Contract To Install Orifice Plates & TRV's at 250 Cabrini Boulevard New York, New York

Contractor agrees to perform heating-system work at 250 Cabrini Boulevard in New York, New York for the sums shown below, to be paid by the Owner. (Note: these prices will hold for thirty days from the date of the Contractor's signature). Prices given are inclusive of any applicable sales tax.

The work is specified in the attached pages of this Contract. The Work does not include asbestos abatement. Any changes to the Work resulting in extra costs will require a change order, to be signed by both the Owner and the Contractor. No substitution of specified equipment or materials shall be allowed without the prior written approval of the Construction Manager. Contractor shall have general-liability and workman's compensation insurance. The Owner and Jonathan Flothow shall each be named as additionally insured parties. All labor and materials will be warranted for a period of one year commencing with receipt of all signoffs. All equipment shall be installed in strict conformance with the manufacturers' recommendations, requirements, and instructions. The work shall conform to all applicable laws, codes, and standards. Contractor is responsible for confirming all site conditions, and for immediately reporting all problems, discrepancies, errors, or omissions relating to the site or this specification to the Construction Manager.

Owner is responsible for removing all cabinetry, furniture, and effects from in front of convector cabinets. Contractor not responsible for surface damage resulting from opening convector cabinets.

Contractor shall keep a list of work completed, making it available to the Construction Manager upon request.

A COPY OF THE ATTACHED SPECIFICATION SHALL BE MAINTAINED ON THE JOBSITE AT ALL TIMES THAT WORK IS BEING PERFORMED!

COST TO INSTALL 355 ORIFICE PLATES, NO TRV'S:	**$**_____
ADDITIONAL COST TO INSTALL 195 TRV'S:	**$**_____
COST TO INSTALL 33 RISER VENTS:	**$**_____
COST TO INSTALL 350 RADIANT BARRIERS:	**$**_____
TOTAL COST FOR PERFORMING ALL ABOVE WORK TOGETHER:	**$**_____
DISCOUNT FOR "NO WAIT" PRICING ON ALL ABOVE WORK:	**$**_____
HOURLY LABOR RATE:	**$**_____
PER-PIECE COST TO INSTALL TRV VALVE-BODY ONLY:	**$**_____

Offered By: Accepted By:

_____ _____ _____ _____

Date Date

("Contractor") ("Owner")

Install Orifice Plates

Description

Every convector valve will be fitted with an orifice-plate, which is about the size and shape of a bottle cap. It fits inside the valve union.

Purchase Orifice Plates

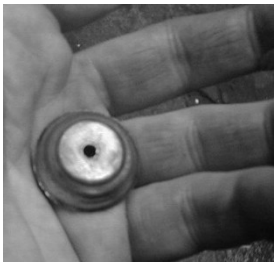
Purchase blank ¾" & ½" orifice plates directly from Tunstall Associates, at (413) 594-8695.

Drill Holes Into Orifice Plates

- Measure the depth and length of the cast-iron convector element. Note: length is measured boss-to-boss.
- Also measure the height of the convector cabinet.
- Use the chart on the following page to select orifice-size.
- Drill the orifice into the approximate center of the plate.
- If a heater is found that is NOT in the chart, notify the Construction Manager, and temporarily install a blank plate.

Install Orifice-Plates

- Install the plate by slipping it into the TRV union, between the tail-piece and valve-body.
- If not carefully installed, the plates can get bent in half, rendering them useless. This can be prevented by applying a small daub of gray dope to the plate to hold it in position on the tail-piece.
- The photo below left shows an orifice-plate after the hole has been drilled into it. The photo at below right shows how a plate fits into a TRV union.



Two-Pipe Heaters Only

Do no work at one-pipe heaters (these are in bathrooms only).

Lobby & Vestibule

- Owner shall open enclosures.
- Vestibule: install a plate with 3/32" orifice into the ¾" hand-valve. No TRV or radiant barrier.
- Two Small Lobby Radiators Near Door: Install blank plates into the ¾" hand valves.
- Large Lobby Radiator: install a plate with 7/64" orifice into the ¾" hand-valve. No TRV or radiant barrier.

Element Length	3½" Deep Element (Casting mark 3B) Cabinet Height 23"	26"	29"	4" Deep Element (Casting mark 4B) Cabinet Height 23"	26"	29"	5½" Deep Element (Casting mark 5C) Cabinet Height 23"	26"	29"	7½" Deep Element (Casting mark 7B) Cabinet Height 23"	26"	29"	Element Length
22"	3/64"	3/64"	3/64"	3/64"	3/64"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	22"
24"	3/64"	3/64"	3/64"	3/64"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	5/64"	24"
26"	3/64"	1/16"	1/16"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	5/64"	5/64"	26"
28"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	28"
30"	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	30"
32"	1/16"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	32"
34"	1/16"	1/16"	1/16"	1/16"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	3/32"	34"
36"	1/16"	1/16"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	3/32"	36"
38"	1/16"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	3/32"	3/32"	38"
40"	5/64"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	3/32"	7/64"	40"
42"	5/64"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	7/64"	7/64"	42"
44"	5/64"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	3/32"	7/64"	7/64"	44"
46"	5/64"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	7/64"	7/64"	7/64"	7/64"	46"
48"	5/64"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	7/64"	7/64"	7/64"	7/64"	7/64"	48"
50"	5/64"	5/64"	5/64"	5/64"	3/32"	3/32"	3/32"	7/64"	7/64"	7/64"	7/64"	1/8"	50"
58"	5/64"	3/32"	3/32"	3/32"	3/32"	3/32"	7/64"	7/64"	1/8"	1/8"	1/8"	1/8"	58"
60"	3/32"	3/32"	3/32"	3/32"	3/32"	3/32"	7/64"	7/64"	1/8"	1/8"	1/8"	1/8"	60"
62"	3/32"	3/32"	3/32"	3/32"	3/32"	3/32"	7/64"	1/8"	1/8"	1/8"	1/8"	9/64"	62"
64"	3/32"	3/32"	3/32"	3/32"	3/32"	3/32"	7/64"	1/8"	1/8"	1/8"	1/8"	9/64"	64"

Install Thermostatic Radiator Valves (TRV's)

Valve Materials

- For ease of installation, valve-bodies should be angle configuration, with the operator-mount opposite the valve inlet (Danfoss 013G8019 for ¾", 013G8014 for ½")
- TRV operators shall be three-part, with the mount, dial, and sensor all separate from each other (Danfoss 013G8564). See photo at right.
- About 75% of the valves are ¾". The rest are ½".

Separate Remote Mounted Dial and Sensor

Valve-Body Installation

- Install the valve-bodies in place of the existing hand-valves.
- Do this work at the same time that orifice-plates are installed.
- Use gray dope and lampwick. Other dopes give off odors that bother some tenants.

Tight Conditions Excluded

Price is based on swapping out hand-valves for TRV's, without having to move the convector core. Moving convector cores in tight spots will be extra work not-in-contract.

Operator Installation

- Use a sharp-point framing-screw to attach a mounted-head cable-tie onto the back or top of the convector cabinet.
- Suspend the sensor so that it lays across the element, passes behind the rail, and hangs just behind the convector's bottom air intake (photo at right).
- Loop up the extra capillary and fasten it with the cable tie.
- Mount the dial onto the baseboard right next to the convector, using two woodscrews. Contractor's option to install the dial at other locations when requested by tenant.

Rooms with Two Convectors

- Install a TRV onto only one of the convectors.
- At the other convector, leave the hand-valve barely open.
- If the hand-valve is inoperable, replace it with a TRV valve-body with no operator (this will be extra work not-in-contract).

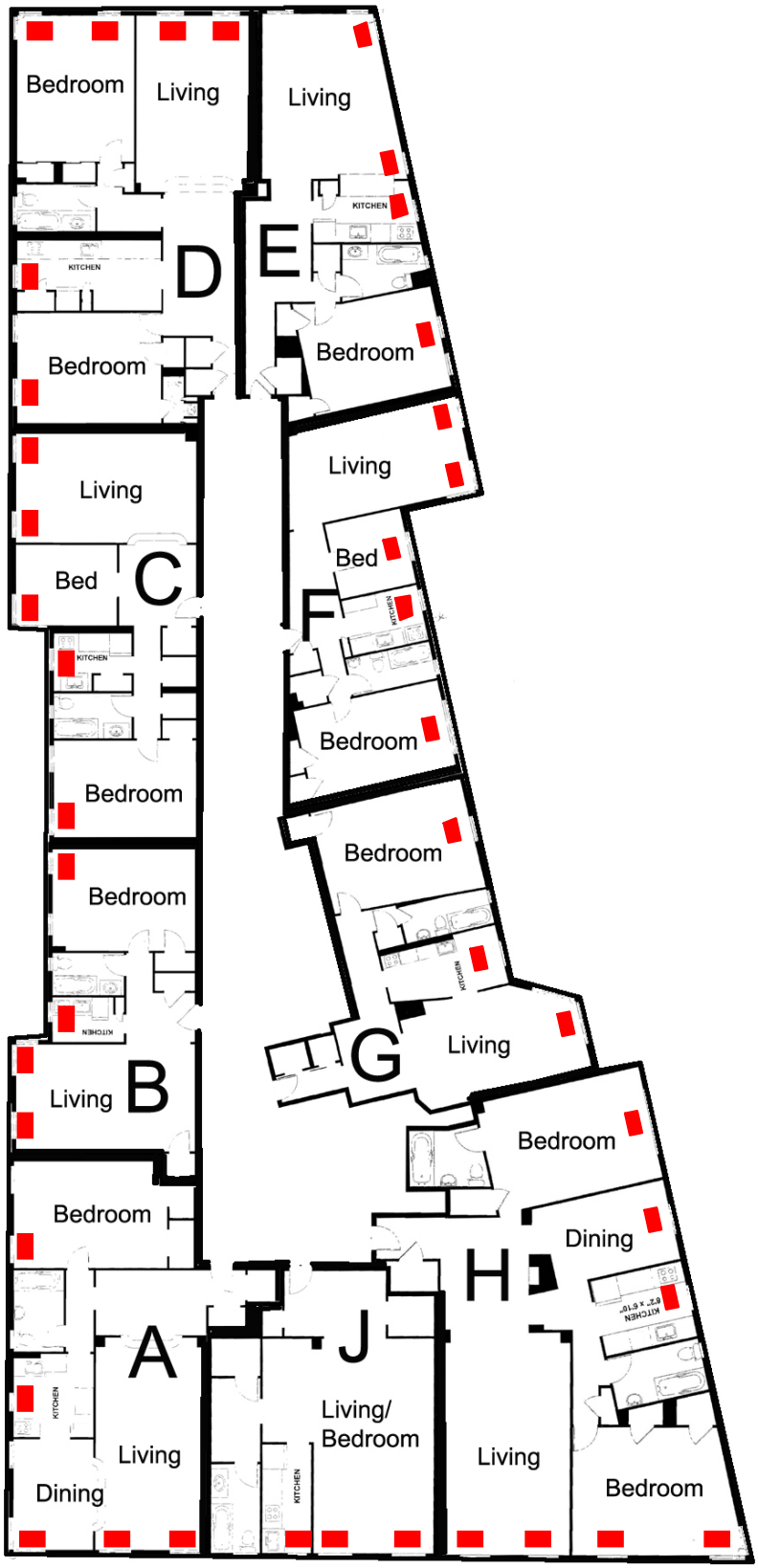
Kitchens

Check each kitchen convector hand-valve. If it is inoperable, replace it with a TRV valve-body with no operator (this will be extra work not-in-contract). In either case, leave the valve barely open.

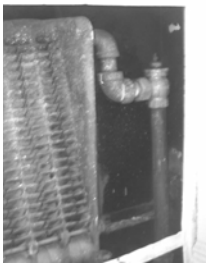
Two-Pipe Heaters Only

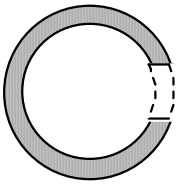
Do no work at one-pipe heaters (these are in bathrooms only).

Typical Floorplan



Riser Vents





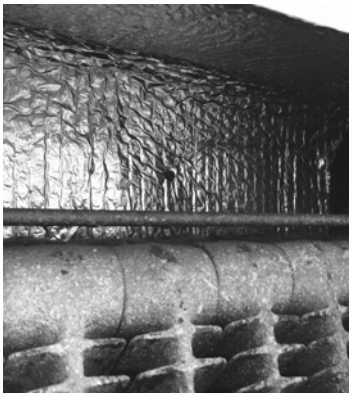
- At the 33 top-floor convectors in bedrooms, living rooms, and dining rooms, install riser vents as follows.
- Drill and tap the ¾" supply takeoff anywhere under the valve. Tapping shall be 1/8" IPS. Use an R-size cobalt drill bit.
- (If the takeoff is ½", do no work, and inform the construction manager.)
- Install a Gorton D vent into the tapping. Seal the threads with gray dope or teflon tape.
- After installation, run the heating system, and make sure the vents don't spit.

Install Radiant Barrier

Description

Install a piece of radiant-barrier type insulation behind each convector core. Do this at the same time as installing orifice-plates.

The barrier acts like a mirror, so simply covering most of the wall behind the convector core is a great benefit.



Material

Radiant barrier shall be double foil-covered bubble type, such as Eco-Foil Double Bubble Foil Insulation or Reflectix.

Installation

- Cut a single piece of radiant barrier, and slide it behind the convector core. It should reach down to the rail, and up to the top. If practical, it should run the full width of the enclosure.
- Notch the barrier as needed to fit around tight spots. Make sure it doesn't bunch up anywhere.
- Fix the barrier in place with at least two sharp-point framing-screws and washers.

Discount for "No Wait" Pricing

Contractor's option to submit a fixed discount on all work, based on Owner agreeing that no more than 15 minutes will elapse between Contractor leaving one apartment and having unencumbered access to all convectors in the next apartment (including time spent waiting for the elevator). The condition of the discount is that time spent waiting in excess of 15 minutes (total per apartment) will be billable at Contractor's hourly rate.

Equipment Takeoff

This information is given to assist the Contractor in bidding, and is not to be considered a comprehensive list of contractually required materials. Pipe, tubing, fittings, ball-valves, wire, conduit, paint, and general supplies are not included.

Count	Item	Make	Model	
±150	Angle Valve-body ¾"	Danfoss	013G8019	_____
±45	Angle Valve-body ½"	Danfoss	013G8014	_____
195	Three-part TRV operator	Danfoss	013G8564	_____
33	Air vent-valve	Gorton	D	_____

From Tunstall Associates:

±265	Orifice plate	Tunstall	Blank ¾"	_____
±90	Orifice plate	Tunstall	Blank ½"	_____

Contract to Perform Boiler-Room Work at 250 Cabrini Boulevard New York, New York

Contractor agrees to perform boiler-room work at 250 Cabrini Boulevard in New York, New York for the sums shown below, to be paid by the Owner. (Note: these prices will hold for thirty days from the date of the Contractor's signature). Prices given are inclusive of any applicable sales tax.

The work is specified in the attached pages of this Contract. The Work does not include asbestos abatement. Any changes to the Work resulting in extra costs will require a change order, to be signed by both the Owner and the Contractor. No substitution of specified equipment or materials shall be allowed without the prior written approval of the Construction Manager. Contractor shall have general-liability and workman's compensation insurance. The Owner and Jonathan Flothow shall each be named as additionally insured parties. All labor and materials will be warranted for a period of one year commencing with receipt of all signoffs. All equipment shall be installed in strict conformance with the manufacturers' recommendations, requirements, and instructions. The work shall conform to all applicable laws, codes, and standards. Contractor is responsible for confirming all site conditions, and for immediately reporting all problems, discrepancies, errors, or omissions relating to the site or this specification to the Construction Manager.

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COST FOR BOILER ROOM RETURN PIPING WORK: **$**_____

COST FOR ALL OTHER WORK: **$**_____

Offered By: Accepted By:

_____ _____ _____ _____

Date Date

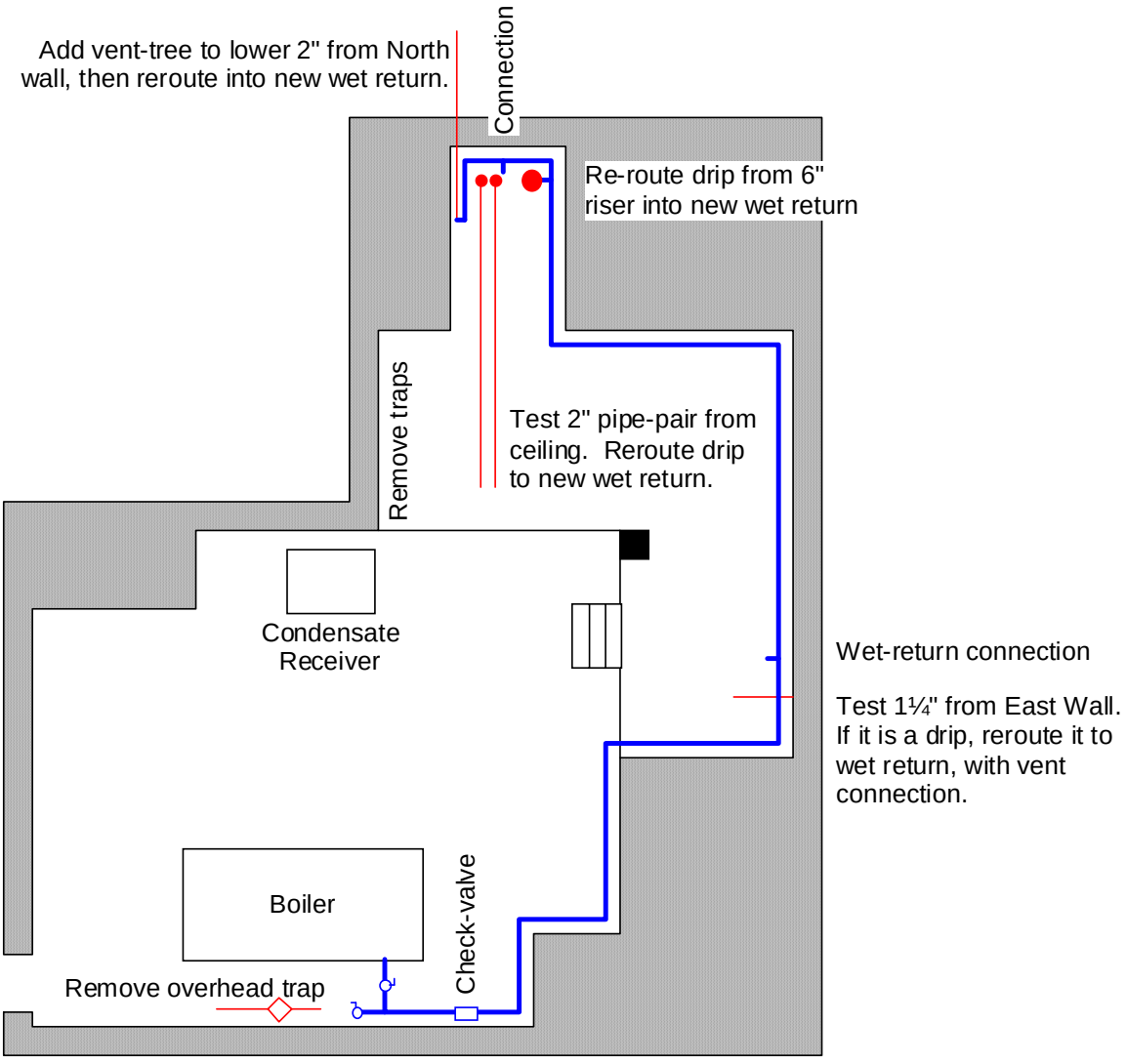
("Contractor") ("Owner")

Boiler Room Return Piping Work

Description

- Pipe a new wet return around the boiler room. Remove all traps. Reroute pressurized drip lines into the new wet return. The radiator returns will still flow into the condensate receiver.
- To confirm which pipes are pressurized drips and which are radiator returns, open three pipes and briefly run the boiler.
- All piping shall be steel.

Plan of Boiler Room Work



New Wet Return

- Run a new 1½" wet return on the floor. Start near the boiler's return connection, then wrap around the boiler room to the North end. Developed run is 80', including verticals.
- Include four 1" drip connections, located as shown.
- On the floor, just before connection to the boiler, include a swing check-valve.
- Past the connection to the boiler, pipe a blowoff. Also pipe a valve into the boiler connection, so the check-valve can be blown off. Valves shall be full-port ball-valves.
- Tie into the pumped return by replacing the 1¼" elbow with a Tee, with the end-port facing down.

Test Overheads

- After all orifice plates are installed, run the system to determine if certain pipes in the boiler room are returns, of if they are pressurized drips from steam mains.
- At the 1¼" pipe that comes in through the East wall hard against the ceiling, open the strainer blowoff (valve #035), and check for live steam.
- In the North corner, a pair of 2" pipes comes in through the ceiling. Test both. Open the nearby strainer blowoff (valve #039), and also the 2" union at the ceiling near the condensate receiver. Live steam should come out of one of them.

Remove Traps: General

- Remove all traps.
- Remove all associated valves and strainers.
- Remove all bypasses.
- Remove all Tee's.
- In general, make it look like there were never any traps. Otherwise, someone will put them back in.

Remove Traps: Locations

- The 1½" trap over the boiler, next to the South wall.
- The two traps next to the condensate receiver.
- The other four traps in the overhead piping.

Vent Connections

- Where indicated below, pipe ¾" connections onto pressurized drips, for main-line vents.
- Locate the vent connection on top of a horizontal pipe, 18" before the elbow going down into the drip-leg. Offset the drip piping as needed.
- Make sure the vent connection is at least 18" above the boiler waterline, but at least 18" below the ceiling.

Reconnect East 1¼" Overhead

- If this pipe is a pressurized return, drip it into the new wet return. Include a capped vent connection. Remove the abandoned overhead piping, and cap the connection at the main.
- If this pipe is *not* a pressurized drip, leave it connected to the overhead piping, with no trap.

Reconnect 2" Pipes from Ceiling

- Drip the pressurized line into the new wet return.
- Leave the unpressurized pipe connected to the overhead piping, with no trap.

Reroute Two Additional Pressurized Drips

Reroute these two pressurized drips into the new wet return:

- The lower 2" coming through the North wall. Include a vent connection.
- The 1½" drip coming off the base of the 6" riser in the North end.

Main Line Vent Trees

Build Trees

- Build two vent-trees of Gorton #2 vents each, as shown in the photo at right. Number of vents will vary.
- Nipples and fittings shall be ¾". Install the vents into ¾"x½" bushings.
- For compactness, use cross-trees and street-elbows as shown.
- Elevate the trees as high as possible.

Install Vent-Tree into Boiler Room

Install a tree with five vents onto the 2" drip coming through the boiler-room's North wall.

Gas Meter Room

Open the union, cut a reducing Tee into the 2" takeoff from the steam main, and install a tree with three vents.

Electric Meter Hallway

Remove the cap from the ¾" spur on the 2" pipe coming out of the wall. Elbow up 6", and install a single Gorton #2 vent.

Boiler Anode Bars

- Install two Neutro-Chem anode bars into the boiler. These are available from Rockmills Boiler.
- Replace the manhole gasket (Rockmills MP 150 boiler).
- Completely drain the boiler, to remove all chemical treatment, and refill it.

Sidearm Backflush

- Remove the 2" cap from the bottom of the sidearm, and pipe a 1¼" drain from there into the drain line (okay to Tee into the 1" under the pump). Include a full-port-ball-valve.
- After the boiler is filled, backflush as follows: turn the oilstat all the way down, close the sidearm's top connection, and open the new drain valve.

Thermal Well

Install a thermal well into the boiler's steam outlet (or the adjacent elbow) by drilling and tapping it ½" IPS.

Contract To Perform Heating Controls Work at 250 Cabrini Boulevard New York, New York

Contractor agrees to perform heating controls work at 250 Cabrini Boulevard in New York, New York for the sums shown below, to be paid by the Owner. (Note: these prices will hold for thirty days from the date of the Contractor's signature). Prices given are inclusive of any applicable sales tax.

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COST FOR ALL WORK: **$**_____

Offered By: Accepted By:

_____ _____ _____ _____

Date Date

("Contractor") ("Owner")

Averaging Thermostat

Description

Install an averaging thermostat with eight wireless sensors by TRS Systems of Chicago. Equipment can be purchased from Leonard Powers, or directly from TRS Systems at (952) 745-4510 www.trssys.com

Materials

Thermostat shall include the following components, programmed by TRS to work together:

- One RC2105 controller, set up for eight sensors
- Eight WT 2630A wireless temperature sensors
- Three RR2552B repeaters
- One OST2630 outdoor air sensor

Also provide eleven 3V lithium batteries (Duracell DL123A or equal).

Installation

- Install the controller onto the panel in the boiler room. Supply 24VAC to it.
- Wire the controller's **COMMON-AUTO** terminals into the limit circuit, in place of the Heat-Timer. Also connect the **MANUAL** terminal, in parallel with the **AUTO** terminal.
- Locate the outdoor air sensor in a shaded location near the boiler room. The sensor is wireless.

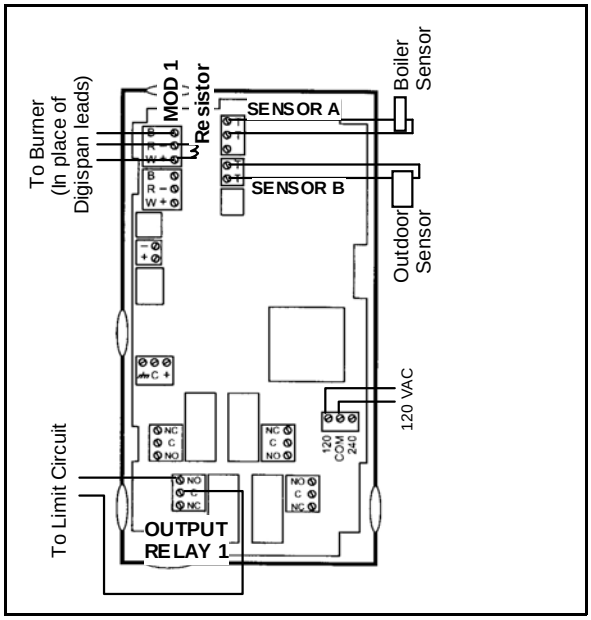
Apartment Sensors and Repeaters

- The repeaters can run on battery power for about four hours. During this time, the repeaters and apartment sensors can be moved around until they all communicate with each other. Once a component is communicating successfully, its **DATA-LINK** light stops blinking.
- In each repeater, make sure the Network ID matches the Controller's Network ID, by looking at the dipswitches on the bottom.
- In each repeater, remove the jumper from **24VAC**, and move it to **BATTERY**.
- In each repeater, install two batteries.
- Temporarily install the repeaters in or near the "C" stairwell, using blue painter's tape. Install them high. Put one at the bottom of the stairwell, one at the top, and one at the middle floor where the apartment sensors will be located. Check to make sure that the repeaters' **DATA-LINK** lights have all stopped blinking, indicating that the repeaters are communicating with the controller.
- In the apartments, use blue painter's tape to temporarily affix temperature sensors to walls at good locations (see below). Install four on the top floor, and four on a middle floor.
- Move the sensors and repeaters as needed until all the **DATA-LINK** lights have stopped blinking.
- Once good locations are selected, supply 24VAC to the repeaters. Tap off the stairwell light wiring, and install transformers.
- If the repeaters are located in the hallways, install them immediately below the plastic cable chase, and run the 24VAC leads through it. Owner to remove chase cover.
- In the repeaters, remove the jumpers from **BATTERY**, and move them back to **24VAC**.

Guidelines for Apartment Sensor Locations

- Owner shall specify rooms for sensors.
- Install sensors at the same height as the light switches.
- Do not install them onto exterior walls, in kitchens or bathrooms, directly over heaters, or in other locations that are unusually hot or cold.

Steam Pressure Reset Control



Description & Materials

A Honeywell T775 will control the burner modulation. As outdoor temperature decreases, the pressure setpoint will increase. (The T775 will detect steam temperature, which will correspond to a pressure range of 1-10 PSI.)

Part numbers are T775R2019 and T775-SENS-OAT

Wiring

- Install a Honeywell T775R2019 controller, and supply power to it (24VAC, 120VAC, or 240VAC).
- Install one of the included sensors into the boiler's new thermal well. Connect it to the **SENSOR A** terminals.
- Install a Honeywell T775-SENS-OAT outdoor-sensor, and connect it to the T 775's **SENSOR B** terminals. Reuse the existing Heat-Timer sensor enclosure, or install a new one in a shaded location, lifted away from the wall.
- Connect the **MOD 1** output terminals to the burner, in place of the leads from the L91.
- Install the included 340-ohm resistor across **MOD 1**'s terminals **R** & **W**.
- Wire the **NO** terminals of **OUTPUT RELAY 1** into the burner's limit circuit.

Settings

Note: the **SETUP** Mode is entered by pressing the **MENU** button for five seconds.

SETUP:	OUTPUTS:	OPTIONS:	USE SCHED:	NO
SETUP:	OUTPUTS:	MOD 1:	TYPE:	SERIES 90
			MIN OUT %:	0 [default]
			INTEGRAL:	400 SEC [default]
			DERIVATIV:	0 [default]
			RESET:	YES-BOILER
SETUP:	OUTPUTS:	# RELAYS:	1	
SETUP:	OUTPUTS:	RELAY 1:	RESET:	YES-BOILER
SETUP:	SENSORS:	SENSOR A:	LABEL:	BOILER
		SENSOR B:	LABEL:	OUTDOOR
MENU:	PROGRAM:	MOD 1:	BOILER MAX:	240°
			OUTSD MIN:	0°
			BOILER MIN:	216°
			OUTSD MAX:	55°
			THROT RNG:	5°
			HEAT/COOL:	HEAT
MENU:	PROGRAM:	RELAY 1:	OFFSET:	+5°
			DIFFERENTL:	10°
			HEAT/COOL:	HEAT

Existing Pressuretrols

Set the operating control to 12 PSI, and the manual reset control to 15 PSI.