

1 **B-24 Gas Turbine Condition Assessments, \$307,100**

2 Q. Provide details of operating problems, other than normal maintenance,
3 experienced at the Hardwoods gas turbine site over the period 2001 to
4 2006F.

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7 A. There have been numerous instances when either of the two gas turbines
8 has failed to start, or one or both of the two gas generators at this facility has
9 been unable to achieve rated output, or one or both gas generators has
10 tripped or other failures have occurred. A portion of the station log is
11 appended.

Hardwoods GAS Turbine Station Log History

Date	Event	Details
2001		Station log missing
1/9/2002	GGB Fuel leak	Fuel pump repairs
1/9/2002	Fuel system trouble	Fuel heater not working
1/11/2002	GGB Fuel leak	Fuel pump repairs
1/18/2002	Air Temp Regulators	Replaced temperature probe
1/24/2002	GGA & GGB failed start	Several attempts Incomplete sequence Failed to light off
1/25/2002	Lube oil problems	Replaced oil gauge on MLO pump # 1
1/29/2002	GGB Trust Bearing Trouble	Thermocouple failed
1/31/2002	GGA & GGB failed start	Incomplete sequence Had to run lube system in manual prior to start to warm oil
2/5/2002	Lube oil problems	Re-circulated oil and governors to maintain temperatures
2/8/2002	GGA & GGB failed start	Incomplete sequence. No flame. Had to run oil and governor pumps for temperature
2/10/2002	Failed to start	Dc ground. Failed control relay.
2002--02-12	Bearings low temp	Circulated oil to warm up.
2/13/2002	Failed start	Incomplete sequence. No flame. Had to run oil and governor pumps for temperature
2/13/2002	DC ground	Failed control relay
2/14/2002	Lube oil problems	Low temperature. Installed heat tracing and pipe insulation.
2/19/2002	Engine expansion joint inspection	
2/19/2002	Compressor # 1 problems	Unloader repairs and gauge replaced.
2/22/2002	Computer problems	Monitor replaced
	Halon fire protection system replaced	
3/1/2002	with inergen system	
3/5/2002	Lube oil problems	Changed demister filter
3/11/2002	Lube oil problems	Secure guard on lube pump motor
3/18/2002	DC ground	Ground on DC lube pump # 2
3/21/2002	DCS Logic changes	EGT mod's
3/22/2002	DC ground	Control relay in charger
4/4/2002	Fuel system trouble	Pump # 1 new shaft and impellar
4/8/2002	GGA failed start	Lube failure on first try
4/12/2002	Lube system trouble	Failed control relay
4/15/2002	Lube oil problems	Demister failure due to faulty control relay
4/18/2002	Lube oil repairs	Repairs to Demister and evaporator
4/22/2002	GGA failed start	Incomplete sequence
4/23/2002	Lube oil system problems	System not shutting down on GT stop.
4/24/2002	Compressor problems	New breaker installed
4/26/2002	Compressor problems	Unloader failure
4/29/2002	Compressor problems	Oil level switch problem
5/1/2002	Compressor problems	Unloader failure
5/6/2002	GGA failed start	Incomplete sequence
5/8/2002	Generator trip	TRTD failure
5/9/2002	Site assessment	Begin of site assessment for oil contamination
5/14/2002	GGA & GGB louvers	Contractor installing louvers
5/16/2002	Lube oil problems	Oil leak in jacking pump
6/4/2002	GGA failed start	Incomplete sequence
6/6/2002	Fuel system repairs	Repairs made in off-loading area
6/12/2002	Air compressors replaced	
6/18/2002	Installed heat tracing cable on GGB	
6/28/2002	AVR fault alarm	Reset, no problem found
7/15/2002	GGA failed start	EGT Alarm
7/16/2002	GGA failed start	EGT Alarm
7/16/2002	Lube oil System alarm	High Temp alarm
7/16/2002	GGA trip	Clutch malfunction
7/17/2002	Generator high temp alarm	Glycol system trouble
8/6/2002	Lube oil system trouble	Demister louver repaired
8/12/2002	GGA Exhaust stack	Repairs
8/14/2002	GGA Expansion joint	Repairs
8/16/2002	Replaced computer monitor	
8/20/2002	GGA Repairs	Replaced bottom deflector ring
9/3/2002	GGB Exhaust stack repairs started	
9/6/2002	GGB expansion joint repairs started	
9/23/2002	GGA install fire louvers	
9/24/2002	GGB install fire louvers	
9/27/2002	Unit controls	Work on control boards
9/30/2002	Generator Filters replaced	
10/3/2002	GGA Inspection	Entry guide vanes inspected
10/30/2002	Speed switch failure alarm	DCS card failure
11/8/2002	GGA failed start	
11/8/2002	Generator showing 75 rpm at stop	control card failure
11/19/2002	GGB fuel leak	failed Jordan valve
12/2/2002	Jacking pumps cutting in and out	DCS control card failure
12/6/2002	DCS control problem with speed	Card failure
12/13/2002	N4 speed switch repairs	
2003		Station log missing

2004	Station log missing
1/19/2005 Cooling system	replaced float switch in glycol tank
1/20/2005 Fuel leak	Leak on main fuel filters
1/24/2005 GGA Failed start	Incomplete sequence on first attempt
1/26/2005 Air syatem trouble	Pressure switches repaired
12/28/2005 DC Ground	Ground on standby diesel
2/7/2005 Cooling system	Glycol conditioner added
2/8/2005 Cooling system	Glycol level switch repaired
2/23/2005 Air system trouble	Air line frozen
3/1/2005 Fuel system trouble	Calibrate fuel gauge
3/9/2005 Start fail	No ready lights
3/31/2005 Ready lights out	Battery ground
4/11/2005 Asbestos site assessment	
4/12/2005 Generator trouble	Excitor trouble
4/22/2005 Replaced Brg # 3 vibration pickup	
5/2/2005 Failed start	Vibration alarm
5/3/2005 Cooling system trouble	Glycol Fan # 2 noisy bearing
5/17/2005 T5 Rad fan repairs	
5/19/2005 GGB Snow Doors	Repair grease lines
5/26/2005 Fuel system trouble	Varec gauge calibrated
Air Dryer and GGB snow doors	
3/30/2005 repaired	
6/7/2005 Installed air conditioning unit	
6/8/2005 Standby diesel fuel tank replaced	
6/9/2005 Fuel leak	Identified fuel in ground between fuel forwarding building and unit.
6/13/2005 Unit available in emergency only	Has to be personal on site due to fuel leak
6/15/2005 GGB unavailable	Failed snow doors
6/23/2005 Control cables	Had to be relocated due to fuel lines replace
6/28/2005 GGB Snow doors	repairs to oil lines to snow doors
Control building roof repairs by	
7/4/2005 contractor	
7/27/2005 Fuel System	Contractor started installation of motorized fuel valves
	Contractor completed replacing fuel lines between fuel forwarding building and units as well a sump drain lines
8/4/2005 Fuel system laeks	as a result of fuel leak
8/4/2005 GGA & GGB Inspections	Hot end inspections completed
8/10/2005 Logic changes for motorized fuel valve	
8/11/2005 GGB EGT problems	Fuel nozzels checked and logic changes
8/12/2005 GGB failed start	Fuel nozzel leaks. GGB unavailable thru weekend. Replaced flex line
8/15/2005 GGB EGT trip	
8/16/2005 GGB EGT	interchanged nozzels 6 & 8
8/17/2005 GGB EGT	Interchanged nozzels from A to B and swapped thermocouples. No success
8/19/2005 GGB Logic	Breaker must be open in order to start GGB
8/22/2005 Field ground alarm	
8/23/2005 Generator stator filter alarm	Field brush connection broken
8/23/2005 Generator Field	Repairs to brush connection on alternator
8/29/2005 GGA EGT trip	GGA clutch malfunctioned on shutdown as well
8/31/2005 GGB EGT trip	Two attempts
9/2/2005 GGB EGT trip	EGT trip on 3 attempts
9/2/2005 GGA Clutch failued	Suspected proximity switch
9/19/2005 GGA Clutch Sticking	
9/19/2005 GGB EGT	Nozzels interchanged and changes to logic
9/20/2005 GGB EGT	Logic changes and repairs to nozzel fuel leak
9/21/2005 GGB EGT Trip at 18 Mw	
9/27/2005 GGA failed start	Incomplete sequence. Started on 3rd attempt
9/15/2005 Multiple alarms	Lightning strike. Vibration relan and annunciator cards damaged
11/10/2005 Sump level logic modified	
11/15/2005 GGB EGT	Nozzels removed
11/16/2005 GGB EGT	Rolls Wood and ABB rep's on site for inspection. Fuel leak on startup
11/17/2005 Unit controls DC ground	GGB Tested to 18 mw where EGT tripped
11/21/2005 GGB Snow doors	Air leak
11/23/2005 GGA Vibration Alarm	Alarmed on startup, reset okay
12/15/2005 Fuel leak	Failed safety valve in fuel forwarding building. All 3 valves replaced.
12/20/2005 GGB Fuel	Jordan valve replaced