
A	10/17/79	Y	Y		Surv. run-24 hrs.
A	10/16/79			Y	Attempted to start-out for maint.
A	10/16/79	Y	Y		Back in service
B	10/16/79	Y	N		Op check
A	10/3/79	Y	Y		Low kw output (3290 kw); sufficient for safeguards load

SET	DATE	START	LOAD	FAIL	REMARKS
B	10/3/79	Y	N		Op check
A	10/3/79	Y	Y		Surv. run
B	9/26/79	Y	Y		Periodic test-Sync to 1B3 4160 Bus
B	9/19/79	Y	Y		Surv. run
B	9/7/79	Y	N		Op check
B	9/5/79	Y	Y		Verification
A	9/5/79	Y	Y		Surv. run
B	9/3/79	Y	Y		Manual start
B	9/3/79	N	N	Y	Relay in start circuit failed; unit would not start automatically but was capable of manual start
A	9/3/79	Y	Y		Op check
A	9/2/79	Y	Y		Verification
A	9/2/79	Y	Y		Op check-H <sub>2</sub> meter in C.R. put on P.W.O.
B	9/2/79	Y	Y		Op check
A	9/2/79	Y	Y		Op check-due to hurricane the H <sub>2</sub> meter in the C.R. did not register
B	8/15/79	Y	Y		Surv. run
A	8/1/79	Y	Y		Surv. run
B	7/18/79	Y	Y		Surv. run
A	7/4/79	Y	Y		Surv. run
B	6/29/79	Y	N		Op check.
B	6/28/79	Y	Y		Op check
A	6/27/79	Y	N		Op check
A	6/27/79	Y	N		Op check prior to taking B out of service
B	6/27/79	Y	N		Op check
B	6/27/79	Y	N		Op check prior to taking A out of service
A	6/26/79	Y	N		Op check
B	6/26/79	Y	N		Op check-A out of service
B	6/26/79	Y	N		Op check-A out of service

SET	DATE	START	LOAD	FAIL	REMARKS
A	6/22/79	Y	N		Op check
B	6/22/79	Y	N		Op check
B	6/22/79	Y	N		Op check--prior to removing A from service
B	6/19/79	Y	Y		Surv. run
A	6/7/79	Y	N		Op check after maint.
B	6/7/79	Y	N		Op check-prior to removing A from service
A	6/6/79	Y	Y		Surv. run
B	5/31/79	Y	N		Op check after maint.
A	5/31/79	Y	N		Op check-B out of service
B	5/31/79	Y	N		Op check-prior to removing B from service
B	5/26/79	Y	N		Op check after maint.
A	5/25/79	Y	N		Op check-prior to removing B from service
A	5/24/79	Y	N		Maintenance Dept. Checkout
A	5/24/79	Y	N		Test run
B	5/15/79	Y	Y		Surv. run
A	5/9/79	Y	N		Op check-prior to removing B from service
A	5/6/79	Y	N		Op check after maint.
A	5/6/79	Y	N		Test run for Maint. Dept. observation
A	5/5/79	Y	N		Op check
B	5/4/79	Y	Y		Surv. run
B	5/4/79	Y	Y		Op check
B	5/4/79	Y	N		Op check
B	5/4/79	Y	Y		Op check
A	5/1/79	Y	Y		Surv. run
A	4/25/79	Y	N		Op check-prior to removing B from service
A	4/24/79	Y	Y		Op check after maint.
A	4/24/79	Y	N		Tripped due to reverse current while trying to load
A	4/23/79	Y	Y		Surv. run
B	4/17/79	Y	Y		Surv. run
A	4/4/79	Y	Y		Unit run at 1500 kw





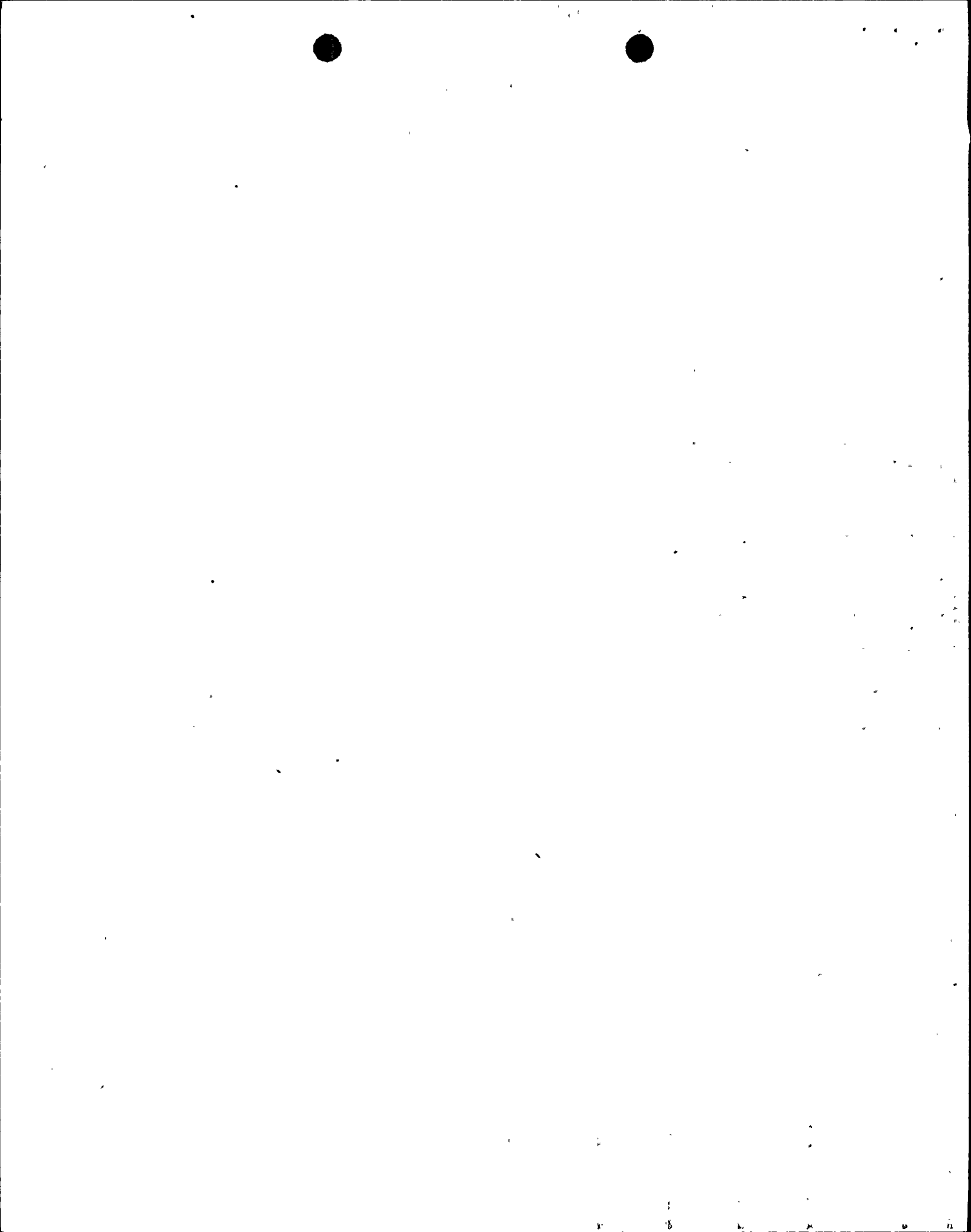
SET	DATE	START	LOAD	FAIL	REMARKS
B	4/4/79	Y	Y		Unit run at 1500 kw
A	4/4/79	Y	Y		Surv. run
A	4/3/79	Y	Y		Surv. run
A	3/31/79	Y	N		Verification of oil transfer pump operation
B	3/31/79	Y	Y		Safeguards Test-accepted full load 3 minutes after speed droop trip
B	3/31/79	Y	Y	Y	Safeguards Test-speed droop problem; D/G tripped.
A	3/31/79	Y	Y		Safeguards Test
B	3/20/79	Y	Y		Surv. run
A	3/19/79	Y	N		Op check
A	3/6/79	Y	Y		Surv. run
B	2/20/79	Y	Y		Surv. run
A	2/14/79	Y	N		Op check-A SUT out of service
A	2/6/79	Y	Y		Surv. run
B	1/31/79	Y	N		Op check-prior to removing B SUT
A	1/17/79	Y	N		Op check-after maint.
B	1/17/79	Y	N		Op check
B	1/16/79	Y	Y		Surv. run
A	1/16/79	Y	N		Op check-prior to removing B from service
A	1/2/79	Y	Y		Surv. run
A	12/21/78	Y	N		Op check-prior to removing A SUT
B	12/21/78	Y	N		Op check-prior to removing A SUT
A	12/21/78	Y	Y		Op check-prior to removing A SUT
B	12/21/78	Y	Y		Op check-prior to removing A SUT
B	12/19/78	Y	Y		Surv. run
A	12/5/79	Y	Y		Surv. run
A	12/1/78	Y	N		Op check-prior to removing A SUT
B	11/21/78	Y	Y		Surv. run
A	11/15/78	Y	N		Test run
A	11/14/78	Y	N		Op check
B	11/14/78	Y	N		Op check-prior to removing A from service.

SET	DATE	START	LOAD	FAIL	REMARKS
A	11/7/78	Y	Y		Surv. run
A	11/4/78	Y	N		Low voltage during bus transfer
B	10/17/78	Y	Y		Surv. run
B	10/12/78	Y	N		Op check
B	10/12/78	Y	N		Op check-prior to removing B SUT
A	10/4/78	Y	N		Check petcock leak
A	10/4/78	Y	N		Check petcock leak
A	10/3/78	Y	Y		Surv. run
B	10/3/78	Y	N		Op check
A	9/19/78	Y	N		Op check
B	9/19/78	Y	Y		Surv. run
A	9/5/78	Y	N	Y	Dirty relay prevented the output breaker from closing from the control room
B	9/5/78	Y	N		Op check
A	9/5/78	Y	Y		Surv. run
B	8/15/78	Y	Y		Surv. run
B	8/15/78	Y	N		Stopped manually due to low lube oil level-can add oil when running if needed
A	8/10/78	Y	N		Reactor tripped
B	8/10/78	Y	Y		Surv. run
A	8/10/78	Y	N		Op check
A	8/10/78	Y	N		Op check
A	8/1/78	Y	Y		Surv. run
A	7/19/78	Y	N		Test run
B	7/19/78	Y	N		Test run-prior to removing A from service
B	7/18/78	Y	Y		Surv. run
A	7/18/78	Y	N		Op check-B out of service
A	7/18/78	Y	N		Op check-prior to removing B from service.
A	7/4/78	Y	Y		Surv. run
B	6/20/78	Y	Y		Surv. run

SET	DATE	START	LOAD	FAIL	REMARKS
B	6/15/78	Y	N		Op check
A	6/15/78	Y	N		Op check-B out of service
B	6/5/78	Y	Y		Run for tech rep inspection
A	6/5/78	Y	Y		Surv. run
A	5/24/78	Y	Y		Troubleshoot-unloaded sat.
A	5/23/78	Y	Y		Would not unload from the control room
B	5/22/78	Y	Y		Surv. run
B	5/21/78	Y	N		Troubleshoot
B	5/21/78	Y	N		Troubleshoot
B	5/21/78	N	N		Troubleshoot
B	5/21/78	N	N		Troubleshoot
B	5/21/78	N	N		Troubleshoot
B	5/21/78	N	N		Troubleshoot
B	5/21/78	Y	N	Y	Output breaker would not close
A	5/14/78	Y	Y		Loss of offsite power-B out of service
A	5/2/78	Y	Y		Surv. run
A	4/21/78	Y	N		Manually stopped because the switchgear door was found open
A	4/21/78	Y	Y		Surv. run
B	4/18/78	Y	Y		Surv. run
A	4/4/78	Y	Y		Surv. run
A	3/25/78	Y	Y		Surv. run
B	3/25/78	Y	Y		Surv. run
B	3/21/78	Y	Y		Surv. run
A	3/13/78	Y	Y		Surv. run-B out of service
B	3/13/78	Y	N		Op check-return to service
A	3/10/78	Y	Y		Op check-return to service
B	3/10/78	Y	N		Op check-prior to removing A from service
A	2/28/78	Y	N		Op check-prior to returning to service
B	2/27/78	Y	N		Op check-prior to removing A from service

SET	DATE	START	LOAD	FAIL	REMARKS
A	2/26/78	Y	N		Op check-prior to removing from service
B	2/21/78	Y	Y		Surv. run
A	2/14/78	Y	N		Op check-prior to removing B from service
B	2/14/78	Y	Y		Op check-return to service
A	2/7/78	Y	Y		Surv. run
B	1/29/78	Y	Y		Reactor trip
B	1/17/78	Y	Y		Surv. run
A	1/3/78	Y	Y		Surv. run
A	12/21/77	Y	N		Op check-prior to removing B for maint.
B	12/21/77	Y	Y		Surv. run
B	12/16/77	Y	Y		Op check after maint.
A	12/16/77	Y	N		Op check after maint.
A	12/6/77	Y	Y		Surv. run
B	11/18/77	Y	Y		Op check-return to service
A	11/18/77	Y	Y		Op check-B out of service
A	11/18/77	Y	N		Op check-prior to removing B from service
B	11/16/77	Y	Y		Test run
A	11/15/77	Y	N		Op check
B	11/15/77	Y	Y		Test after maint.-Stopped due to low coolant level; water could have been added during operation, stop was discretionary
B	11/15/77	Y	Y		Surv. run
A	11/15/77	Y	N		Op check
A	11/1/77	Y	Y		Surv. test
A	10/28/77	Y	Y		Test after maint.
B	10/28/77	Y	N		Test prior to taking A out of service
B	10/23/77	Y	N		Op check
B	10/23/77	Y	N		Op check-A out of service
B	10/23/77	Y	N		Surv. run
A	10/23/77	Y	Y		Surv. run

SET	DATE	START	LOAD	FAIL	REMARKS
B	10/22/77	Y	Y		Op check-A out of service
B	10/22/77	Y	Y		Op check-A out of service
B	10/22/77	Y	Y		Op check-A out of service
B	10/21/77	Y	Y		Op check-A out of service
B	10/21/77	Y	Y		Op check-A out of service
B	10/21/77	Y	Y		Op check prior to taking A out of service
A	10/21/77	Y	Y		Under voltage relay dropped on 1A3 bus
B	10/18/77	Y	Y		Surv. run
A	10/8/77	Y	Y		Loss of offsite power test on A side
A	10/4/77	Y	Y		Surv. run
A	10/4/77	Y	N		Troubleshooting
A	10/4/77	Y	N		Troubleshooting
A	10/4/77	Y	N		Troubleshooting
A	10/4/77	Y	N		Troubleshooting
A	10/3/77	Y	N		Troubleshooting
A	10/3/77	Y	N		Troubleshooting
A	10/3/77	Y	Y		Surv. run
A	10/3/77	Y	Y		Surv. run
A	9/26/77	Y	Y		Turbocharger breakdown
A	9/25/77	Y	Y		Surv. run
A	9/24/77	Y	Y		Surv. run
B	9/24/77	Y	Y		Surv. run
B	9/23/77	Y	Y		Op check-SUT out of service
B	9/23/77	Y	Y		Op check-SUT out of service
B	9/22/77	Y	Y		Op check-SUT out of service
B	9/22/77	Y	Y		Op check-SUT out of service
B	9/21/77	Y	Y		Op check-SUT out of service
A	9/21/77	Y	Y		Op test-SUT back in service
A	9/21/77	Y	Y		Op test-SUT out of service
B	9/21/77	Y	Y		Op check-SUT out of service



SET	DATE	START	LOAD	FAIL	REMARKS
A	9/21/77	Y	Y		Op check-SUT out of servi
B	9/21/77	Y	Y		Op check-SUT out of service
B	9/20/77	Y	Y		Surv. run
B	9/6/77	Y	N		Op check
A	9/6/77	Y	Y		Surv. run
A	8/24/77	Y	Y		Surv. run
B	8/24/77	Y	N		Op check
B	8/23/77	Y	Y		Test run
A	8/23/77	Y	Y		Test run
A	8/23/77	Y	Y		Test run
A	8/18/77	Y	Y		Op check-prior to taking B out of service
A	8/18/77	Y	Y		Op check
B	8/17/77	Y	Y		Op check-prior to taking A out of service
B	8/16/77	Y	Y		Surv. run
A	8/16/77	Y	Y		Op check
A	8/2/77	Y	Y		Surv. run
B	7/19/77	Y	Y		Surv. run
A	7/5/77	Y	Y		Surv. run
A	7/5/77	Y	Y		Surv. run-stopped due to load fluctuations-stop was discretionary (added oil to gov.)
B	6/28/77	Y	Y		Surv. run
B	6/21/77	Y	Y		Surv. run
A	6/7/77	Y	Y		Surv. run
B	6/7/77	Y	Y		Op check-P.M. on air start relay valves
A	6/7/77	Y	Y		Op check after P.M.
A	5/31/77	Y	Y		Reactor trip
B	5/31/77	Y	Y		Reactor trip
A&B	5/16/77	Y	Y		Loss of offsite power following a reactor trip-all systems responded as designed
A	5/3/77	Y	Y		Test run-B out of service



SET	DATE	START	LOAD	FAIL	REMARKS
B	5/3/77	Y	Y		Test run after repairs
B	5/2/77	Y	Y		Op check-A out of service
A	5/2/77	Y	Y		Test run after oil change
A	4/30/77	Y	Y		Reactor trip-loss of 1A2 and 1A3
B	4/30/77	Y	Y		Reactor trip-loss of 1B2 and 1B3
A	4/22/77	Y	Y		Op check
B	4/22/77	Y	Y		Op check
B	4/19/77	Y	Y		Op check-stopped due to low tube oil level; could add oil during operation
B	4/19/77	Y	Y		Op check-stopped due to low lube oil level; could add oil during operation
B	4/19/77	Y	Y		Surv. run
A	4/10/77	Y	Y		Test run after fixing air leak
B	4/10/77	Y	Y		Op check-air leak on A airstart sys.
A	4/9/77	Y	Y		Surv. run
B	4/9/77	Y	Y		Surv. run
A	4/5/77	Y	Y		Surv. run
B	3/15/77	Y	Y		Surv. run-was completed satisfactorily-tripped on reverse current when taking D/G off the line
B	3/15/77	Y	Y		Surv. run
A	3/15/77	Y	Y		P.W.O. test
A	3/8/77	Y	Y		Surv. run
B	3/8/77	Y	N		Op check
A	3/8/77	Y	N		Op check-stopped due to low lube oil level; could add oil during operation
B	3/8/77	Y	Y		Op check-A out of service
A	3/2/77	Y	N		Test run
A	3/1/77	Y	Y		Surv. run
B	3/1/77	Y	N		Op check-A out of service
A	3/1/77			Y	Attempted to start for surv. run (failed to start because of unreset overspeed trip following generator lockout)
B	2/22/77	Y	N		Generator trip test
A	2/22/77	Y	N		Generator trip test

SET	DATE	START	LOAD	FAIL	REMARKS
A	2/22/77	Y	N		Support for reactor trip
B	2/22/77	Y	N		Support for reactor trip
B	2/15/77	Y	Y		Surv. run
A	2/2/77	Y	N		Op Check
B	2/2/77	Y	N		Op check
A	2/1/77	Y	Y		Surv. run
B	1/21/77	Y	Y		Op run
B	1/20/77	Y	Y		Op run 1 1/2 hrs
A	1/20/77	Y	Y		Op run 1/2 hr
A	1/20/77	Y	N		Op run
A	1/20/77	Y	N		Op run
A	1/19/77	Y	N		Op run
A	1/19/77	Y	N		Op run
A	1/19/77	Y	N		Op run
A	1/19/77				Failed to start - troubleshooting
A	1/19/77			Y	Failed to start
A	1/18/77	Y	Y		Op check
A	1/18/77	Y	N		Op check
B	1/18/77	Y	Y		Turbocharger breakdown
B	1/7/77	Y	Y		Surv. run
A	1/7/77	Y	N		Op check
A	1/7/77	Y	N		Op check
A	1/6/77	Y	N		Op check
A	1/6/77	Y	N		Op check-B out of service
A	1/5/77	Y	Y		Surv. run
B	1/3/77	Y	N		Run to check oil level after maint.
B	12/21/76	Y	Y		Surv. run
A	12/7/76	Y	Y		Surv. run
B	11/29/76	Y	Y		Surv. run
A	11/19/76	Y	N		Op check

SET	DATE	START	LOAD	FAIL	REMARKS
A	11/7/76	Y	N		Test run
A	11/2/76	Y	N		Maint. test run
A	11/2/76				Troubleshooting associated with the failure of 11/1/76
B	11/1/76	Y	N		Op check
A	11/1/76			Y	Failed to start
B	10/19/76	Y	Y		Surv. run
A	10/5/76	Y	Y		Surv. run
B	10/1/76	Y	N		Test run-working on the Kw-hr meter
B	9/27/76	Y	N		Op check-stopped to add coolant - water could have been added during operation, stop was discretionary
A	9/24/76	Y	N		Op check
B	9/24/76	Y	N		Op check
A	9/17/76	Y	N		Started to do periodic test of C.I.S.
A	9/7/76	Y	Y		Surv. run
A	9/2/76	Y	N		Test run
B	8/17/76	Y	Y		Surv. run
A	8/13/76	Y	N		D/G A channel check
A	8/10/76	Y	N		Op check
B	8/10/76	Y	Y		Surv. run
A	8/6/76	Y	N		Op check-prior to removing B from service
A	8/3/77	Y	Y		Surv. run
B	8/1/76	Y	N		Initiation of 1B C.I.S.
B	8/1/76	Y	N		Initiation of 1B C.I.S.
B	7/31/76				Troubleshooting failure to start on C.I.S.
B	7/31/76			Y	Initiation of 1B C.I.S.-B failed to start
A	7/31/76	Y	N		Initiation of 1A C.I.S.
B	7/20/76	Y	Y		Surv. run
A	7/6/76	Y	Y		Surv. run
A	6/21/76	Y	N		Op check-prior to maint.
B	6/21/76	Y	N		Op check-prior to maint.
B	6/15/76	Y	Y		Surv. run

SET	DATE	START	LOAD	FAIL	REMARKS
B	6/2/76	Y		Y	Tripped due to abnormal current phase 1
B	6/2/76	Y	Y		Troubleshooting
B	6/2/76	Y	N		Test of relay
A	6/2/76	Y	Y		Test sync. verification
A	6/1/76	Y	N		Would not sync. with loaded bus (would not occur in emergency operation)
B	5/26/76	Y	N		Op check
A	5/26/76	Y	N		Op check-prior to removing B from service
A	5/26/76	Y	N		Op check-prior to removing B from service
B	5/20/76	Y	N		Test after maint.
A	5/20/76	Y	N		Op check-prior to removing B from service
B	5/18/76	Y	N		Test run
A	5/18/76	Y	N		Op check after maint. (sluggish start)
B	5/18/76	Y	Y		Surv. run
B	5/17/76	Y	N		Op check-A out of service
A	5/17/76	Y	N		Op check-B out of service
B	5/17/76	Y	Y		Surv. run
A	5/4/76	Y	Y		Surv. run
A&B	5/1/76	Y	N		Op check-prior to taking out line #1
A&B	5/1/76	Y	N		Op check-prior to taking out line #2
A	4/30/76	Y	Y		Pick up B SUT- 1 1/2 hrs.
B	4/30/76	Y	Y		Pick up B SUT- 2 hrs.
B	4/20/76	Y	Y		Surv. run
B	4/20/76	Y	Y		Surv. run
A	4/6/76	Y	Y		Surv. run-KW indicator chart indicated fluctuations; problem was in the chart not the generator

