RESOLUTION OF BOARD OF DIRECTORS
BROOKS TOWER RESIDENCES CONDOMINIUM ASSOCIATION, INC.

HVAC TEMPERATURE REGULATION
Adopted March 18, 2004

Background:
Each year, regulating the temperature of the heating and cooling system is met with some scrutiny, particularly during transitional periods in the spring and fall. Working within the limitations of the system's design, Management must balance the negative effects of mechanical stress and energy consumption against the varying demands for heat and air-conditioning.

Historically the practice has been to consider forecast temperatures a week at a time, choosing a corresponding system temperature that can be maintained as long as possible. This eliminates excessive mechanical stress and energy consumption, but doesn't always provide optimal comfort. Even if operated with comfort as the only consideration, the design of the system does not allow for simultaneous heat and air-conditioning. As a result, optimal control is impossible during periods of mild seasonal temperatures. The following is intended as a starting point for the establishment of a policy and / or set of criteria for the year-round operation of the heating and cooling system.

Overview:
Heat and air-conditioning in Brooks Tower is provided by the building's central plant, which delivers tempered water to machinery in each condominium. The central plant has three modes of operation: Heating Mode, Cooling Mode, and Neutral Mode. The equipment in each condominium blows warm or cool air depending on the temperature of the water being supplied. The efficiency of the equipment in the individual condominium units varies, depending on condition and design specifications, however an energy loss of about 10 degrees is to be expected, making the discharged air temperature less extreme than the temperature of the water in the system.

Proposed System Operation:
The maximum temperature within the system's set parameters is 125 degrees, and the minimum is 50 degrees. The maximum rate of change is 1.5 degrees per hour. Changes from one mode to another may require up to 48 hours.

The temperature of the system is regulated as a function of the *average* forecast temperature (AFT); the AFT is calculated as the midpoint between the forecast high and low for a 24-hour day.

Heating Mode:
The system is operated in the Heating Mode when the AFT is below fifty degrees. The system's water temperature is regulated as a function of the AFT such that: HVAC water temperature = (AFT) (-1/3) + 125 degrees.

Sample, HVAC temperatures as a function of AFT

Low	High	Average	HVAC Temp
-5	0	-3	126
2	13	8	123
9	26	18	119
16	39	28	116
23	52	38	113
32	65	49	109

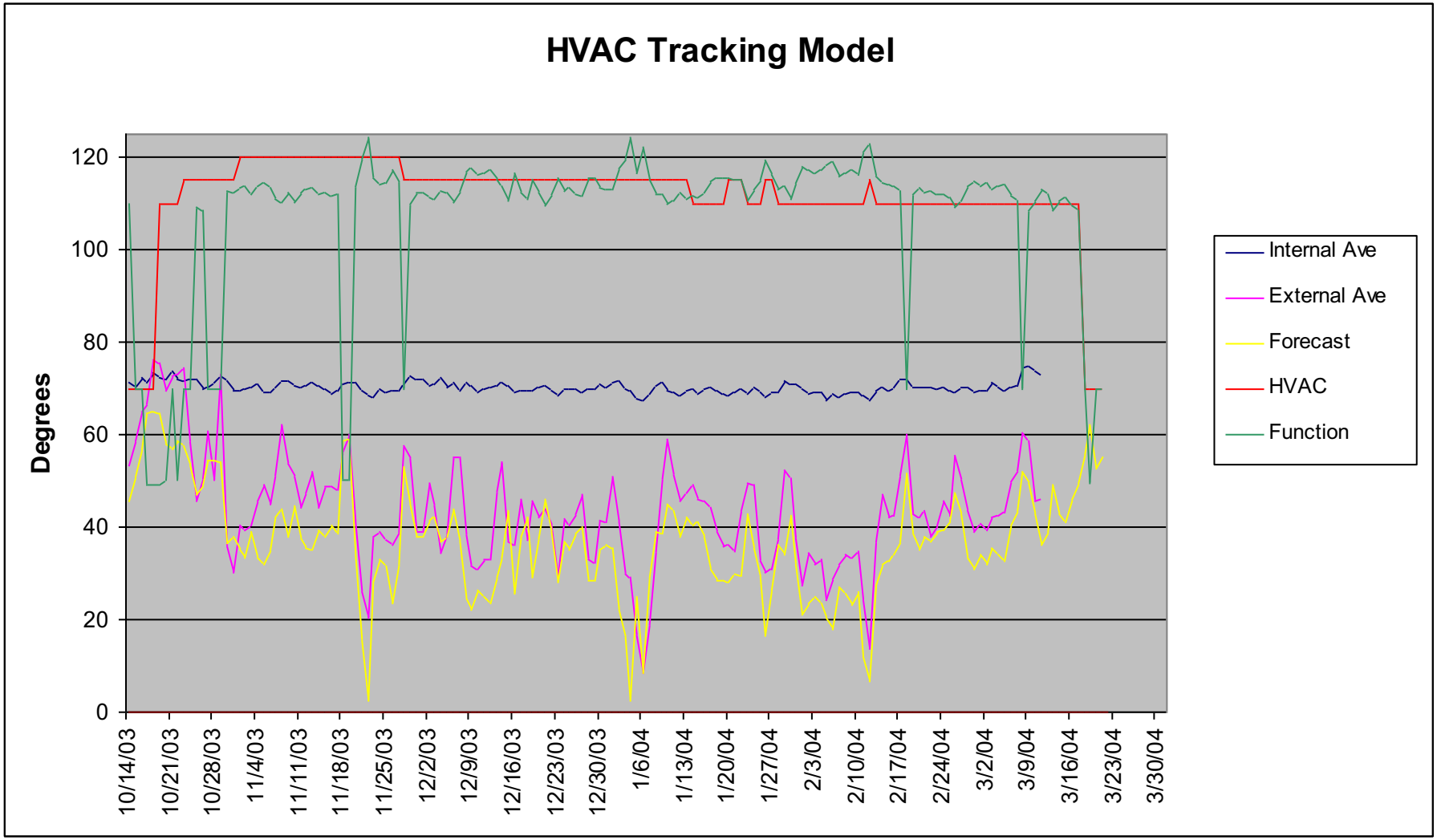
Neutral Mode:
The system is operated in the neutral mode when the AFT is above 49 degrees and below 58 degrees. In this mode, no energy is invested and the system is off.

Cooling Mode:
The system is operated in the cooling mode when the AFT is above 57 degrees. In this mode, the system's water temperature is regulated as a function of the AFT such that: HVAC water temperature = (AFT) (-1/6) + 60 degrees.

Sample, HVAC temperatures as a function of AFT

Low	High	Average	HVAC Temp
40	75	58	50
47	81	64	49
54	87	71	48
61	93	77	47
68	99	84	46
75	105	90	45

In Conclusion:
The attached graph shows historic temperatures and the building's system temperature since October 2003. System temperature as a function of the AFT is represented without regard for the maximum rate of change of 1.5 degrees per hour. Imposing the limit on the rate of change will eliminate radical swings in the system's temperature and moderate the slope of the function line shown on the graph. By allowing dynamic but gradual switching between modes, we hope to maintain comfort while optimizing energy consumption and minimizing stress on plumbing and machinery.


HVAC Tracking Model
Degrees
120
100
80
60
40
20
0
10/14/03
10/21/03
10/28/03
11/4/03
11/11/03
11/18/03
11/25/03
12/2/03
12/9/03
12/16/03
12/23/03
12/30/03
1/6/04
1/13/04
1/20/04
1/27/04
2/3/04
2/10/04
2/17/04
2/24/04
3/2/04
3/9/04
3/16/04
3/23/04
3/30/04
Internal Ave
External Ave
Forecast
HVAC
Function