

(14)
(17)

INTEROFFICE MEMORANDUM

TO: WARD PONTICELLI
FROM: JACKIE BROWN *JB*
SUBJECT: CORRECTION OF THE "STACK EFFECT" AND IMPROVEMENTS TO BUILDING PRESSURE CONTROLS AT 25 SIGOURNEY
DATE: 08/06/01
CC: MANUEL BECERRA, DONNA BAISLEY

Based upon the attached Luchini, Milfort Goodell & Assoc. report and Wings documents regarding the stack effect and pressure control equipment, please have an engineer prepare the design to:
1. correct the stack effect and 2. allow for control of static pressure.

Luchini, Milfort & Goodell prepared the evaluation report and therefore already have an understanding of the problem at this facility so they may be a good prospect for preparing the design documents for bidding purposes.

Copies of 2 proposals from Johnson Controls are also attached. These quotes are based upon their assessment of the work needed to correct stack effect.

**AIR FLOW STUDY
FOR
25 SIGOURNEY STREET
HARTFORD, CT.**

Prepared By:

*Luchini, Milfort, Goodell & Associates, Inc.
Wethersfield, CT.
29 May 2001*

PURPOSE

The purpose of this report is to verify outside air quantities to the building as a whole and to verify air balance in the 17th floor in particular. Actual field measurements and tests for outside air quantities were done by Dick Wing of Wing's Testing and Balancing Company on May 15, 2001. A report of his findings are attached as Appendix A.

This report will supplement, and be considered in conjunction with, equipment surveys made by Johnson Controls, Inc.

RESULTS

1. The 17th floor is receiving 5183 CFM of minimum outside air, well above the 4000 CFM specified and far in excess of the 3000 CFM required for a population of 150 people.
2. Total outside air delivered through the north shaft is 24,525 CFM, 89% of the specified 27,600 CFM. Total outside air delivered through the south shaft is 34,081 CFM, 112% of the 30,300 CFM specified. Although some adjustments need to be made on a floor-by-floor basis, the building is, as a whole, adequately ventilated.
3. A report done by Dick Wing in 1996 indicated a "stack effect" exhaust of 29,985 CFM. Since the building conditions have not changed, we can assume that the stack effect has not changed. Regardless of the outside air being delivered, stack effect causes building infiltration, resulting in moisture in the building infrastructure.

RECOMMENDATIONS

1. First, and most important do the following, mitigate the stack effect.
 - a) Elevator Machine Room - 14,675 CFM
Close up 5' x 5' opening to relief vent.
 - b) Kitchen exhaust duct - 5,762 CFM
Provide tight (low leakage) automatic damper.
 - c) Install exhaust fan to top of relief shaft, rated at approximately 45,000 CFM. This fan would be provided with a variable frequency drive, operated by a static pressure sensor in the exhaust shaft set to maintain

negative .05" static pressure in the shaft.

1. Check and adjust system air balance after corrections listed in Item #1 are completed.
2. Adjust control sequences to maintain slight positive pressure in the building (JCI).

CONCLUSIONS

The outside air supply to the building has been found to be in excess of the requirements of ASHRAE, and more than adequate to sustain a population of 150 per floor. The conclusion, then is that the IAQ problems are due to mold growth resulting from the infiltration of moisture through the building walls. If measures to stop the infiltration are implemented the problem should be mitigated.

To: JACQUELYN BROW, DPW
FROM: ED CARVALHO, JCI

5/23/01

AS REQUESTED:

COPY OF WING'S TESTING & BALANCING PRELIMINARY
REPORT @ 25 SIGOURNEY STREET.

Thanks.
Ed C.

WING'S



TESTING & BALANCING CO., INC.

94 No. Branford Rd., Branford, CT 06405

203-481-4988 Fax 203-482-5634

WBE Certified in Connecticut, Hartford & New Haven

FAX TRANSMITTAL

To: PETE LUCHINI
Company: L-M-G

Date: 5-15-01
From: Dick Wing

Subject: 25 SIGOURNEY ST
VENTILATION TESTING

Message:

- * THE 17TH FL. HAS 5183 CFM MIN. OA
29.6% ABOVE THE LISTED 4000 CFM.
- * THE BLDG. HAS A LOT OF LEAKAGE.
(SEE WTB.CO REPORT FEB. 13, 1996)
- * WE'LL LET YOU KNOW WHEN WE
CAN TEST VAV BOXES & OUTLETS.

ENJOY THE READING!

Dick

No. of Pages 6 Fax Number 860-529-6700

If the transmission is incomplete, or if you have any questions, please contact us immediately at the number shown above.

Thank you.

Richard A. Wing

Reliability and Results for 20 Years

Visit us on the Internet: www.wingstesting.com or e-mail us: wings@wingstesting.com

WING'S TESTING & BALANCING CO., INC., 94 NO. BRANFORD RD., BRANFORD, CT 06405

VELOCITY PRESSURE READINGS

PROJECT: 25 SIGOURNEY ST DATE: 5-15-01

AREA SERVED: NORTH OF VENT (OASF-1) TECH: DW

TRAVERSE LOCATIONS	DUCT SIZE	AREA SQ.FT.	DESIGN		CENTERLINE STATIC PRES.	FINAL		NOTES
			FPM	CFM		FPM	CFM	
19	28x16	3.11		2200		302	940	
18				2000		502	1562	
17				2000		656	2041	
16				2200		398	1238	
15				2200		880	2738	
14				2200		571	1776	
13				2200				
12				2200		668	2069	
11				2200		553	1720	
10				2200		828	2576	
9				2200		600	1867	
8				2200		536	1668	
7				2200		508	1580	
6				2200		750	2333	
5 LOBBY METH				1600		150	467	(2)
				27600			24575	89%
17 1/2 N.	28x16	3.1		2500		823	2592	(4)

REMARKS

(1) ETB REPORT

(2) GOES NEG 151 FPM WHEN DOOR IS OPEN

WING'S TESTING & BALANCING CO., INC., 94 NO. BRANFORD RD., BRANFORD, CT 06405

VELOCITY PRESSURE READINGS

PROJECT: 25 SIGOURNY ST		DATE: 5-15-01					
AREA SERVED: SOUTH OA VENT (CH-2)		TECH: DW					
TRAVERSE LOCATIONS	DUCT SIZE	AREA SQ.FT.	DESIGN	CENTERLINE	FINAL		NOTES
			FPM	CFM	STATIC PRES.	FPM	
20				1200			
19	16x28	3.11	2200	500	1556		
18			2000	689	2144		
17			2000	1010	3142		
16			2200	1305	4060	(2)	
15			2200	944	2937		
14			2200	842	2620		
13			2200				
12			2200	936	2912		
11			2200	1093	3369		
10			2200	820	2551		
9			2200	899	2797		
8			2200	1142	3553		
7			2200	988	3074		
6			2200	554	1724		
5	LOBBY & MEZZ		2100	0	0	(3)	
			30300		34081	112%	
17th S.	28x16	3.1	4000	1093	3400	(1)	
REMARKS							

- (1) FROM E.T.B. REPORT
- (2) REDUCES TO 4-400 WHEN MER DOOR IS OPEN
- (3) DPR CLOSED, SLIPPED ON LINKAGE
- ~~(4) RE-TEST AS LOBBY/MEZZ UNIT~~

February 13, 1996

Tunxis Management Co.
Attn: Vincent Lanatieri
25 Sigourney Street
Hartford, CT 06106

Re: 25 Sigourney Street
6th Floor HVAC Testing

Water System:

The hot water system was designed to allow heating to the AHU's during morning warm up only. The pump design of 320 GPM will handle the VAV reheat, radiation and unit heater connected load of 381 GPM, but not while the AHU's are active which increases the total connected load to 760 GPM. The AHU's are operating beyond the morning warm up mode and consequently "steal" flow potential to the VAV's.

A spot check of a common cold area, 6th floor, zone 6 (Hans Spacer's office), indicated adequate flow with over 100° discharge air temperature while on a call for heating. The building was unoccupied on the day of testing, January 15, 1996. When the building was made active, the discharge air temperature dropped to 85°, indicating that some water was diverted to other areas.

Air Systems:

While lack of water flow doesn't help the overall situation, it is not the cause of poor performance. "Stack effect" is the major cause of the problems. Stack effect is the natural phenomenon of warm air rising in a multi-story building, exfiltrating through any and every available opening at the top of the building while an equal amount of cold air infiltrates at the base of the building. Exfiltration measurements were taken at the following locations:

Description	Exiting CFM
* SEF-1 (Smoke Exhaust Fan) has a barometric relief back draft damper which is spilling air and the automatic damper is wide open (see sk-1)	9,548
* Elevator machine room roof has a 5'x5' opening to a louvered relief vent	14,675
* Kitchen exhaust fans that are not running, have fan discharge wire mesh screens that are relieving 350 FPM: 44" dia = $138" \times 10" = 9.59 \times 350 = 3358$ 35" dia = $110" \times 9" = 6.87 \times 350 = 2404$	5,762

VIL: 25BORN3.BAM

bathroom exhaust fans?

Page 2

Re: 25 Sigourney Street
6th Floor HVAC Testing

- * Terrace sliding glass doors are leaking air as shown by smoke tests
- * 20th Floor Commissioner's office fixed position window panels are leaking air around the metal mullions as shown by smoke tests

Total calculated leakage

29,985

The 2 make up air fans, with design of 4900 CFM each, have a total capacity in excess of the exhaust design CFM, which results in a designed net plus pressurization for the building. The actual operating conditions are different however. Make up fan, OAS-1 is running at 1/2 speed and some outside air dampers serving mechanical equipment rooms are not opened, further contributing to the negative pressure.

Recommendations:

- * Contract a HVAC engineering firm to review our report and findings, in addition to addressing code issues, etc. (Note: BVH Engineers, Inc. has first hand information on the base building design.)
- * Eliminate air leakage
 - isolate the SEF-1 relief damper (sk-1)
 - close the static pressure control damper (sk-1)
 - close the elevator shaft ventilation relief
 - tighten the sliding door tracks
 - seal the mullions at the fixed pane windows
- * Adjust the make up air fan systems to provide adequate ventilation for occupants and building pressurization

Summary:

The control of temperature and humidity is difficult, if not impossible, in a building with a severe negative pressure. The infiltrating air is not heated, cooled or filtered and enters wherever it can causing drafts, temperature fluctuations and high energy costs. We believe that correcting the stack effect will address the problems and then the water system will be able to meet the heating needs.

If you have any questions, or we can be of further service, please do not hesitate to call.

Very truly yours,

Wing's Testing & Balancing Co., Inc.

Richard A. Wing

Richard A. Wing, General Manager

File: ZISGRNY.BAM

WING'S



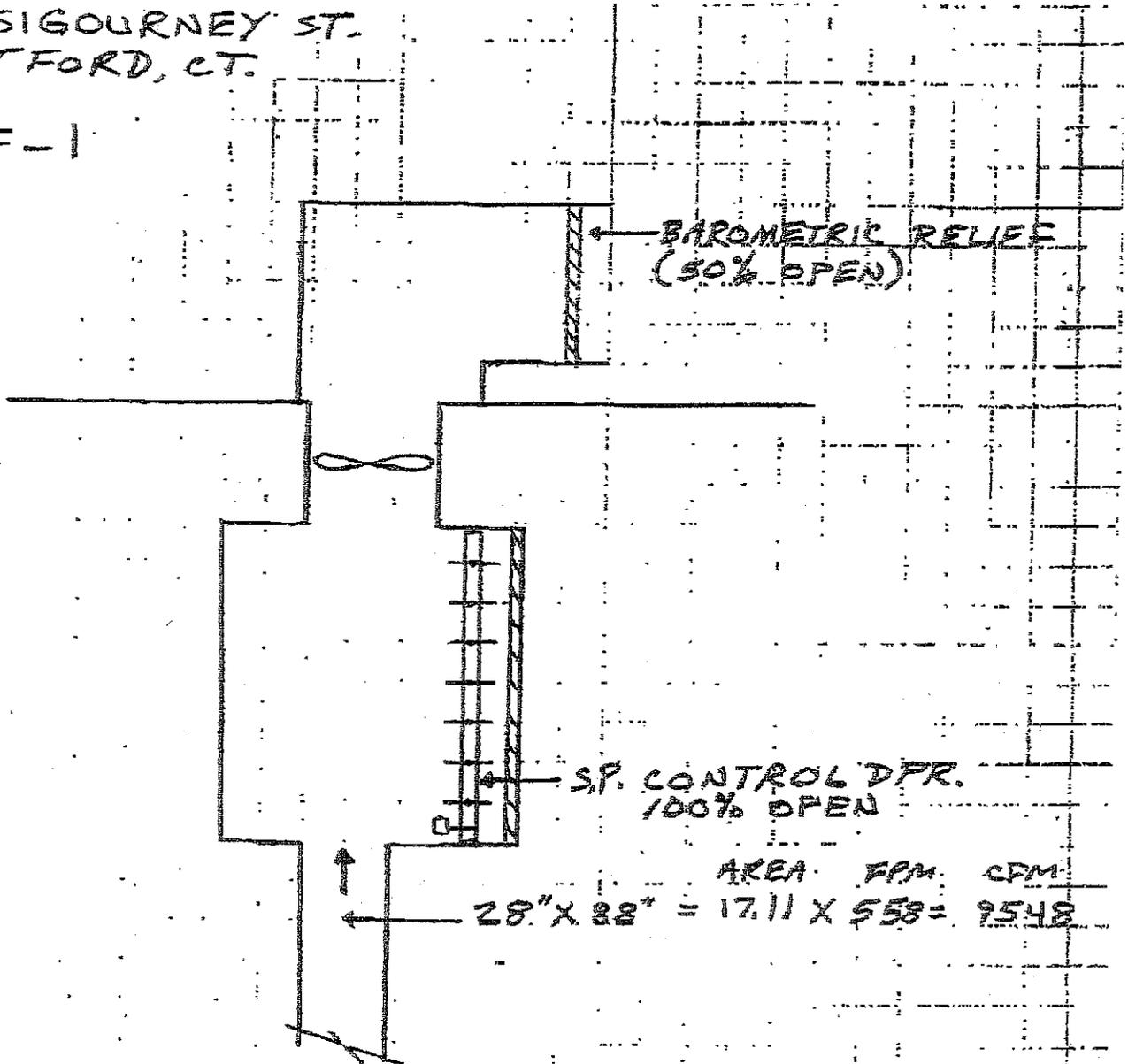
TESTING & BALANCING CO., INC.

94 No. Branford Rd., Branford, CT 06405

203-481-4988 Fax 203-488-5634

1-15-96
25 SIGOURNEY ST.
HARTFORD, CT.

SEF-1



AREA	FPM	CFM
28" X 28"	17.11	558
		= 9548

SK-1



058
605 Franklin Avenue
Hartford, CT 06114
Tel. (860)520-6200
Fax: (888)274-4538

PROPOSAL

To: Tunxis Management Company
One Liberty Square PO box 488
New Britain CT 06050
Attn: Maurice Halle
Title: Chief Building Engineer

Date: June 29, 2001
Project: Exhaust Dampers
Location: 25 SIGOURNEY
Proposal # 61

Work Proposed

Johnson Controls proposes to :

- * Install one manual opposed blade damper in the elevator exhaust duct to be adjustable if necessary.
 - * Remove exhaust fans from existing curbs, and install curb adapters with low leakage opposed blade dampers
 - * Reinstall Exhaust fans and rewire exhaust fans
 - * Install electric motorized damper actuators with outdoor enclosures
 - * Install pitch boxes for electrical connections
 - * Integrate new low leakage dampers into the exhaust fan control sequence
- All work is to be performed on Saturdays as scheduled with Moe Halle of Tunxis Management.

Benefits

By installing dampers in the building exhaust ducts the building stack effect should be eliminated. By eliminating the stack effect no unfiltered air will be entering the building and that will lower drafts causing infiltration of outdoor contaminants.

Exclusions

1. Any labor or materials not specifically included in the "Work Proposed" section above.
2. Unless otherwise stated, any and all overtime labor is excluded from this proposal.
3. Any applicable taxes, or special freight charges are also excluded from this proposal.

The price for this work is: \$27,652.00 , payable upon completion of the work.

(IMPORTANT: This proposal incorporates by reference the terms and conditions attached).

This proposal is hereby accepted and Johnson Controls is authorized to proceed with the work, subject, however to credit approval by Johnson Controls, Inc. Milwaukee, WI.

This proposal is valid for the next
90 days

Purchase Order Number: _____

Maurice Halle
Tunxis Management Company

Signature: _____
Name: _____
Title: Chief Building Engineer
Date: _____

Johnson Controls, Inc.

Signature: _____
Name: Luca Petracca
Title: Service Representative
Date: June 29, 2001

Johnson Controls, Inc.
Controls Group
605 Franklin Avenue
Hartford, CT 06114
Telephone: 860/520-6200
Fax: 860/247-3644



Mrs. Donna Baisley
State of Connecticut DPW
165 Capitol Avenue
Hartford, CT 06106

D.P.W.
FAC. MGMT.
JUN 20 9 07 AM '01

June 27, 2001

Re: 25 Sigourney Street
Hartford, CT

Dear Mrs. Baisley:

We are pleased to submit our budget for the installation of a new building exhaust fan to be located on the roof. Work shall include labor and material as follows:

Equipment Installation

New Equipment Stand Alone:

\$ 113,765.00

1. Furnish and install one (1) new 45000 cfm exhaust fan
2. Provide electrical power wiring (based on 200' of feed)
3. Furnish and install one (1) new VFD
4. Curb adapter.
5. Remove and dispose of existing fan
6. Work to be performed on a weekend
7. Structural support of fan on roof (allowance for structural analysis)
8. Furnish and install required ductwork for new fan installation.

Sequence of Operation Controls

JCI equipment static pressure and VFD controller:

\$ 12,500.00

9. Furnish and install DDC unit DX-9600 controller
10. Furnish and install DDC Static pressure sensor
11. New unit Control damper, to prevent off line stack effect
12. Software Programming of unit functions and schedule control

Exclusions and Clarifications:

- CT State Sales tax not included
- Structural modification of existing roof truss
- Cutting and patching
- Permit fees not included
- Included an allowance for a helicopter to remove existing fan and set new fan. We did not include any costs associated with additional insurance coverage that may be required. Further discussions are required.
- Included an allowance for structural support for fan. We have included the review adequacy of existing beams immediately below the location of the new roof fan support. We have not included the building vertical or lateral loads.
- Price is based on using an upblast fan with a duct curb adapter.
- Helicopter lift pricing is based on work being performed on 7/28/01

If you should have any further questions, please do not hesitate to call us. Thanks you for thinking of Johnson Controls, Inc.

Sincerely,
JOHNSON CONTROLS, INC.

Edward Carvalho
PC project Manager

cc: Manny (DPW)
Moe @ Services
Jackie, DPW

WING'S



TESTING & BALANCING CO., INC.

94 No. Branford Rd., Branford, CT 06405
203-481-4988 Fax 203-488-5634

6-29-01

DPW

ATTN: JACKIE BROWN

RE: 25 SIGOURNEY ST. - VENTILATION TESTING

FIELD REPORT

FAX# 860-713-7262

WE HAVE LOCATED & EVALUATED THE CONTROL FOR MAINTAINING SYSTEM STATIC PRESSURE FOR OAF-1#2.

THEY ARE LOCATED ON THE 8TH FL. NORTH MER. AND EACH OF THE ΔP CONTROLLERS HAVE THE HI SIDE IN THE DUCT, & THE LOW SIDE OPEN TO THE M.E.R. THIS SITUATION CAN CHANGE THE FLOW POTENTIAL BASED ON THE SUCTION PRESSURE OF THE 8TH FL. NORTH FAN SYSTEM!

JOHNSON CONTROLS (LUCA) & WING'S TESTING & BALANCING (DICK) WORKED TOGETHER, AND CAME UP WITH THE FOLLOWING MODIFICATION PLAN:

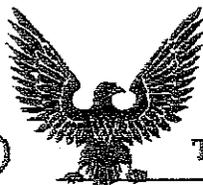
- * UPGRADE THE CONTROLS TO PROVIDE AUTOMATIC RELIABLE CONDITIONS. (WHEN THE ΔP SENSOR LO SIDE WAS CONNECTED TO ATMOSPHERE, NO CHANGE TO SYSTEM SPEED OCCURRED.)
- * ADD A DUCT EXTENSION TO THE MIN. SECTION WITH A VOLUME DAMPER TO CONTROL FROM THE EXISTING AIR FLOW STATIONS. (SEE SK-1)

PLEASE REVIEW & CONSIDER THESE MODIFICATIONS, AS MANY BENEFITS WILL BE ADDED.

1. CHANGING STATIC PRESSURE WITHOUT CHANGING MIN. FLOW RATES.
2. INCREASING THE PURGE QUANTITY TO ANY SINGLE OR MULTIPLE FLOORS.
3. REDUCED OPERATING ENERGY (OVERALL) WHILE INCREASING VENTILATION TO A SINGLE FLOOR.

COPY: PETER LUCHINI 860-529-6700

WING'S

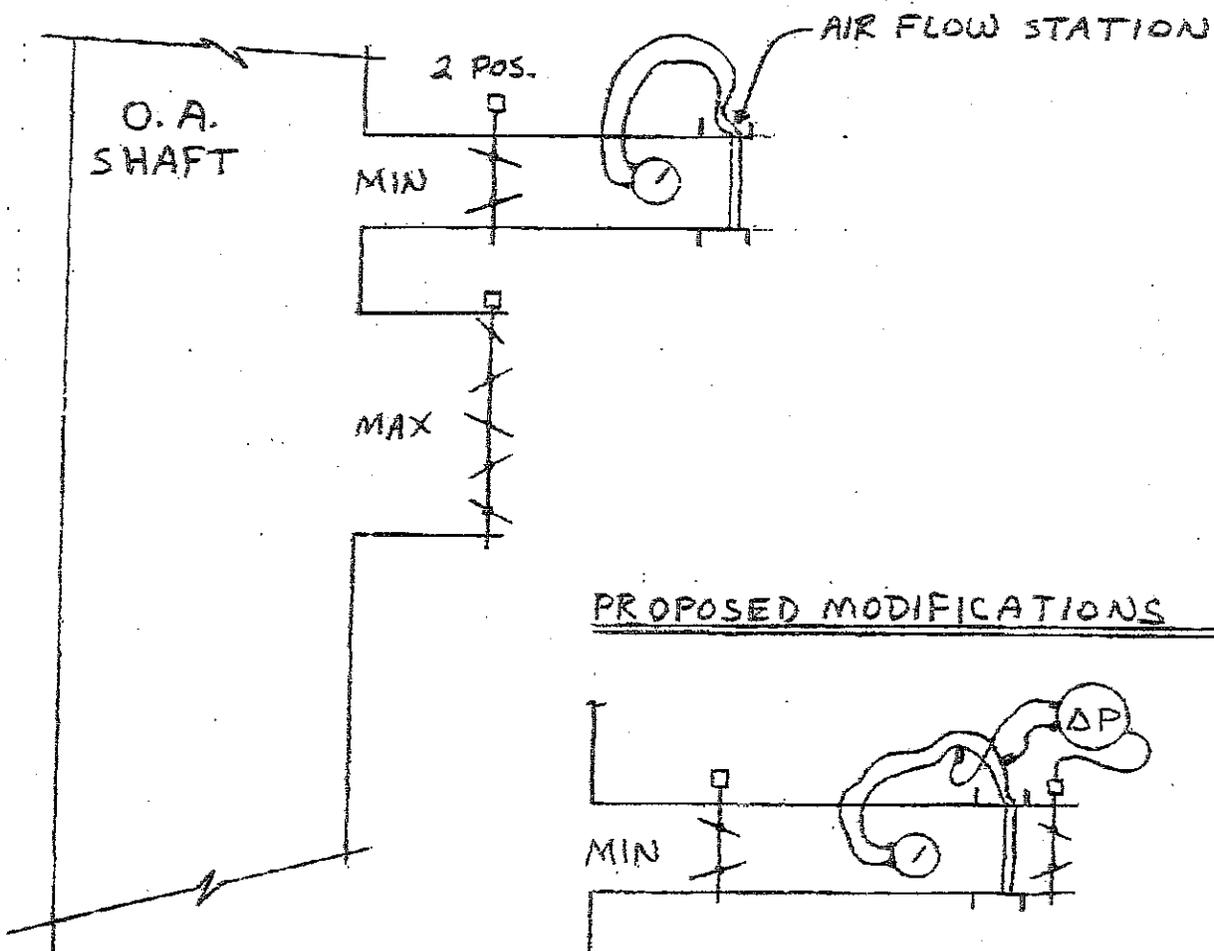


TESTING & BALANCING CO., INC.

94 No. Branford Rd., Branford, CT 06405
203-481-4988 Fax 203-488-5634

25 SIGOURNEY ST VENTILATION SYSTEM

EXISTING - TYPICAL FLOOR



THE NEW DAMPER TO BE CONTROLLED BY A ΔP SENSOR TIED INTO THE AFS.

SK-1