APPENDIX 1: AN OCCUPANT SATISFACTION PROFILE SURVEY

The following survey questionnaire has been developed by Judith Heerwagen, Ph.D., as parts of contracted works undertaken first for the Bonneville Power Administration (of Portland, OR) and later for the Pacific Gas & Electric Company (of San Ramon, CA.) The main task for both studies was to assess the viewpoints and experiences of occupants working in commercial office buildings.

At the time when the BPA project commenced Dr. Heerwagen was a faculty member in the College of Architecture and Urban Planning, at the University of Washington. Subsequently, she performed the work for PG&E as an independent contractor. Presently, she is a Senior Research Scientist with the Human Affairs Research Center of the Battelle Memorial Institute, in Seattle.

If you have questions concerning this questionnaire or its components, you can direct such questions to Dr. Heerwagen, via E-mail, at the address: Heerwag@Battelle.org .

OCCUPANT SATISFACTION PROFILE

The work environment

Below are statements that represent people's feelings and attitudes about experiences in work environments. Please circle the number that best describes how much you agree with each statement.

1=Strongly disagree
2=Somewhat disagree
3=Neither agree nor disagree
4=Somewhat agree
5=Strongly agree

	Strongly disagree				Strongly agree
1. Having pleasant physical surroundings at work is important to me.	1	2	3	4	5
2. My work requires long periods of quiet and concentration.	1	2	3	4	5
3. It's important to me to be able to control environmental conditions in my workspace.	1	2	3	4	5
4. It is difficult to work when I am physically uncomfortable.	1	2	3	4	5
5. My work requires high levels of privacy for confidential meetings and/or phone conversations.	1	2	3	4	5
6. Most of my tasks require me to work with one or more people in group meetings.	1	2	3	4	5
7. I spend most of my day at my own workspace rather than in meetings or other work settings.	1	2	3	4	5

8. Many people personalize or change their workspaces in some way to make it more comfortable and pleasant. Have you added any of the following items to your workspace?

Yes	No		Yes	No	
___	___	Posters or paintings to decorate the walls	___	___	A fan
___	___	Furniture	___	___	A space heater
___	___	Plants or flowers	___	___	A lamp
___	___	Bookshelves	___	___	Carpet
___	___	Storage facilities (files, boxes, etc.)	___	___	Tea/coffee maker
___	___	A radio or CD player	___	___	Pictures of family,friends or pets

Other: ______________________________

9. How much did these changes increase your satisfaction with your workspace?
1=not at all 2=somewhat 3=moderately 4=very much

Environmental Conditions for Different Tasks

10. People do many different kinds of tasks at work. Nonetheless, they normally spend most of their time on just a few kinds of activities. Check **three tasks** from those listed below on which you spend most of your time; then rate the quality of the environmental conditions for each of the tasks by placing a number in the box that best corresponds to your perceptions of the quality of each of those conditions for the tasks you do. If the list does not contain the appropriate activities for your work, please add them at the bottom.

Use the following scale:
1 = VERY POOR-- numerous problems exist that are disrupting and can't be resolved.
2 = POOR-- a few problems exist that are disrupting and difficult to resolve.
3 = OKAY -- some problems exist that are disrupting, but can usually be resolved.
4 = GOOD -- minimal problems that are somewhat disrupting, but can be resolved.
5 = EXCELLENT -- no disrupting problems exist; conditions are just right.

TASKS (select **three**)	Lighting	Temperature Conditions	Air Quality Conditions	Privacy	Noise Conditions
Computer tasks: Word processing from supplied text					
Word processing of your own materials					
Data entry					
Data analysis					
Database management					
Programming					
Computer graphics					
Other:					

Continued on next page.....

1 = VERY POOR- numerous problems exist that are disrupting and can't be resolved.
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TASKS

	Lighting	Temperature Conditions	Air Quality Conditions	Privacy	Noise Conditions
Other visual tasks:					
Typing					
Light reading					
Concentrated/analytical reading					
Proofreading					
Writing					
Art/graphics work (non-computer)					
Non visual tasks:					
Solitary mental activities					
Strategic planning meetings					
Other meetings					
Talking on the phone					
Greeting/directing visitors					
Other tasks:					

Window and Lighting Control Conditions

11. Does your workspace have a window with the view to the outdoors? ___ Yes ___ No
IF NO, go to question 18.

12. Can you operate shades on your window? __ Yes ___ No

13. Can you open/close the window? ___ Yes ___ No

14. Is the view of outdoors: CHECK ONE
___ predominantly nature (trees, grass, shrubbery)
___ mixture of nature and buildings or other built features (roads, vehicles, parking lots)
___ predominantly built

15. How pleasant do you find the view?
1=Very unpleasant
2=Somewhat unpleasant
3=Neither pleasant nor unpleasant
4=Somewhat pleasant
5=Very pleasant

16. If you do not have a window to the outdoors in your immediate workspace, can you see out a window elsewhere in the office when seated at your desk? __ Yes __ No

17. How satisfied are you with the window conditions in your workspace?
1=Very dissatisfied 2=Somewhat dissatisfied 3=Neutral 4=Somewhat satisfied 5= Very satisfied

In this section, we would like to know how much you can alter lighting to suit your needs and preferences and what kinds of changes you have made, if any, to the light conditions in your workspace.

18. CONTROL: In your workspace, can you:

Yes	No	
___	___	Turn ceiling lights on/off
___	___	Dim the ceiling lights with a dimmer
___	___	Control the number of ceiling lights in use
___	___	Turn a task lamp on/off
___	___	Control the direction of the task light
___	___	Open/close shades to control sun/daylight

19. CHANGES: Have you made any of these changes?

Yes	No	
___	___	Added a your own lamps
___	___	Covered daylight sensors
___	___	Added window coverings
___	___	Removed fluorescent tubes in ceiling fixtures
___	___	Changed the type of fluorescent tube used in the light fixtures

20. How would you rate the amount of control you have over lighting in your workspace?
0=None 1=A little 2=Moderate 3=Very much

21. How satisfied are you with this level of control over the lighting?

1=Very dissatisfied 2=Somewhat dissatisfied 3=Neutral 4=Somewhat satisfied 5=Very satisfied

22. Lighting Problems
Please rate the following lighting situations in terms of how much of a problem they are for you at this time. If the situation is not applicable (e.g., you don't have a window, or you don't use a computer) mark "4 " for not applicable.

How much of a problem?
0=Not at all
1=A little
2=Moderate
3=Very much

a. Shadows on your work surface	NA	0	1	2	3
b. Glare from the sun on your work surface	NA	0	1	2	3
c. Excessive warmth/brightness from the sun	NA	0	1	2	3
d. Glare from ceiling lights	NA	0	1	2	3
e. Reflections from ceiling lights on your computer screen	NA	0	1	2	3
f. Reflections from windows on your computer screen	NA	0	1	2	3
g. Occupancy sensors that turn lights off even when you are present	NA	0	1	2	3
h. Flicker from fluorescent lamps	NA	0	1	2	3
i. Humming from fluorescent lamps	NA	0	1	2	3

Other problems: ______________________________
____

23. To what extent are you able to resolve these problems when they occur?
0=Not at all 1=Somewhat 2=Moderately 3=Completely 4=not applicable; there are no problems

24. How much do these problems interfere with your ability to do your work when they occur?
0=Not at all 1=Somewhat 2=Moderately 3=Very much 4=not applicable

25. Taking into consideration only the **electric lighting** (e.g., ceiling and task light), how satisfied are you with:

1= Very dissatisfied
2= Somewhat dissatisfied
3= Neutral
4= Somewhat satisfied
5= Very satisfied

The lighting as it supports the **tasks** you do	1	2	3	4	5
The way the light makes your workspace **look** and **feel**	1	2	3	4	5

26. Taking into consideration only the **daylighting**, how satisfied are you with::
___ Not applicable; there is no daylight in my workspace

1= Very dissatisfied
2= Somewhat dissatisfied
3= Neutral
4= Somewhat satisfied
5= Very satisfied

The lighting as it supports the **tasks** you do	1	2	3	4	5
The way the light makes your workspace **look** and **feel**	1	2	3	4	5

Temperature Conditions

27. In your workspace, can you make any of the following adjustments in the temperature conditions:

Yes	No	
___	___	Adjust a thermostat in your workspace
___	___	Adjust a thermostat elsewhere that controls the temperature in your workspace
___	___	Open/close a window in your workspace
___	___	Adjust a built-in air movement controller

28. Have you made any of the following changes in your workspace to control temperature conditions?

Yes	No	
___	___	Added a fan
___	___	Added a space heater
___	___	Added a foot warmer
___	___	Covered up air vents
___	___	Rearranged furniture to increase your temperature comfort
___	___	Added window coverings to control heat from sun or cold drafts

(Other: ____)

29. How would your rate the degree of control you have over temperature conditions in your workspace?

0=None 1=A little 2=Moderately 3=Very much

30. How satisfied are you with this level of control?

1=Very dissatisfied 2=Somewhat dissatisfied 3=Neutral 4=Somewhat satisfied 5=Very satisfied

31. How often is your workspace:

1=Rarely
2=Sometimes
3=Often
4=Very often

a. Too warm	1	2	3	4
b. Too cold	1	2	3	4
c. Too drafty	1	2	3	4

32. When you are too warm or too cold, how frequently do you engage in any of the following activities in order to increase your comfort?

0=Never
1=Rarely
2=Sometimes
3=Usually

a. Adjust your clothing	0	1	2	3
b.Drink something hot/cold	0	1	2	3
c. Open/close a window	0	1	2	3
d. Open/close window blinds	0	1	2	3
e. Use a fan	0	1	2	3
f. Use a space heater/foot warmer	0	1	2	3
g. Adjust the thermostat	0	1	2	3
h. Talk to the building manager	0	1	2	3
i. Leave your workspace for a while	0	1	2	3
j. Try to ignore the discomfort	0	1	2	3
k. Complain to coworkers	0	1	2	3
l. Rearrange furniture	0	1	2	3

33. To what extent do these actions help you to resolve warm/cold discomfort?
0=Not at all   1=Somewhat   2=Moderately   3=Very much

34. How much does warm or cold discomfort interfere with your ability to do your work?
0=Not at all   1=Somewhat   2=Moderately   3=Very much

35. Have you noticed differences in temperature conditions related to time of day or season?
___ Yes ___ No

IF YES, please explain briefly:

____

____

Air Quality Conditions

36. In your workspace, can you make any of the following adjustments to control air quality:

Yes	No	
___	___	Open/close a window to the outdoors
___	___	Adjust a built-in air movement device
___	___	Open/close a door

37. Have you taken any of the following actions to improve air quality?

Yes	No	
___	___	Added a fan
___	___	Added an air filter
___	___	Added a humidifier
___	___	Added an air ionizer

38. How would you rate the amount of control you have over air quality in your workspace?
0=None 1=A little 2=Moderate 3= Very much

39. How satisfied are you with this level of control over air quality?
1= Very dissatisfied 2= Somewhat dissatisfied 3= Neutral 4= Somewhat satisfied 5= Very satisfied

40. Do you use any of the following materials in your workspace on a regular basis (e.g., once a week or more)?

	Yes	No
Paints	___	___
Glue	___	___
Marker pencils	___	___
Duplicating fluids	___	___
Cleaning fluids	___	___

41. How well do odors from materials and/or food smells disappear from your work area?
0=Not at all 1=A little 2=Somewhat 3=Very well

Please rate the following aspects of indoor air quality in your workspace:

42. AIR MOVEMENT	43. AIR FRESHNESS	44. ODORS	45. HUMIDITY

[redacted]

54. When you are seated at your desk, can you distinguish what people are saying in nearby workspaces when they are talking in normal conversational voices? ____ Yes ___ No

55. When you are talking in your workspace, can your nearest neighbors hear what you are saying if you do not close your door (or if you do not have a door)? ____ Yes ___ No ___ Don't know

56. When you experience acoustical problems, how frequently do you engage in the following behaviors to improve the situation?

Frequency:
0=Never
1=Rarely
2=Sometimes
3=Usually

a. Use a "Walkman"	0	1	2	3
b. Turn on a radio/CD player	0	1	2	3
c. Close the door	0	1	2	3
d. Close the window	0	1	2	3
e. Ask people to be more quiet	0	1	2	3
f. Leave your workspace	0	1	2	3
g. Ignore the problem	0	1	2	3

57. To what extent do these actions improve the situation?
0=Not at all 1=Somewhat 2=Moderately 3=Very much

58. If you cannot resolve the situation to your satisfaction, to what extent do acoustical problems interfere with your ability to do your work?
0=Not at all 1=Somewhat 2=Moderately 3=Very much

Visual Character

Visual character refers to the overall look and feeling a space projects. we would like you to rate the visual character of your office as a whole, including your workspace. For each of the visual features below, make your rating by making a check along the line at the position that best corresponds to your perception.

59. COLOR SCHEME:

Stimulating _ _ _ _ _ _ _ _ _ _ _ Boring
Soothing _ _ _ _ _ _ _ _ _ _ _ Disturbing
Monotonous _ _ _ _ _ _ _ _ _ _ _ Chaotic
Pleasant _ _ _ _ _ _ _ _ _ _ _ Unpleasant

60. SPATIAL LAYOUT:

Cramped _ _ _ _ _ _ _ _ _ _ _ Spacious
Varied _ _ _ _ _ _ _ _ _ _ _ Monotonous
Messy _ _ _ _ _ _ _ _ _ _ _ Well-maintained

67. VISUAL INTEREST (This refers to the decor,window views, interior views, materials that are used to enhance a space aesthetically):

Interesting _ _ _ _ _ _ _ _ _ _ _ Uninteresting
Appealing _ _ _ _ _ _ _ _ _ _ _ Unappealing
Inviting _ _ _ _ _ _ _ _ _ _ _ Uninviting

68. How would you rate the office environment in terms of its potential for fostering your creative abilities at work?

___ Very good ___ Good ___ Neither good nor poor ___ Poor ___ Very poor

69. Taking into consideration the kind of work you do, as well as your personal environmental preferences, how well does your workspace fit your needs and preferences? Circle the number which best characterizes your feelings.

Very good fit 1 2 3 4 5 6 7 8 9 **Very poor fit**

Okay fit

\n Environmental Report Card

'0. In this section, we would like you to compare the temperature, lighting, acoustical, and air uality conditions in your workspace. If you were asked to do a report card on your workspace, vhat grade would you assign to each of the following conditions: Please use the following scale:

A+ A A- B+ B B- C+ C C- D+ D D- F

	grade
LIGHTING	_____
CONVERSATIONAL PRIVACY	_____
GENERAL NOISE CONDITIONS	_____
TEMPERATURE CONDITIONS	_____
ABILITY TO CONTROL ENVIRONMENTAL CONDITIONS	_____
OVERALL AESTHETIC QUALITY OF THE OFFICE	_____

71. If you could change **one** feature of your workspace or the office in general, what would it be? :f there is nothing you would change, please let us know that also.

____

____

____

Personal Background and Demographics

72. Your age: ____ 18-25 ___ 26-35 ___ 36-45 ___ 46-55 ___ older than 55

71. Gender: ___ Male _ Female

73. Job category: ___ Managerial ___ Professional ___ Support staff ___ Clerical ___
___Other: ______________________________

74. Work status: ___ Full time ___ Part-time (% of time:__________) ___ Hourly

75. How long have you occupied your current workspace? ______

76. How long have you worked in this building? ______

77. Which of the work space types listed below best describes the kind of space you occupy? CHECK ONE.
___ Enclosed private office
___ Enclosed office shared with one or more persons
___ Reception desk
___ Workspace with partitions
___ Workspace in an open area with other workstations
___ Other (please describe: ______________________)

78. Many people spend much of their time in meetings or in activities that require them to be away from their desk during the day. Approximately, how much time do you work **away from your desk** on an average day?
___ less than an hour ___ 1 to 2 hours ___ 3 to 4 hours ___ 5 or more hours

79. Do you regularly work at home during the normal work hours? ____ Yes ___ No

80. IF YES, how often do you work at home? ___________

81. Is there anything else you would like to say about the building or your workspace?

____

____

: you very much for your time in filling out the survey!

APPENDIX 2: A SUPPLEMENTAL BIBLIOGRAPHY

EXPLANATION OF SYMBOLS: X = INFORMATION PRESENT IN TEXT; XX = VERY GOOD SOURCE FOR INFORMATION

AUTHOR, TITLE, PUBLISHER, DATE	AIR FLOW -- DESCRIPTIVE INFORMATION OFFERED	AIR FLOW MEASUREMENTS: EXAMPLES PRESENTED	AIR FLOW MEASUREMENT TECHNIQUES: PROCEDURES EXPLAINED	CLIMATE DATA (WITH ATTENTION TO WIND)	THERMAL COMFORT: PRINCIPLES AND RELATIONSHIPS	EXAMPLES OF BUILDINGS CREATED FOR GOOD AIR FLOW	DESIGN GUIDELINES FOSTERING GOOD AIR FLOW	DETAILS FOR ENVELOPE COMPOSITION (FOR CONTROLING AIR FLOW)	RULES-OF-THUMB FOR CREATING BUILDINGS WITH GOOD AIR FLOW	MODELING USING SOFTWARE	MODELING USING REDUCED-SCALE PHYSICAL MODELS		
OLGYAY, V., DESIGN WITH CLIMATE, PRINCETON UNIVERSITY PRESS, 1963	X			X	X	X	X	X					
GIVONI, B., MAN, CLIMATE, AND ARCHITECTURE (2ND ED.), APPLIED SCIENCE PUBLISHERS, 1976	X			X	XX		X						
FRY, M., AND DREW, J., TROPICAL ARCHITECTURE, REINHOLD PUBLISHING CO., 1956	X			X	XX	X	XX	X					
SAINI, B.S., BUILDING IN HOT DRY CLIMATES, JOHN WILEY & SONS, 1980	X			X	X	X	X						
KOENIGSBERGER, O., T. INGERSOLL, A. MAYHEW, & S. SZOKOLAY, MANUAL OF TROPICAL HOUSING AND BUILDING, PART I: CLIMATIC DESIGN, LONGMAN GROUP LTD., 1973	X			X	X	X	X	X					
ALLEN, E., HOW BUILDINGS WORK, OXFORD UNIVERSITY PRESS, 1980	X				X		X	X					
MELARANGO, M., WIND IN ARCHITECTURAL AND ENVIRONMENTAL DESIGN, VAN NOSTRAND REINHOLD CO., 1982	X						X		X				
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BROWN, G.Z., SUN, WIND, AND LIGHT, JOHN WILEY & SONS, 1984	X			X	X	X	X		X				
STEIN, B., AND J. REYNOLDS, MECHANICAL AND ELECTRICAL EQUIPMENT FOR BUILDINGS (8TH ED.), JOHN WILEY & SONS, 1992	X			X	X	X	X		X				
EVANS, M., HOUSING, CLIMATE, AND COMFORT, ARCHITECTURAL PRESS LTD., 1980	X			X	X	X	X						
WATSON, D., AND K. LABS, CLIMATIC DESIGN, MCGRAW-HILL BOOK CO., 1983	X			X	X	X	X	X					
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CHANDRA, S., P. FAIREY III, AND M. HOUSTON, COOLING WITH VENTILATION, FLORIDA SOLAR ENERGY CENTER, CAPE CANAVERAL, FL, 1986	XX			X	X		XX	XX					
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CLARK, R. AND O. EDHOLM, MAN AND HIS THERMAL ENVIRONMENT, EDWARD ARNOLD PUBLISHERS, 1985	X				XX		X						
LATTA, J., WALLS, WINDOWS, AND ROOFS FOR THE CANADIAN CLIMATE, NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA, 1973	X			X		X	X	X					
BOWEN, A., E. CLARK, AND K. LABS (ed.), PROCEEDINGS OF THE INTERNATIONAL PASSIVE AND HYBRID COOLING CONFERENCE, AMERICAN SOLAR ENERGY SOCIETY, MIAMI,1981	XX	XX	XX	X	X	XX	X	X			X		
FULLERTON, R., BUILDING CONSTRUCTION IN WARM CLIMATES, OXFORD UNIVERSITY PRESS, 1977	X						X	X					
_______., CLIMATES OF THE STATES (3RD ED.), GALE RESEARCH CO., 1985				XX									
MUELLER, M., SELECTED CLIMATIC DATA FOR A GLOBAL SET OF STANDARD STATIONS FOR VEGETATION SCIENCE, DR. W. JUNK PUBLISHERS, 1982				XX									
SLASIN, S. AND G. DECHABANEIX, CARIBBEAN STYLE, C.N. POTTER, 1985	X					XX	X	X					

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AUTHOR, TITLE, PUBLISHER, DATE	BASICALLY, A QUALITATIVE PRESENTATION	ANALYTIC EXPRESSIONS FOR ASSESSING/PREDICTING AIRE FLOW	EXTERNAL MEASUREMENT TECHNIQUES ILLUSTRATED	BUILDING INTERIOR MEASUREMENT TECHNIQUES ILLUSTRATED	RECOMMENDED BUILDING FORMS ILLUSTRATED (FOR GOOD AIR FLOW)	POTENTIALLY-USEFUL BIBLIOGRAPHIC INFORMATION	DIFFICULTY LEVEL ANTICIPATED FOR STUDENT USERS (1= EASY to 4 = HARD)				
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**EXPLANATION OF SYMBOLS: X = INFORMATION PRESENT IN TEXT;
XX = VERY GOOD SOURCE FOR INFORMATION**

AUTHOR, TITLE, PUBLISHER, DATE	BASICALLY, A QUALITATIVE PRESENTATION	ANALYTIC EXPRESSIONS FOR ASSESSING/PREDICTING AIRE FLOW	EXTERNAL MEASUREMENT TECHNIQUES ILLUSTRATED	BUILDING INTERIOR MEASUREMENT TECHNIQUES ILLUSTRATED	RECOMMENDED BUILDING FORMS ILLUSTRATED (FOR GOOD AIR FLOW)	POTENTIALLY-USEFUL BIBLIOGRAPHIC INFORMATION	DIFFICULTY LEVEL ANTICIPATED FOR STUDENT USERS (1= EASY to 4 = HARD)
ROSENBERG, N., B. BLAD, AND S. VERMA, MICROCLIMATE: THE BIOLOGICAL ENVIRONMENT (2ND ED.), JOHN WILEY & SONS, 1983			X			X	3
FRITSCHEN, L. AND L. GAY, ENVIRONMENTAL INSTRUMENTATION, SPRINGER-VERLAG, 1979				X		XX	3
SHERMAN, M. (ed.), AIR CHANGE RATE AND AIRTIGHTNESS IN BUILDINGS, AMERICAN SOCIETY FOR TESTING AND MATERIALS (STP 1067), 1990		XX		XX		XX	4
CHARLESWORTH, P., AIR EXCHANGE RATE AND AIRTIGHTNESS MEASUREMENT TECHNIQUES -- AN APPLICATIONS GUIDE, AIR INFILTRATION AND VENTILATION CENTRE, 1988		X		XX		XX	4
LIDDAMENT, M., AIR INFILTRATION CALCULATION TECHNIQUES -- AN APPLICATION GUIDE, AIR INFILTRATION AND VENTILATION CENTRE, 1986		XX		X		XX	4
_______., ASHRAE HANDBOOK OF FUNDAMENTALS, AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS, INC., 1993		X	X	X		XX	4
_______., VENTILATION EFFECTIVENESS [ASHRAE TECHNICAL DATA BULLETIN, 8(2)], AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS, INC, 1992		X		X		XX	3
CHEN, Q., INDOOR AIRFLOW, AIR QUALITY, AND ENERGY CONSUMPTION OF BUILDINGS, FACULTY OF MECHANICAL ENGINEERING, DELFT UNIVERSITY OF TECHNOLOGY, THE NETHERLANDS, 1988		XX		X		XX	4
HOLMAN, J., HEAT TRANSFER (4TH ED.), MCGRAW-HILL BOOK CO,. 1976		XX				X	4