MAINTENANCE INFORMATION SYSTEMS

A maintenance information system is a necessary part of a good maintenance program. Such a system makes the maintenance program more effective and reduces its cost in the long run. A suitable system allows the maintenance manager to gather data to support maintenance decisions. It includes equipment failure data that may be fed back to designers or manufacturers, used for process hazard evaluation (see PRC.1.13.0), or sent to the purchasing department to support changes to specifications or to support the selection or avoidance of particular vendors or equipment types. The maintenance information system is also a valuable resource for the planning department to use when preparing job packages for future maintenance work.

The maintenance information system provides:

- An easily retrievable historical record for each major piece of equipment or group of similar equipment. This record should include the original specification information, manufacturer, a history of operation time and conditions, and a record of inspection results and of all maintenance performed.
- Equipment inspection and service schedules that specify the inspection and service scope and standards. The schedule should indicate which safety precautions apply and which permits are required during each activity (for example, see PRC.1.9.0). When fire protection equipment or systems are involved, proper backup procedures should be required (see PRC.1.1.0).
- A persistent follow-up or tracking system to ensure that proper inspection and maintenance service are being performed according to schedule.
- An equipment repair and maintenance task priority assignment system that automatically increases the priority of deferred jobs.
- Specifications for special replacement parts and materials for individual pieces of equipment so that proper parts and materials are used during maintenance procedures. A list of qualified suppliers for these items should be maintained. Management of change procedures should be followed before any substitutions are authorized. See PRC.1.0.2.
- An inventory of spare parts and an inventory control system. The control system should include written procedures for proper storage of large, complex or sensitive parts such as turbine rotors, electric motors or coils, or electronic modules.
- Programs to analyze the effectiveness and cost of inspection and maintenance procedures.
- Written notification to management and other affected departments so they will be promptly alerted when critical or safety-related components and systems are out of service for maintenance or any other reason.

In most organizations, the maintenance information system uses computers to assist in program management. With the present state of the technology, there is no reason that even small organizations cannot benefit from the relatively low-cost computer equipment and maintenance management software available.

Operating Logs

Operating logs are not generally a part of the maintenance information system; however, they may provide valuable information to it. To be effective, any log program requires the following attributes:

- The information must be gathered regularly. Even less desirable information, regularly collected, may be better than the right information, gathered haphazardly. For example, consider a pump that is being pulled out of alignment by process temperature changes. While daily vibration readings might be the most efficient way to disclose this condition, it is also true

that reliable hourly bearing temperature readings may bring the problem to the attention of an astute reviewer faster than vibration readings which are taken “as the opportunity presents.”

- The information that is selected for collection should be complete enough for intelligent interpretation. For example, turbine bearing temperatures are more valuable if the load on the turbine at the time of the reading is also recorded.
- The information is periodically reviewed by a maintenance engineer. Too often, loss investigations reveal meticulously gathered data showing a steady, unexplained rise in vibration level or a steady, unexplained drop in performance — that no one noticed until the crash.

Operating logs for any but the most rudimentary equipment must be custom designed. Logs are so important that preparation or review by an independent specialist is recommended. As examples, sample log sheets for small, low-pressure heating boilers and small, compression-type, fluorocarbon air conditioning machines are shown in Figures 1 and 2.

OVERVIEW FORMS PACKET
(See GAP.1.3.0 in the OVERVIEW Manual)
Published as part of Global Asset Protection Services LLC

SUGGESTED BOILER LOG SHEET

NOTE: This log is suitable only for boilers in heating systems which return 100% of the condensate to the boiler or which circulate hot water. It is not suitable for steam boilers with safety valves set higher than 15 psi (1.03 bar) or water boilers operating at greater that 160 psi (11 bar) or 250°F (121°C).

Boiler Number _____ Person Responsible for Boiler _____ Phone Number _____

Inspector's Name/Agency _____ Phone Number

Last Inspection ____ ____ ____ Operating Certificate Expires ____/____/____

Location of Certificate (if not posted) _____

Annual Service ____/____/____ Service Firm _____ Phone Number _____

The following tests and inspections may be recorded on the chart on the reverse side.

☐ **SAFETY OR RELIEF VALVE TEST**. With pressure in the boiler, fully open the valve, using the test lever provided, and let it snap shut. If the valve does not reseat properly, repeat. **If the safety or relief valve cannot be lifted, the boiler must be shut down immediately until the valve can be repaired or replaced.**

☐ **LOW WATER FUEL SUPPLY CUTOUT (LWFCO) RAPID DRAIN TEST**. With the burner in operation, rapidly flush the LWFCO chamber using the drain valve provided. The burner **must** shut off when the device is drained. **If the boiler does not have at least one properly functioning LWFCO, it must not be left unattended until repairs are made.**

☐ **LWFCO SLOW DRAIN TEST**. With the burner in operation, verify the function of the LWFCO by **slowly** reducing the level of the water in the boiler. Great care must be taken to prevent actually firing the boiler with insufficient water. This test should be performed quarterly for steam boilers and annually for water boilers.

☐ **DRAIN WATER GAUGE GLASS**. If necessary, drain and flush the water column and gauge glass.

☐ **BURNER CHECK**. Observe the boiler and burner for a long enough period to be certain that the burner operates normally. Test the combustion safeguard system (if possible).

☐ **CIRC OR COND PUMP CHECK**. For steam boilers, when testing the LWFCO, verify operation of the condensate pump and/or emergency feeder.

☐ **CHECK SYSTEM FOR LEAKS**. The entire system should be examined for leaks of steam and water with particular attention paid to pump and valve packings, automatic air vents, and condensate tank overflow lines. Leaks, in addition to possible water or humidity damage, are wasteful of energy and, over time, will result in scale buildup in the boiler.

☐ **WATER CHEMISTRY CHECK**. Test the boiler water as appropriate for your area. Quarterly is normally sufficient. The frequency must be determined by experience.

CALL YOUR SERVICE FIRM OR BOILER INSPECTOR IF YOU NEED ASSISTANCE WITH ANY OF THESE ITEMS

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GAP.1.3.0

Figure 1. Simple Boiler Log Sheet (front).

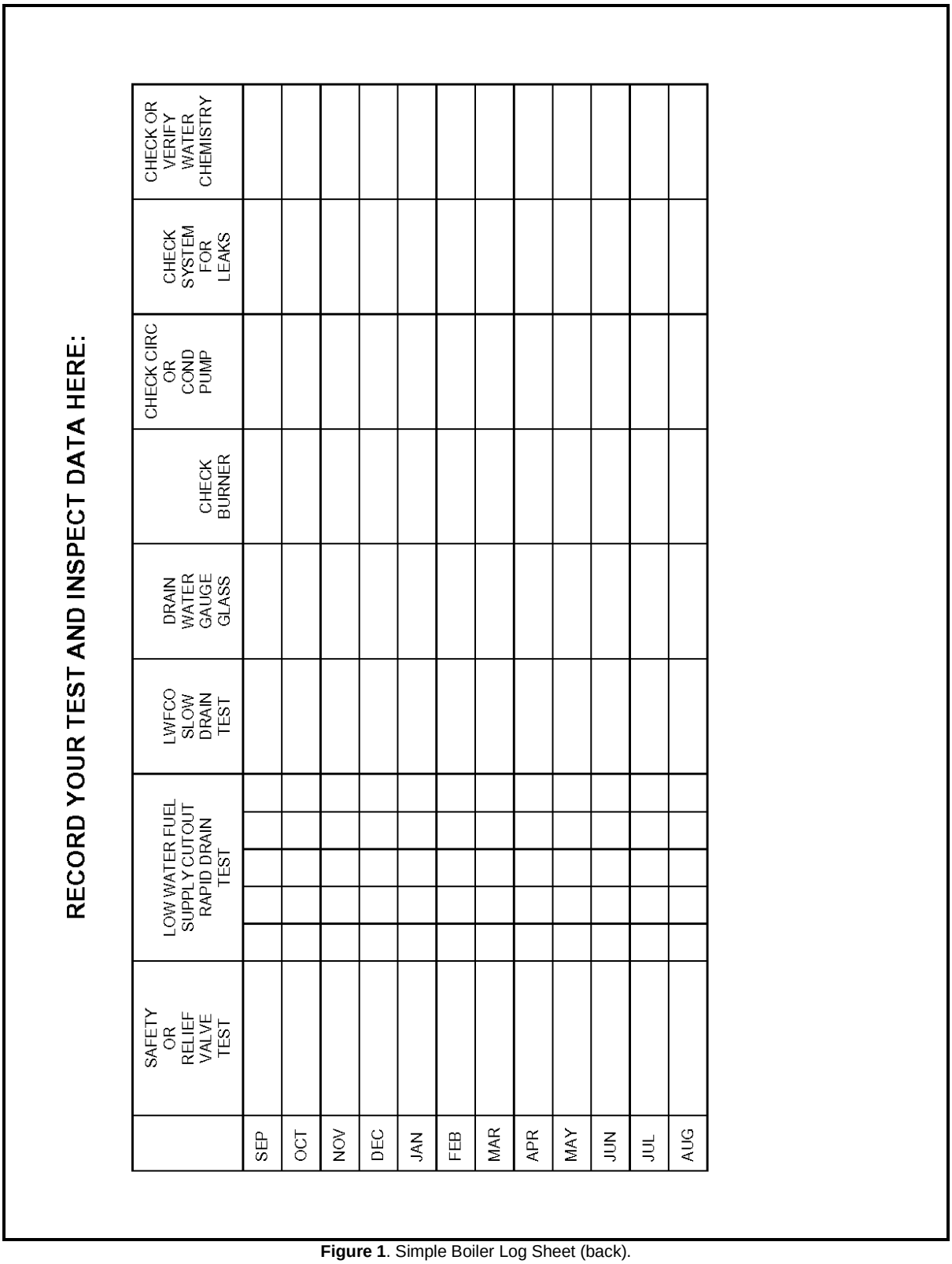
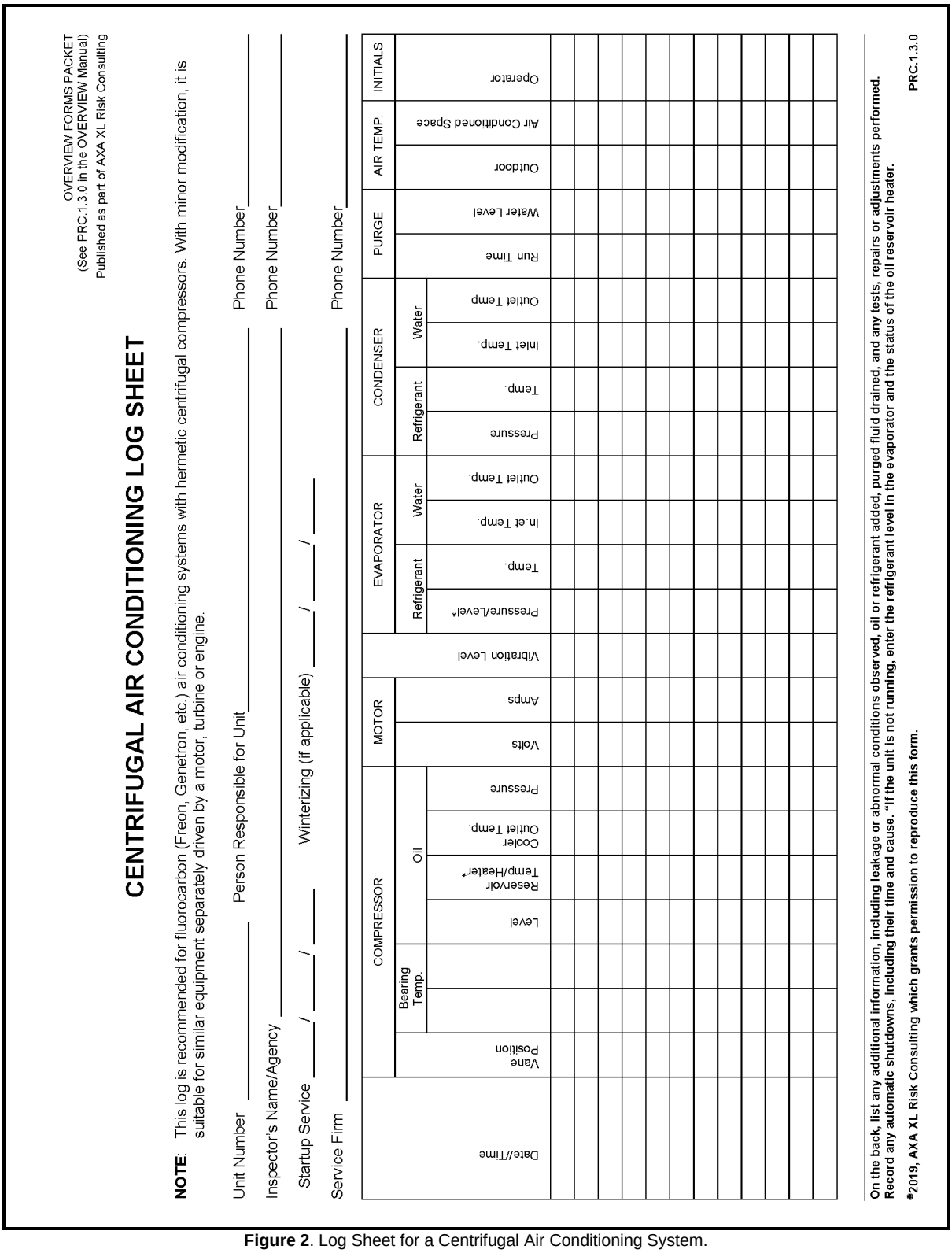


Figure 1. Simple Boiler Log Sheet (back).



OVERVIEW FORMS PACKET
(See PRC.1.3.0 in the OVERVIEW Manual)
Published as part of AXA XL Risk Consulting

CENTRIFUGAL AIR CONDITIONING LOG SHEET

NOTE: This log is recommended for fluorocarbon (Freon, Genetron, etc.) air conditioning systems with hermetic centrifugal compressors. With minor modification, it is suitable for similar equipment separately driven by a motor, turbine or engine.

Unit Number _____ Person Responsible for Unit _____ Phone Number _____

Inspector's Name/Agency _____ Phone Number _____

Startup Service ____/____/____ Winterizing (if applicable) ____/____/____

Service Firm _____ Phone Number _____

Date//Time	COMPRESSOR							MOTOR			EVAPORATOR				CONDENSER				PURGE	AIR TEMP.		INITIALS
	Vane Position	Bearing Temp.		Oil																		
				Level	Reservoir Temp/Heater*	Cooler Outlet Temp.	Pressure	Volts	Amps	Vibration Level	Refrigerant		Water		Refrigerant		Water		Run Time	Water Level	Outdoor	Air Conditioned Space	Operator
											Pressure/Level*	Temp.	In.et Temp.	Outlet Temp.	Pressure	Temp.	Inlet Temp.	Outlet Temp					

On the back, list any additional information, including leakage or abnormal conditions observed, oil or refrigerant added, purged fluid drained, and any tests, repairs or adjustments performed. Record any automatic shutdowns, including their time and cause. "If the unit is not running, enter the refrigerant level in the evaporator and the status of the oil reservoir heater.

PRC.1.3.0

Figure 2. Log Sheet for a Centrifugal Air Conditioning System.