APPENDIX "E"
INSPECTION AND MAINTENANCE
(From NFPA No. 204)

VENT INSPECTION AND MAINTENANCE

400. Importance

401. Vents should be maintained in operating condition at all times.

402. The malfunction of smoke and heat venting facilities during a fire could have a critical influence on the final outcome, and as a minimum would serve to void an important investment. Vents, like any other mechanical equipment, are vulnerable to poor performance or failure if not inspected and maintained at regular intervals. This is particularly true of units which are intended solely for fire emergency and may not be operated for many years.

410. Frequency of Inspection and Maintenance

411. Frequency of inspection and maintenance is largely influenced by the basic design of the vent and by the nature and severity of its exposure, both internal and external, to corrosive atmosphere and weathering conditions. In view of these variable influences, some of which may not be anticipated or adequately evaluated, the following inspection program is advocated as a sound basic policy, with implementation in accordance with recommendations and suggestions of the vent manufacturer.

(a) An acceptance performance test of all vents should be conducted immediately following installation to ascertain proper operation of all components.

(b) A schedule should be established for the operation of units at frequent intervals. Operation of one-sixth of the units at least every six months under summer and winter conditions is recommended. Visual inspection of units not operated is advised.

(c) All pertinent characteristics of performance should be logged to permit comparison of results with those of previous inspection or acceptance tests. These comparisons will provide a basis for determining need for maintenance or for modifying the frequency of the inspection schedule to fit the experience.

(d) A review of the inspection schedule should be made if there is a change in plant occupancy, or in neighboring plants, which might introduce a significant change in nature or severity of corrosive atmosphere exposure.

From NFPA 90A
APPENDIX A. MAINTENANCE

Failure to maintain proper conditions of cleanliness in air duct systems and carelessness in connection with repair operations have been important contributing causes of several fires which have involved air conditioning systems.

The following recommendations apply, in general, to the period of operation of the system; systems operated only part of the year should be given a thorough general check-up before starting operation and again after shutting down.

1. Fresh Air Intakes.

(a) Conditions outside the fresh air intake should be examined at the time of inspection of the ducts. Items to be noted are, (1) Accumulations of combustible material near the intake, (2) Presence of buildings or structures which may present an exposure to the intake allowing smoke and fire to be drawn in, (3) Operating condition of any automatic damper designed to protect the opening against exposure fire.

(b) If accumulations of combustible material are noted, they should be immediately removed, and arrangements made to avoid such accumulations. Inspections should thereafter be made more frequently. If newly erected exposures are noticed, consideration should be given to the protection at the intake to see that it is adequate. (See 902(e).)

2. Inspection and Cleaning of Ducts.

(a) Inspections to determine the amount of dust and waste material in the ducts (both discharge and return) should be made quarterly, except that if after several inspections such frequent inspection is found unnecessary, the interval between inspections may be adjusted to suit the conditions.

(b) Cleaning should be undertaken whenever inspection indicates the need.

(c) Cooling and heating coils should be cleaned, if necessary, at the time of cleaning the ducts.

NOTE.—Thorough cleaning of ducts may require scraping, brushing, or other positive means. Vacuum cleaning may not remove dust of an oily or sticky nature, or heavy accumulations in the elbows or seams. The amount and kind of dust and dirt will depend greatly on the occupancy and the arrangement of duct system.

3. Inspection and Cleaning of Plenum Chambers.

(a) Plenum chambers should be inspected monthly, except that if after several inspections such frequent inspection is found unnecessary, the interval between inspections may be adjusted to suit the conditions.

(b) Cleaning should be undertaken whenever inspection indicates the need. Where plenum chambers are found used for storage, arrangements should be made to prevent this, such as keeping the doors locked. (See 316(a).)

4. Filters.

(a) All air filters shall be kept free of excess dust and combustible material. Unit filters shall be renewed or cleaned when the resistance to air flow has increased to two times the original resistance or when the resistance has reached a value of recommended replacement by the manufacturer. A suitable draft gage should be provided for the purpose. Draft gages, of a type, which will operate a warning light or produce an audible signal when excessive dust loads have accumulated, are recommended. If the filters are of the automatic liquid adhesive type, sludge shall be regularly removed from the liquid adhesive reservoir.

(b) Filters, intended to be thrown away, after use, should never be cleaned and reused.

(c) Care should be exercised in the use of liquid adhesives. Use of an adhesive of low flash point would create a serious hazard. (See 502.)

(d) Electrical equipment of automatic filters should be inspected monthly, observing the operation cycle to see that the motor, relays and other controls function as intended. Drive motors and gear reductions should be inspected at least semi-annually, and lubricated when necessary.

5. Fans, Fan Motors and Controls.

(a) Fans and fan motors should be inspected at least quarterly, and cleaned and lubricated when necessary. Care should be exercised in lubricating fans to avoid allowing oil to run ont the fan blades. Fans should also be checked for alignment, and to see that they are running freely.

(b) Automatic fan controls should be examined at least once a year to see that they are in operable condition.

6. Fire Doors and Fire Dampers.

Each fire door and fire damper should be examined once a year, giving attention to hinges and other moving parts, to see that it is in good operable condition.

7. Repair Work.

Great caution should be exercised in the use of open flames or spark emitting devices, inside of ducts or plenum chambers, or near air intakes. (See 307.)

8. Inspection Form.

The use of an inspection form to assist in obtaining a thorough inspection is recommended. The form should be made up to fit the system or systems involved, listing the items needing attention.

APPENDIX "E"
OPERATING AND MAINTENANCE INSTRUCTIONS
FOR
ALL BOILERS
"CLEANING NEW BOILER"

When new boiler is placed in service for first time, it should be cleaned in the following manner.

a. Fill boiler until water reaches top of gauge glass.
b. Add soda ash and caustic soda at rate of 1 pound each per thousand lbs. of water in boiler through safety valve opening(1000 lbs. water is 120 gals.)
c. Dissolve chemicals thoroughly before introducing into boiler.
d. Run an overflow pipe from boiler to convenient drain.
e. Start light fire sufficient to boil water without producing steam pressure.
f. Open boiler feed valve sufficiently to allow steady trickle to run from overflow pipe.
g. Boil slowly for 5 hours or longer.
h. Drain boiler. Remove handhole covers or washout plugs, and hose out interior of boiler thoroughly.
i. Refill boiler to normal water line.
j. If water in gauge glass is not clear, repeat procedure, using stronger solution of soda ash and caustic soda and boil for longer time.
k. Aggravated cases of dirty boilers are sometimes better corrected by blowing off under pressure—this should, preferably, be done by someone familiar with that method.
l. At this time, boiler water should be treated.

To minimize corrosion and pitting, the boiler water should be treated with a corrosion inhibiting material. A number of companies specialize in the supply and supervision of water treatment. As a very minimum, if a water treatment service is not retained, purchase and employ one of the single treatment compounds. Never allow a boiler to stand full of raw water for more than a few hours. Immediately after filling the boiler fire it until the temperature reaches 190 degrees F. to drive off free air.

"CARE OF BOILERS IN SERVICE"
GENERAL INSTRUCTIONS

CLOSED SYSTEM—A closed type hot water heating system should be provided with an air compression tank, a relief valve in accordance with ASME Requirements to prevent excess pressure, a combination altitude-pressure gauge and thermometer to indicate amount of water pressure and temperature in system.

1. Black and red hands of altitude-pressure gauge should be together when system is full.
2. Relief valve(s) should be tested by pulling hand lever occasionally to determine that they work properly and that disc reseats tightly

OPEN SYSTEM—An open type hot water heating system should be provided with an expansion tank located at highest point of system. An overflow pipe is connected to the tank to permit escape of excess water. A combination pressure altitude gauge and thermometer indicates height of water in expansion tank.

1. When filling boiler, notice movement of pressure gauge hand and be sure that black and red hands are together when expansion tank is one-third full.
2. Expansion tank and its overflow drain pipe should be so located that they cannot freeze in cold weather.

STEAM HEATING SYSTEM—A steam heating system is provided with a safety valve(s) to prevent excess pressure, a steam pressure gauge to indicate pressure within boiler, and a gauge to show level of water in boiler.

1. Observe rise of water level in gauge glass and open gauge glass drain cock as boiler fills with water.
2. Test the accuracy of gauge glass by using drain cock on water column occasionally.
3. If water does not flow out freely, obstructed cock should be cleaned immediately.
4. It is important that water level indicators operate properly for maintenance of water line.
5. Cocks at top and bottom of water gauge glass should always be open.
6. Safety valves should be tested occasionally by pulling hand lever to be certain that they work properly and that disc of valve reseats tightly.
7. Make sure that steam pressure gauge cock is always open.

STARTING THE BOILER

1. Make certain that valves in piping to heating system are open before starting fire.
2. Dampers must be opened and firebox thoroughly vented.
3. Breeching must fit tightly into stack and should not extend into stack beyond thickness of wall.
4. Follow instructions of manufacturer of firing device (oil burner, gas burner or stoker) to start fire.
5. Increase temperature gradually—watch water level carefully— if it appears necessary to admit more water, do so but determine reason why more water is needed—loss of water from system indicates there is a leak—do not confine investigation to boiler but examine entire system.

Oil burners, gas burners and stokers are automatically controlled but do not leave boiler room after starting fire until it has been determined that burner and automatic controls are working satisfactorily.

ROUTINE OPERATION

1. Do not carry more steam pressure than is absolutely required to heat building.
2. Do not try to operate multiple boiler heating system with one boiler when weather is cold and two boilers are required.
3. If steam valves have been closed for any reason during time one boiler of battery was out of service, those valves should not be opened again until pressure of entire system is equalized.

Appendix E

JORDAN SYSTEMS & FORMS, INC.

CITY OF GREENSBORO
BUILDING DEPT. — HEATING -B-

Date _____

Contractor _____

Address _____

Owner _____

Elec. Cont. _____

B.T.U.-H.P.

A.M. or P.M.

Section _____

Boilers — Steel, Cast Iron — Coal — Gas — Oil — Electric

Chill Water _____
Steam Gen. _____
H.W. Heating _____
H.W. Supply _____
High Pres. Steam _____
Low Pres. Steam _____
Miniature _____

Permit No. _____

CODE 3

TOTAL INSPECTION FEE

CONTRACTOR CODE

Warm Air — Heat Pump — Coal — Gas — Oil — Electric
Air Cond. — Air Cooled — Water Cooled — Electric

Air Condition _____
Heat Pump _____
Baseboard _____
Conversion Burner _____
Heat Exchanger _____
Duct System _____
Duct Unit Heater _____
Floor Furnace _____
Space Heater _____
Unit Heater _____
Wall Heater _____
Inspection Penalty _____
Extra Inspection _____
Fee Due $ _____

Reject

First Inspection _____

Final Inspection _____

C.G.I. _____

PW-10-B

Meter

Inspector
WHT NE560-1

Typical Field Inspection Record for File