



**State of Tennessee
Department of Children's Services**

Institutional Maintenance and Construction Guidelines

**Division of Facilities Management and
Support Services
7th Floor Cordell Hull Building**

Effective Date: September 2006

Introduction

This document sets forth institutional maintenance guidelines to be followed in compliance with Tennessee Department of Children's Services Policy.

If questions arise concerning any aspects of these guidelines, please do not hesitate to contact the Director of Facilities Management and Support Services at (615) 741-7269 or fax 615-251-9529.

TABLE OF CONTENTS

I.	Organization Concepts	4
II.	Work Requests	5
III.	Maintenance Scheduling and Monitoring	6
IV.	Equipment Inventory System	7
V.	Institutional Grounds	8
VI.	Institutional Structures	9
VII.	Building Roofs	10
VIII.	Building Mechanical Systems	11
IX.	Building Plumbing Systems	12
X.	Building Electrical Systems	13
XI.	Central Heating Plant – Boiler Operation and Care	14
XII.	Air Conditioning	19
XIII.	Water and Wastewater Treatment	20
XIV.	Major Maintenance Funding Requests	21
XV.	Emergency Repairs	22
XVI.	Construction and Renovation Projects	23

SECTION I.

Organization Concepts

General:

This manual outlines essential requirements and provides basic guidelines for institutional maintenance which are consistent with policy. Each superintendent and facility manager is afforded maximum flexibility to establish and sustain a preventive maintenance system suitable for their institution.

Requirements:

The superintendent and facility manager shall develop and implement a management plan for preventative maintenance of their institution.

Guidelines:

The management plan should:

- Define staff assignments and responsibilities
- Provide systematic inspection and maintenance of the facility
- Schedule and complete routine maintenance assignments
- Accommodate emergency repairs and special projects
- Employ an efficient records system

Note:

An approved automated Maintenance Management software program may be used. All references to DCS Forms are for use with a manual records system.

SECTION II.

Work Requests

General: [Maintenance Work Requests \(Form CS-0090\)](#) are standard written records used to initiate maintenance work. This form should be completed by any employee noting a need for maintenance work. Maintenance emergencies may be communicated by telephone; however, Form CS-0090 should still be completed in order to record the work. Conditions which endanger safety or health, disrupt essential activities, impair security, or cause excessive property damage are deemed emergencies.

Requirements: [Maintenance Work Requests \(CS-0090\)](#) shall be used for all maintenance activity.

Guidelines: The facility manager should:

- Ensure that each request is completed and accurately filled out.
- Classify the work, establish priority, and estimate completion time of requested work.

SECTION III.

Maintenance Scheduling & Monitoring

General:

The facility manager is responsible for scheduling and monitoring maintenance work.

Requirement:

The facility manager shall establish and use an efficient method to schedule and monitor all maintenance activities.

Guidelines:

The facility manager should:

- Distinguish new, in process, pending and completed work requests.
- Monitor all work requests to ensure proper completion.
- Maintain records of completed work.
- Use incomplete work orders to establish work backlog.
- Schedule routine preventive maintenance tasks based upon equipment manufacturers recommendations recorded on equipment task sheets (Form CS-0238).

SECTION IV. Equipment Inventory System

General: Cataloguing the location, technical data and maintenance requirements of important pieces of equipment is essential for an efficiently managed maintenance system. Equipment such as pumps, compressors, motors, HVAC controls, alarms, and similar critical items should be included in the inventory system. The facility manager will determine equipment items inventoried.

Requirement: The facility manager shall:

- Assign a number to each inventoried item and record on Form CS-0089 and Form CS-0238.
- Maintain equipment record (Form CS-0089) and master task sheet (Form CS-0238) on each inventory item.

Guidelines: The facility manager should:

- Maintain current information on all equipment inventory items.
- Organize equipment lists, data sheets, task sheets, or files in a manner most convenient to this institution.
- Efficiently schedule maintenance checks.
- Use work order ([Form CS-0090](#)) for any checks/repair required.

SECTION V.

Institutional Grounds

General:

A properly maintained facility will always display well kept grounds and pleasing shrubs in an attractively landscaped setting.

Requirement:

The superintendent shall ensure that facility grounds are neat and well maintained.

Guidelines:

The superintendent, through delegation of responsibilities to facility personnel, should:

- Ensure that grounds are attractively landscaped, lawns mowed, flowers and shrubs groomed.
- Remove litter and piles of junked or surplus items.
- Keep garbage and trash in covered containers.
- Maintain unobstructed ditches and storm drains.
- Ensure that fences, gates, entries, and traps are clear and painted.
- Maintain walks, drives, and parking areas without breaks or deterioration.
- Keep picnic areas clean.
- Keep recreational surfaces well marked.
- Keep gravel drives and parking areas well defined.

SECTION VI. Institutional Structures

General: All institutional structures should be well maintained.

Requirement: The facility manager shall maintain all institutional structures.

Guidelines: The facility manager should:

- Inspect each building twice per year, preferably in the spring and fall of each year, and record findings on Form CS-0239.
- Check that exterior walls are clean, free of cracks, properly caulked and painted.
- Check that roof system is inspected and maintained according to Section VII of this manual.
- Check that doors, windows, and screens are correctly maintained, caulked, and painted with hardware in good working condition.
- Ensure that interior surfaces are free of cracks, holes, broken surfaces, and well painted.
- Requests for major repair and/or replacement should be submitted to the Director of Facilities Management and Support Services.

SECTION VII.

Building Roofs

- General: Each building roof system should be inspected and maintained as part of the preventive maintenance program.
- Requirement: The facility manager, or their designee, shall inspect and maintain all building roofs.
- Guidelines: The facility manager should:
- Inspect each roof every six months, preferably in the spring and fall.
 - Use [Form CS-0239](#) to document roof inspections and maintenance needs.
 - Maintain copies of all roof bonds and warranties.
 - Ensure that necessary repairs are completed as soon as possible by qualified personnel. Minor repairs may be performed by institutional personnel. However, no repairs should be attempted on roofs where warranties remain in effect. Doing so voids any warranty. The Director of Facilities Management and Support Services should be notified within 24 hours of discovery of any roof problem.
 - Requests for major repair or replacement should be submitted to the Director of Facilities Management and Support Services.

SECTION VIII. Building Mechanical Systems

- General: Building mechanical systems should be routinely inspected and repaired as part of an active preventative maintenance program.
- Requirement: The facility manager, or their designee, shall inspect and maintain all building mechanical systems.
- Guidelines: The facility manager should:
- Ensure that mechanical rooms are clean and free of clutter or improper storage.
 - Keep equipment panels and covers in place and properly labeled.
 - Check that system components such as steam lines, gas lines, and water and air lines are properly labeled including flow direction.
 - Maintain mechanical systems leak free without excessive equipment noise or vibration.
 - Ensure that gauges, recording instruments, relief valves, controls, and similar equipment is in place, clean, and operating properly.
 - Maintain all mechanical equipment in proper working order.
 - Keep all steam and condensate lines properly insulated.
 - Ensure that all emergency smoke evacuation systems are tested regularly and necessary repairs completed.
 - In cooperation with the Facility Safety Officer inspect and maintain all life safety systems.

SECTION IX. Building Plumbing Systems

- General: Building plumbing systems should be routinely inspected and repaired as part of an active preventive maintenance system.
- Requirement: The facility manager, or their designee, shall inspect and maintain all building plumbing systems.
- Guidelines: The facility manager should:
- Keep plumbing fixtures clean, leak free, and in good operating order.
 - Make random checks of toilets, showers, faucets, drains, grease traps, and similar equipment.
 - See that floor drains are unobstructed and have proper covers in place.
 - Keep water lines adequately insulated and in good condition.
 - Remove exposed service lines where plumbing fixtures have been removed.
 - In cooperation with the Facility Safety Officer, ensure that all sprinkler systems are regularly tested and necessary repairs completed.
 - Keep plumbing chases clean and free of clutter and improper storage.

SECTION X.

Building Electrical Systems

General:

Building electrical systems require routine inspection and repair as part of an active preventative maintenance system.

Requirement:

The facility manager, or their designee, shall inspect and maintain all building electrical systems.

Guidelines:

The facility manager should:

- Keep electrical rooms clean and free of clutter and improper storage.
- Make sure that electrical panels, breakers, fuses, and disconnects are clearly labeled and well maintained, and with all covers correctly in place.
- Remove all abandoned services, switches, panels, and conduit.
- Ensure that light fixtures are operable with correct coverings in place.
- Maintain all circuits within rated amperage.
- In cooperation with the Facility Safety Officer maintain all fire alarm systems.
- Service and maintain all electronic security systems.

SECTION XI.

Central Heating Plant - Boiler Operation and Care

General:

Boiler plants and equipment must be operated according to rules and regulations published by the State of Tennessee, Department of Commerce and Insurance, Division of Fire Prevention, Boiler and Pressure Vessel Section. Codes and regulations apply to fuel boilers and unfired pressure vessels.

High Pressure Boilers:

High pressure boilers are defined as steam boilers operating at pressures above 15 psig or hot water boilers operating above 160 psig or 250 degrees Fahrenheit.

High Pressure boilers shall have full-time operator attendance. Full time attendance means the presence of a competent operator who never leaves the boiler room for more than 20 minutes.

EXEMPTION #1: The State of Tennessee, Department of Labor, Division of Boiler and Elevator Inspection, Boiler and Pressure Vessel Section has granted a variance at various facilities concerning attendance of a boiler operator for High Pressure Boilers. Those facilities with an approved electronic control and monitoring system (CB-Hawk) are exempt from this requirement. However, a boiler operator shall be assigned to perform normal duties on at least one shift per day, 5 days per week. Operational checks shall be performed a minimum of once per shift on unmanned shifts and weekends in accordance with the approved variance (Use Boiler Monitor Log for these operational checks). These facilities **must** comply with approved variance. A copy this variance shall be readily available and kept in the boiler plant at all times.

EXEMPTION #2: At various facilities there may be a high pressure boiler located in the laundry room which serves only the laundry and is in operation only when the laundry is in operation. In this situation a full time boiler operator is not required, however, operational checks must be performed at intervals not exceeding twenty (20) minutes. The Laundry Supervisor or his designee may be allowed to perform these operational checks.

Low Pressure Boilers:

Low pressure boilers are defined as steam boilers operating at pressures 15 psig or lower, or hot water boilers operating at or below 160 psig or 250 degrees Fahrenheit. Low pressure boilers do not require full-time attendance. Operational checks should be performed a minimum of once per 8 hour shift by personnel designated by the Superintendent/Director. These operational checks should include inspection of the following:

- Water Level
- Steam Pressure and/or
- Hot water pressure and temperatures
- Leaks

Any deficiencies should be reported to the Facilities Manager.

During one shift per day, five days per week, a boiler operator should complete these operational checks as well as perform the daily, weekly, monthly and annual requirements specified.

Hot Water Heaters:

Hot water heaters equipped with ASME-National Board-stamped safety relief devices are exempt from registration, inspection and certificate requirements of the Department of Labor, Division of Boiler and Elevator Inspection, Boiler and Pressure Vessel Section.

These domestic service hot water heaters shall have a temperature and pressure relief valve. The additional requirements of this section do not apply to domestic service hot water heaters.

RECOMMENDATIONS:

It is recommended that the monthly and annual operational checks and requirements be performed under a preventative maintenance contract.

Maintenance contracts are **strongly recommended** for high pressure systems.

Requirements: A.

DUE TO THE SERIOUS, EXPENSIVE AND POTENTIALLY LIFE THREATENING CONSEQUENCES OF NEGLIGENT BOILER OPERATION AND MAINTENANCE, ALL SPECIFICATIONS IN THIS SECTION ARE MANDATORY.

Unless indicated otherwise, the following requirements apply to high and low pressure boilers. Each facility manager should select those items which apply, include manufacturer's recommendations, and prepare operational check lists tailored to their own needs.

B. General: The facility manager shall:

- Employ qualified boiler room supervisors and equipment operators.
- Regularly monitor and evaluate the job performance of boiler room supervisors and operating staff.
- Take appropriate disciplinary action against supervisors and operators who fail to complete the requirements of their job performance plan or the requirements of this manual.

- Apply to the Department of Labor and secure permission for the installation of any boiler or unfired pressure vessel.
- Obtain a certificate of inspection permitting operation of a newly installed boiler or unfired pressure vessel.
- Post certificate of inspection, under protective glass, in boiler room or near unfired pressure vessel.
- Never allow repairs to any boiler or vessel by a person of firm not properly licensed by the State to perform this type of work.
- Never weld, have any welding performed, or make major repairs until written instructions authorizing such repairs have been issued by the Department of Labor or a Tennessee commissioned inspector.
- Maintain manufacturers' manuals, containing information about boilers and auxiliary equipment, in the boiler plant area.
- Post written procedures for start-up, normal operation, shut down and storage of idle boilers which follow manufacturers' recommendations.
- Identify and inventory major pieces of equipment which require routine preventive maintenance and produce data sheets and task assignments as required in Section IV.
- Maintain detailed maintenance records which record the date, description of task performed, identify the person who performed the work, and identify the parts replaced, repaired or cleaned.
- Follow manufacturer's recommended lubrication procedures and schedules.

C. Daily: The Boiler Room Supervisor and/or operator shall:

- Check and record exhaust gas temperatures from two different firings. **(HIGH PRESSURE ONLY)**
- Check and record steam pressure at least three times per eight-hour shift. **(HIGH PRESSURE ONLY)**
- Check unstable water level resulting from contaminates in boiler, boiler overload, or malfunctioning feedwater pumps, water level controls, or related equipment. Determine cause of unstable water level and repair.
- Check burner operations to ensure properly functioning air controls and burner cleanliness.
- Check motors and auxiliary equipment for proper operations; repair if necessary.
- Check and record boiler blowdown, adjust blowdown frequency, based upon the chemical conditions and quantity of feed water used.

- Check that blowdown valve does not leak.
- Check automated blowdown systems to ensure against excessive release.
- Check that daily boiler records and analytical reports (Forms CS-0240 and CS-0241) are used and properly completed **(HIGH PRESSURE ONLY)**.
- Check water chemical treatment to ensure efficient and proper treatment of boiler water **(HIGH PRESSURE ONLY)**.
NOTE: In low pressure installations and high pressure installations, with an authorized electronic control and monitoring system installed, the items listed above shall be performed during the manned shift.

D. Weekly: The Boiler Room Supervisor shall:

- Check exhaust gas compositions and temperature at different firing positions. Adjust burner to achieve the following recommended amounts. **(HIGH PRESSURE ONLY)**

<u>Fuel</u>	<u>Oxygen (%)</u>	<u>Carbon Dioxide (%)</u>
Natural Gas	1.5	10.0
No. 2 fuel oil	2.0	11.5
No. 6 fuel oil	2.5	12.5

- Check relief valve leaks, obtain qualified repair if needed.
- Check water level control by stopping feedwater pumps and observing if water level control stops fuel flow to burner.
- Check that water level control does not allow water level to boiler to drop below recommended low level.
- Check pilot and burner assemblies; clean according to manufacturer's instructions.
- Check spark gap, electrode conditions and burner condition.
- Check boiler operating characteristics by observing flame failure and re-start.

E. Monthly: The Boiler Room Supervisor and/or operator shall:

- Check blowdown and water chemical treatment procedure to ensure efficient chemical treatment of boiler water. A service contract is recommended.
- Check and record exhaust gas composition and temperature over the active firing range. Compare these measurements with those of previous months and adjust equipment as needed to obtain desired operation.
- Check combustion air supply for adequate air inlet to boiler room.

- Check and clean combustion air inlet to boiler.
- Check fuel delivery systems, pressure gauges, pumps, filters, and transfer lines; clean and repair as needed.
- Check all belts for damage and proper tension.
- Check packing glands for proper compression and leakage; adjust or repair as needed.
- Check access openings and flame scanner assemblies for air leaks; adjust or repair as needed.

F. Semi-Annual: The Boiler Room Supervisor and/or operator shall:

- Check relief valve operation by manually opening valve while boiler is under normal operating load, observe pressure and force required, adjust or obtain qualified repair as needed.

G. Annual: The Boiler room Supervisor and/or operator shall:

- Clean waterside and fireside surfaces according to manufacturer's recommendations.
- Repair refractors using manufacturer's recommended material and procedures.
- Remove, recondition or replace feedwater relief valves as needed.
- Clean condensate receivers and deaeration system.
- Clean and recondition feedwater pumps.
- Clean and recondition fuel delivery system components such as pumps, filters, burner, pilot, oil preheaters and storage tanks.
- Check electrical systems.
- Check and clean all electrical terminals.
- Check electrical controls; replace defective parts.
- Check mercury switches; replace if needed.
- Check hydraulic and pneumatic valves; repair any leaks.
- Follow start-up and operational procedures.
- Check exhaust gas composition, adjust to give desired results.
- Check oil storage tanks for sludge and water accumulation; clean if needed.
- Ensure that all boilers and auxiliary equipment is inspected annually by Department of Labor or a Tennessee commissioned insurance company boiler inspector.

SECTION XII. Air Conditioning Systems

- General: Air Conditioning and Refrigeration systems should be routinely inspected and maintained as part of an active preventive maintenance program.
- Requirement: The facility manager, or their designee, shall inspect and maintain all facility air conditioning and refrigeration systems and report leakage and usage of controlled refrigerants.
- Guidelines: The facility manager should:
- Inventory all major air conditioning and refrigeration equipment, complete data sheets, maintenance task sheets, and schedule routine maintenance checks.
 - Inventory all refrigerants stored at the facility and report any leaks of refrigerant.
 - Record any changes in inventory or usage of refrigerants R-11, R-12, R-22, R-500 or R-502 using the Refrigerant Equipment Service Form. Reports must be specific. Provide equipment inventory number, location, refrigerant type, amount of refrigerant used, and the date of service. This is also true for equipment taken out of service and when replacement equipment is installed.
 - Ensure that system components and conduit connections are tight and leak free.
 - Make sure equipment and mechanical rooms are clean.
 - Lubricate all equipment according to manufacturer's instructions.
 - Prevent entry of moisture and other contaminants into cooling system.
 - Maintain all safety devices in correct working condition.
 - Maintain current manufacturer's maintenance data for each inventoried piece of equipment.
 - Review operation and water treatment procedures for conformity with manufacturer's recommendations. Correctly lay-up cooling towers which will be idle during winter months to prevent rust and freezing. Consider using maintenance contracts as needed to supplement the skills and manpower available at the facility.

SECTION XIII. Waste and Wastewater Treatment

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- General: Water and wastewater treatment plants must be operated according to the rules and regulations of the Tennessee Department of Environment and Conservation, the Water Quality Control Act of 1977, and the Water Environment Health Act of 1984. All water and wastewater plants are classified according to their size and complexity, and the qualifications of the operators are set accordingly. Only the operator in charge is legally required to be certified, but other operators are encouraged to become certified.
- Requirement: The facility manager shall:
- Employ water and wastewater plant operators who have been certified by the Department of Health and Environment.
 - Ensure that all water and wastewater plants and plant operators comply with the terms and conditions of the permit issued by the Department of Health and Environment, including testing and record keeping requirements.
- Guidelines: The facility manager should:
- Employ qualified operators.
 - Encourage all operators to obtain certification.
 - Respond quickly to maintenance and repair requests submitted by the plant operators.
 - Regularly monitor and evaluate the performances of the plant operators.
 - Ensure that permits are renewed and posted under protective glass in the plant offices.
 - Ensure that all plant equipment is operational and correctly calibrated.
 - Ensure that all logs and reports are completed as required by the Department of Health and Environment.
 - Establish operational check lists to insure that all necessary testing and reporting requirements are met.

SECTION XIV. Major Maintenance Funding Requests

General:

The department's annual appropriation includes a limited funding for major maintenance. Major maintenance funds are set aside for non-routine, non-recurring maintenance projects.

The primary purpose of the major maintenance account is to provide a secondary funding source to institutional maintenance funds in the event of an emergency. Its secondary purpose is to assist institutions with maintenance projects in the \$5,000 to \$99,999 cost range.

Maintenance projects costing \$100,000 or more are classified as Capital Maintenance and are funded through the department's capital budget process and require State Building Commission approval.

Requirement:

If a superintendent finds that a maintenance emergency exists or is about to occur, they shall contact the Director of Facilities Management and Support Services.

Division shall assess the technical problem and obtain the needed technical assistance.

Routine requests for major maintenance funds shall be forwarded to the Facilities Director as part of the capital budget process.

The Facilities Director shall prioritize routine major maintenance requests for consideration as funds become available.

Guidelines:

Additional maintenance needs identified throughout the year should be reported to the Director of Facilities Management and Support Services.

SECTION XV. Emergency Repairs

General: Each institution should be prepared to deal with emergency maintenance/repair needs.

Requirement: The facility manager shall establish provisions for handling emergency repairs or replacement in life-threatening situations.

Guidelines: The provisions should:

- Ensure that prompt service is available in life-threatening situations.
- Provide a listing of emergency telephone numbers to be kept both in Central Operations and in the Maintenance Office. This listing should include emergency telephone numbers for maintenance personnel as well as a telephone listing of potential contractors for all major disciplines (electrical, plumbing, HVAC, utility companies, etc.).
- Ensure that State purchasing guidelines are followed in obtaining bids for repairs and replacement unless doing so would constitute a continuance of a life threatening situation, in which case repairs/replacement should be authorized immediately. Such repairs/replacement shall be properly documented to justify the use of emergency purchase procedures without obtaining bids.

SECTION XVI. Construction and Renovation Projects

General: New construction and the renovation of existing institutional buildings are controlled by the Department of Finance and Administration, Division of Real Property Administration. Construction includes any work which builds new space including additions to existing buildings. Renovation includes major repairs and refinishing of existing buildings to return them to like new condition or change and improve their usefulness. Under these guidelines, removal of partitions or walls, construction of new doorways and windows, change in occupancy type or utility service systems is considered a renovation. Repairs and routine maintenance work, by contrast are not renovation and are the responsibility of the Department of Children's Services.

Requirement: Superintendents shall send written requests for renovation or new construction through the appropriate Executive Director as part of the department's capital budget process.

Guidelines: Superintendents should prepare written project requests which include:

- Project description and justification.
- Proposed method of execution.
- Proposed time schedule.
- Estimated cost.
- When possible, sketches or drawings depicting proposed work.

During construction by private contractors, the facility manager should observe the contractor's work and report obvious problems to the project representative of Division of Real Property Administration in the Department of Finance and Administration and to the central office Director of Facilities Management and Support Services.

The institution should not give directions to the contractor nor should they request favors or changes from the contractor.

In the warranty period following construction, the institution should maintain the newly completed facility and make a record of warranty problems to be corrected. Warranty problems should be reported to both the Department of Finance & Administration, Division of Real Property Administration and to DCS Director of Facilities Management and Support Services.