

THE DETERMINATION OF CONSUMER SATISFACTION
WITH LOAD MANAGEMENT DEVICES ON HOME APPLIANCES

by

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This report to the Public Utility Research Center, College of Business Administration, University of Florida, is based on consultations with Florida Power and Light Company concerning assessment of consumer satisfaction with load management devices. Neither organization has reviewed the contents of this Report. The authors are solely responsible for the findings and conclusions.

One of the most important issues facing suppliers of electric power today is load management. Utility companies must plan for, and construct, sufficient generating capacity to cover peaks of demand for electricity which may be far in excess of average daily demand. This means that much generating capacity must be held in reserve over and above that needed to handle emergencies (such as the failure of a generator). Obviously, it would be beneficial to the utility if the demand curve for power could be smoothed, as fewer resources would need to be devoted to construction and maintenance of reserve generating capacity. This would also work to the benefit of consumers, since their rates should decrease in proportion to the utility's lower construction and maintenance costs.

One means of regulating demand is through the use of "load management devices". These are essentially remote-control switches which can be placed on major electrical appliances. The utility can then either turn off the appliance for a period during times of peak demand, or "cycle" the appliance on and off at specified intervals. Usually, appliances such as air conditioners and electric heaters are cycled, while water heaters are simply turned off for some interval.

While the ability to control home electric consumption may represent an economic benefit to both the utility and consumers, it may also represent an inconvenience or hardship to the consumer. Thus, it is important to know the effect of load control devices on consumer's satisfaction with their appliances' performance, comfort in the home, inconvenience associated with daily activities and so forth. This is particularly necessary given the current regulatory requirement that consumers volunteer to have such devices placed in their home.

With this information, the utility can estimate how many customers would

be willing to have load management devices installed on a permanent basis, and the amount of financial incentive required to offset any feelings of discomfort or inconvenience. Research in this area could also identify particular problems that consumers experience with load control and provide management with information that could be used to alter the timing and frequency of control or that could be used to help consumers cope better with such control. In addition, information gained from the research could be employed to calculate the level of compensation necessary to achieve a given savings in reserve generating capacity.

In order to obtain reliable and valid information, a properly designed study is vital. One must carefully specify the questions to be addressed, and design a series of measures to reflect variables of interest. The study must be conducted over a sufficient period of time to allow initial adjustment to the equipment, as well as to account for seasonal variation in such variables as comfort. A sufficient time period must elapse for changes in satisfaction to make themselves evident, and the course of such changes evaluated. And, of course, the study must be designed in such a way that alternative explanations for any changes in satisfaction levels, amount of desired incentive payment, etc. can be eliminated, and the true effects of the load management device's operation detected. Finally, the sample studied must be representative of the population of interest, or inferences must be appropriately restricted.

Study Design. The question addressed here is "What are the effects on customer satisfaction and behavior of the installation and operation of load management devices controlling consumer's air conditioners, home electric heating systems, and hot water heaters?" The devices are designed to cycle air conditioners on and off at 20-minute intervals, and to turn off water heaters for up to 6 hours. The two types of control are to be independently enforced.

In order to have an appropriate baseline, at least two groups are necessary - an experimental group which experiences control, and a control group which does not. However, only two groups are inadequate. Even if people were (as experimental logic requires) randomly assigned to experimental and control groups, any differences between them might be due to any of several factors:

1. Receipt of incentive payments (yes for experimental, no for control).
2. Simply having the control equipment and monitor lights in the home, whether or not it was ever used.
3. The feeling of special treatment or attention obtained from being in an experiment (the "Hawthorne effect").
4. Resentment at not being chosen for the experimental group by controls.
5. Joint or "interactive" effects of the equipment's presence with other factors, such as temperature, humidity, etc. which might increase or decrease satisfaction responses. For example, with high humidity, actual cycling of the air conditioner might produce lower satisfaction as compared to a "no equipment" control. However, the mere possibility of cycling of the air conditioner might produce lower satisfaction as well, whether or not actual control took place. Under low humidity conditions, no differences might occur.

Thus, additional control groups are necessary. The first should be a "placebo" group, whose members are treated identically with the experimental group with one exception: their control equipment is never used. Comparison of the group with the true experimental group shows the effects of the actual operation of the equipment, over and above the factors listed earlier. Without such a control group, one could easily be misled about the level of satisfaction or dissatisfaction with load management.

Additional controls are also necessary. To discover if there is indeed an effect of simply installing the equipment, a control group which is "participating" but does not get the control equipment installed is necessary. A "waiting list" control group is ideal; these people are told that, due to the small amount of equipment available, they have been placed on a waiting list. They are asked to complete the measures, receiving an incentive for doing so. Comparison of this group with the placebo group reveals effects due to the

presence of the equipment and more "active" participation in the study.

A fourth, "minimal involvement" group, should be told they were not included in the study due to equipment limitations, and definitely will not receive any load management devices. They should be invited to participate in a "different" study, completing appropriate measures for an incentive payment. Comparison of this group with others will reveal participation effects - for example, any effects of "anticipation" or Hawthorne effects in the waiting list group. Comparison with the experimental group will show the effects of all factors in combination. As the study proceeds, factors such as the Hawthorne effect might diminish, narrowing the difference between placebo, waiting list, and minimal involvement groups, permitting a better judgment of the effects of the actual operation of the load management devices over time.

Sample Selection. Since only volunteers are to be included in a load management program, the usual problem of inference from volunteer to non-volunteer population does not exist. An initial survey would establish the potential group of participants, as well as providing information on how potential volunteers may differ in terms of demographic or other variables (attitude towards conservation of energy, for example) from nonvolunteers.

Once the potential sample is defined, it should be stratified on appropriate variables, such as income, family size, neighborhood, physical structure of the home, etc. Which variables are most important is at this point a matter of judgment, as no data exist relating demographic to responses to load management. From these strata, homes are assigned at random to each of the experimental and control groups, so that each group is stratified similarly to the total sample. Of course, the more equipment that is available, the more stratification variables can be included; the size of the experimental and placebo groups limits the number of variables that can

adequately be represented in them.

Time Sampling. A two-year period is the minimum time adequate to conduct such a study. This is simply because random variations in seasonal severity could produce relatively unique effects on satisfaction or dissatisfaction. A very cool summer would be expected to result in little control of air conditioning equipment, thus little reason for dissatisfaction. A hot and humid summer would produce the opposite effect. Thus, two complete seasonal cycles, at a minimum, are necessary to adequately estimate the effects of load management.

Another factor is also important. It may require a season for people to become adjusted to load management, for example by changing their activities. Thus, the long-term effects can only be estimated in the second season of use.

Measurement frequency is another issue. While it is desirable to gather data as often as possible on variables of interest, people cannot be induced to answer questions too often or too extensively.

Since satisfaction and other variables must be measured via questionnaires, a minimally satisfactory interval should be determined for each of several sets of variables. In this way, the respondent answers the smallest number of questions on the fewest occasions consistent with the research goals.

For variables such as comfort, monthly questioning would be the minimal interval. This allows adequate tracking of the effects of weather variation, for example, without causing annoyance. Other measures, such as changes in activity, may be collected at longer intervals - seasonally, for example. This would allow adequate time for such changes to take place and become part of household routine. Too long a measurement interval is undesirable because of retrospective distortion in responses or simple forgetting.

It is true that multiple measurements may have reactive effects. However, these effects should be either equivalent in the various groups or, if not,

then detectable by appropriate comparisons. For example, if measurement suggests changes in household activities uniquely relevant to those whose appliances are controlled, an experimental group vs. placebo group difference on that variable should be detected.

The only alternative to multiple measurement is quite costly - independent groups of respondents measured once, at different times. Without multiple measures, changes in the variables of interest cannot accurately be traced to weather, to familiarity with control devices, to innovations in household practices, etc. Thus, the possible reactivity is judged less costly than the available alternatives.

Dependent Variables. In this instance, we are concerned with the willingness of consumers to have load management devices installed, changes in satisfaction produced by such devices, the cost of incentive payments required to retain the load management equipment in the home, and possible changes in activities resulting from these devices. Also of concern are the relationships between demographic characteristics and acceptance and satisfaction, physical aspects of the home such as size, roof color, etc., and of course seasonally-based and experience-based changes in the above variables. These concerns are reflected in the list of questions presented in Table 1, supplied by Florida Power & Light Company.

Insert Table 1 here

The questionnaire presented in the Appendix was designed to answer these questions. Questions 1-7, and 9 of Part 1, 1-7 of Part 2, and 9 and 11 of Part 3 were designed to be answered by the total sample. Other questions, dealing specifically with the control equipment, were designed for the experimental and placebo (or "everything but") groups only. Consultation with

TABLE 1

Concerns of Florida Power and Light Company
with Respect to the Design of the
Load Management Study

1. Which customer characteristics affect overall customer acceptance or rejection? A draft copy of the customer application shows the type of data that will be collected.
2. What other variables affect customer acceptance?
 - a. Frequency and duration of control
 - b. Outside temperature and humidity
 - c. Inside temperature setting
 - d. Temperature rise or fall as a result of control
3. Would a guaranteed maximum number of interruptions per year influence acceptance? For example, one might contract for no more than 15 interruptions per year for \$40 or no more than 30 interruptions per year for \$60. In this project, all customers will have the same credit schedule. A copy of the Load Management Agreement that the customer will sign is attached.
4. Are override devices and control indicator lights really necessary? For which type of customer?
5. Will the attitudes of those who decline to volunteer at the beginning of the project change as results of the project are made known to them?
6. Does the quarterly payment method versus bill reduction method of payment affect acceptance (FPL method vs. FPC method)?
7. How were appliance interruptions dealt with by the customers?
8. Is acceptance perceived differently for the water heater than the air conditioning or heating? Does the time of year of control (winter vs. summer) make a difference?

NOTE: Concern #5 was felt to be outside the scope of this study as it requires a separate investigation.

representatives of the sample population and officials of the company would normally establish which questions would be answered monthly, seasonally, semi-annually, or annually.

In developing such a questionnaire, pretesting with respondent population is important. This establishes clarity of wording, meaningfulness of questions and rating tasks, the frequency with which people are willing to fill out the questionnaire, and so forth.

While the method of measuring comfort perceptions, convenience, general satisfaction, and the like is long-established and usually valid, care must be taken to ensure the validity of the concepts themselves. For example, do people really perceive discomfort due to humidity and temperature variation independently? An answer to these sorts of questions would require analysis of data from a pretest sample, and would aid in developing the shortest possible questionnaire. Problems with measurement methods or new approaches might also be uncovered with pretest analyses. For example, scales might be shortened or lengthened, definitions clarified, specific variables added or deleted, several single items combined for analysis into a more general dimension, and so forth.

It must be emphasized that research is a constructive process, and that new research builds on past experience. The design and the measures presented here are means of asking one set of questions. With experience, better methods will be developed, and new questions will suggest themselves. Each round of this process will, hopefully, move the firms involved closer to the goal of providing the best service for the least cost to the consumer.

APPENDIX

Sample Questionnaire and Experimental Procedures
Developed for Florida Power and Light Company

GENERAL PROCEDURES

1. Subject contact and assignment.

- A. Subjects must be randomly assigned to experimental, "everything but" control, waiting list control, and minimal involvement control groups.

If desired, subjects can be stratified on one or more bases, such as geography, education, occupation, yearly power consumption, or income prior to assignment. It is important to remember that with a relatively small sample, a large number of stratification variables will render comparisons meaningless because of small samples within the four groups.

- B. When contacting subjects in experimental and "everything but" conditions, they should be told that the incentive they are receiving is compensation for allowing the control equipment to be placed in their house. They should understand that control is at the option of FP&L and that their appliances may or may not be controlled at the same time as a neighbor's. They should be given evidence that the equipment is in fact operative when it is installed.

They should also understand that filling out the questionnaire is part of the study, and they should commit themselves to filling out the questionnaire at the start. An extra incentive of 25¢ to 50¢ should also be enclosed with the questionnaire.

Subjects in control 3 ("waiting list") and control 4 ("minimal contact") should be told that, because there were more volunteers than equipment available, the equipment was given to randomly selected persons, since that was the fairest procedure for everyone. "Waiting list" control subjects should be told they will get the equipment as it becomes available; minimal involvement control subjects should be told there is little chance of their participating in this study.

Both should then be told that they can participate in a questionnaire study of satisfaction with their appliances and FP&L's service. The questionnaires should be shown to them, and they should be told that they must be filled out on a monthly basis. They should also be told of the incentive payment for each questionnaire.

All those who volunteer should commit themselves, in writing, to return each monthly questionnaire for the full period of the study.

2. Data Coding and Reporting

Most requirements for data coding are contained in the keypunching instructions. In addition, please note the following:

- A. Please enter the subject code, and the month/year on each questionnaire before it is sent out to the respondent.

- B. We will also want to secure important demographic data for each subject. Probably what we should do is agree on which variables you have already collected that would be useful for analytic purposes. This data should then be punched on cards in a format similar to that outlined in the keypunching instructions.
- C. The questionnaires should be administered monthly and the punched data should be sent to us for analysis. Its important that the questionnaire be verified after punching. Any questionnaire not returned by responents should be followed up with a telephone call. Missing data on any questionnaire should be filled in, if possible, by telephone.

LOAD MANAGEMENT PROJECT QUESTIONNAIRE

Response to this questionnaire should refer to the period

Part 1

(Card 1)

(1) - 1 In this part, we are concerned with the comfort level of your home.

(2-4)SC_____ The questions below are designed to tell us how temperature and humidity

(5-7)MY_____ affected your feelings of comfort. Please answer each question according to your true feelings of comfort or discomfort.

(8) 1. On the average, during the period covered by this questionnaire how comfortable was the temperature in your house? Please circle the number that best matches your feelings.

1 2 3 4 5 6
very moderately slightly slightly moderately very
uncomfortable uncomfortable uncomfortable comfortable comfortable comfortable

(9) 2. On the average, during the period covered by this questionnaire, how comfortable was the level of humidity (dryness or dampness) in your home? Please circle the number which best matches your feelings.

1 2 3 4 5 6
very moderately slightly slightly moderately very
uncomfortable uncomfortable uncomfortable comfortable comfortable comfortable

3. Please read the list of activities below. We need to know if there were any times you felt very uncomfortable due to either temperature of humidity (or both) while doing these (or other) things. For each activity we have listed, please write in the space provided the number of times you felt very uncomfortable in your home due to either temperature, humidity or both.

Activity	Temperature (number of times)	Humidity (number of times)
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(10-11)(12-13) a. exercising	_____	_____
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(14-15)(16-17) b. doing housework	_____	_____
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Activity	Temperature (number of times)	Humidity (number of times)
(18-19) (20-21) c. entertaining guests	_____	_____
(22-23) (24-25) d. cooking	_____	_____
(26-27) (28-29) e. ironing	_____	_____
(30-31) (32-33) f. non-strenuous activities (reading, TV viewing)	_____	_____
(34-35) (36-37) g. home repair work	_____	_____
h. other (please list)	_____	_____
(38-39) (40-41) h. _____	_____	_____
(42-43) (44-45) i. _____	_____	_____
(46-47) (48-49) j. _____	_____	_____
(50-51) (52-53) k. _____	_____	_____

4. Did any family members feel especially uncomfortable during this period due to temperature or humidity (or both)? Please check all that apply.

(T)	(H)	Not in home	yes, temperature	yes, humidity
(54 - 55)	a. Wife	_____	_____	_____
(56 - 57)	b. Husband	_____	_____	_____
(58 - 59)	c. Male children	_____	_____	_____
(60 - 61)	d. Female children	_____	_____	_____
(62 - 63)	e. Grandmother	_____	_____	_____
(64 - 65)	f. Grandfather	_____	_____	_____
	g. Others	_____	_____	_____
	(Please list)			
(66 - 67)	h. _____	_____	_____	_____
(68 - 69)	i. _____	_____	_____	_____
(70 - 71)	j. _____	_____	_____	_____

(Card 2)
(1) - 2

(2-7)-DUP

5. (A) Air Conditioning. Which of the following things did you do in this period to make sure that you and your family were comfortably cool? Please check each one that you did.

	Activity	yes (✓)	Convenience rating (see question 6)
(8-10)	a. used window or portable fan	_____	_____
(11-13)	b. used attic fan	_____	_____
(14-16)	c. pre-cooled house	_____	_____
(17-19)	d. opened doors/windows	_____	_____
(20-22)	e. shut rooms when not in use	_____	_____
(23-25)	f. ate out (restaurant)	_____	_____
(26-28)	g. cooked outdoors	_____	_____
(29-31)	h. avoided using oven	_____	_____
(32-34)	i. changed time of using clothes dryer	_____	_____
(35-37)	j. closed curtains	_____	_____
(38-40)	k. installed sun control film	_____	_____
(41-43)	l. added insulation	_____	_____
(44-46)	m. added weatherstripping	_____	_____
(47-49)	n. spent more time away from home. (i.e., movies, shopping, etc.)	_____	_____
(50-52)	o. wore lighter clothing	_____	_____
(53-55)	p. Other (Please list)	_____	_____
(56-58)	q. _____	_____	_____
(59-61)	r. _____	_____	_____
(62-64)	s. _____	_____	_____

(Card 3)
(1) - 3

5. (B) Heating. Answers to questions in this section refer to things that you did in order to keep your house or yourself comfortably warm. Please check each thing that you did.

(2-7)-DUP

	Activity	yes (✓)	Convenience rating (see question 6)
(8-10)	a. bought an electric heater	_____	_____
(11-13)	b. used an electric heater previously owned	_____	_____
(14-16)	c. used a fireplace for heat	_____	_____
(17-19)	d. pre-warmed the house (warmed house to higher temperature than normal)	_____	_____
(20-22)	e. closed curtains	_____	_____
(23-25)	f. added insulation	_____	_____
(26-28)	g. added weatherstripping to doors/windows	_____	_____
(29-31)	h. shut off little-used rooms	_____	_____
(32-34)	i. spent more time away from home (for example movies, shopping)	_____	_____
(35-37)	j. dressed more warmly	_____	_____
(38-40)	k. cooked with oven	_____	_____
(41-43)	l. used clothes dryer	_____	_____
(44-46)	m. went to bed earlier	_____	_____
(47-49)	n. used electric blanket	_____	_____
(50-52)	o. arranged furniture to heat more efficiently (i.e., put couch in front of fireplace)	_____	_____
	Others (please list)		
(53-55)	p. _____	_____	_____
(56-58)	q. _____	_____	_____
(59-61)	r. _____	_____	_____

6. Please go back and consider those things you checked in questions 5A and 5B. In the space provided under "Convenience Rating", please place a number from 1 to 7, using the scale below, telling us how convenient or inconvenient you feel it was for you to do each of those things. For example, if you used a window fan to help cool your house, and you felt that this was very inconvenient, you would write a -3 in the space provided. If you thought it was slightly convenient you would write a +1, and so forth. Remember, we need to have a convenience rating for each item you checked or listed in question 5.

-3	-2	-1	0	+1	+2	+3
very	moderately	slightly	neither con-	slightly	moderately	very
inconvenient	inconvenient	inconvenient	venient nor	convenient	convenient	convenient

(62-63)

7. Considering all those things that you checked above, how convenient or inconvenient was it on the average for you to do them? (Circle the number that best indicates your feelings).

-3	-2	-1	0	+1	+2	+3
very	moderately	slightly	neither con-	slightly	moderately	very
inconvenient	inconvenient	inconvenient	venient nor	convenient	convenient	convenient

(64)

8. How many times during the period covered by this questionnaire do you think your heat or air conditioning was controlled by FP&L? Please circle one.

not certain 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 more than 15

(65-68)

On the average how long was each period of control?

_____ hours _____ minutes

[Note - this question is omitted from the questionnaire for control groups 3 & 4]

9. During the period covered by this questionnaire, at what temperature did you usually set your thermostat:

(69-70)

During the day? _____

(71-72)

During the night? _____

Part 2

Water Heater

(Card 4)
(1) - 4
(2-7)-DUP

1. How many times during the period covered by the questionnaire did you or other family members run out of hot water while doing each of the following things?

	Activity	Number of times hot water ran out	Convenience rating (see question 2)
(8-11)	a. showering or bathing	_____	_____
(12-15)	b. bathing children	_____	_____
(16-19)	c. washing dishes	_____	_____
(20-23)	d. washing clothes	_____	_____
(24-27)	e. house cleaning requiring hot water	_____	_____
	Other (please list)		
(28-31)	f. _____	_____	_____
(32-35)	g. _____	_____	_____
(36-39)	h. _____	_____	_____

(40-41) 2. Now, please go back and consider each activity during which you ran out of hot water at least once. In the space provided under "Convenience Rating", write a number from 1 to 7, using the scale below, to tell us how inconvenient you felt it was to run out of hot water at that time.

-3 -2 -1 0 +1 +2 +3
 very moderately slightly neither con- slightly moderately very
 inconvenient inconvenient inconvenient venient nor convenient convenient convenient

3. Which of the following things did you do during the period covered by this questionnaire to make sure you didn't run out of hot water? Please check each

one that applies.

	Activity	yes (✓)	Convenience rating (see question 4)
(42-44)	a. changed time of bathing or showering	_____	_____
(45-47)	b. changed time of bathing children	_____	_____
(48-50)	c. changed time of washing dishes	_____	_____
(51-53)	d. changed time of washing clothes	_____	_____
(54-56)	e. changed time of house-keeping requiring hot water	_____	_____
(57-59)	f. washed clothes in cold water	_____	_____
(60-62)	g. took shorter showers and/or shallower baths	_____	_____
(63-65)	h. washed clothes less often	_____	_____
(66-68)	i. washed dishes less often	_____	_____
(69-71)	j. took cooler showers/baths	_____	_____
(72-74)	k. did housecleaning with hot water less often	_____	_____
(Card 5) (1) - 5 (2-7)-DUP	Other (please list)	_____	_____
(8-10)	l. _____	_____	_____
(11-13)	m. _____	_____	_____
(14-16)	n. _____	_____	_____

4. Now, please go back and consider each activity that you checked or listed in question 3. In the space provided under "Convenience Rating", write a number from 1 to 7, using the scale below, to tell us how inconvenient you felt it was to do each thing. For example, if you thought it was moderately

inconvenient to wash your dishes at a different time than you normally would, you would write a -2 in the space provided.

-3	-2	-1	0	+1	+2	+3
very inconvenient	moderately inconvenient	slightly inconvenient	neither con- venient nor inconvenient	slightly convenient	moderately convenient	very conven- ient

(17-18) 5. Considering all those things that you checked above, how convenient or inconvenient was it on the average for you to do them? (Circle the number that best indicates your feelings).

-3	-2	-1	0	+1	+2	+3
very inconvenient	moderately inconvenient	slightly inconvenient	neither con- venient nor inconvenient	slightly convenient	moderately convenient	very conven- ient

[Note - questions 6-8 are for the experimental and "everything but" groups only]

(14-20) 6. How many times during the period covered by the questionnaire was your water heater controlled by FP&L? Please circle one.

not certain 1 2 3 4 5 6 7 8 9 10 12 13 14 15 more than 15

(21-24) 7. On the average, how long was each period of control?

_____ hours _____ minutes

(25-27) 8. Considering those times when you ran out of hot water: What percent of those do you think were caused by the control device on your water heater? (Please circle the percentage closest to your best estimate). For example, if you thought that about half of the times you ran out of hot water were the fault of the control device you would circle 50%.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Part 3

[Part 3 is mostly for the experimental and "everything but" groups. Only questions 9 and 11 should be used for the other control groups].

This section concerns your general reaction to having the control device in your home.

1. On the average, how many times each day during the period covered by this

questionnaire did you check the indicator light on your:

(28-29) a. heater or air conditioner _____

(30-31) b. water heater _____

2. How many times during the period covered by the questionnaire did you override the control on your:

(32-33) a. heater or air conditioner _____

(34-35) b. water heater _____

(36) 3. If you overrode the control on the heater or air conditioner: on the average how much did overriding the control reduce the discomfort that control by FP&L was causing? (Circle one)

1	2	3	4	5	6	7
did not reduce it at all		slightly reduced it		moderately reduced it		eliminated it completely

(37) 4. If you overrode the control of your water heater: on the average, how much did overriding the control reduce the inconvenience that control by FP&L was causing?

1	2	3	4	5	6	7
did not reduce it at all		slightly reduced it		moderately reduced it		eliminated it completely

5. In the space below, please list the situations that caused you to override the controls on your heater or air conditioner. That is, why did you decide to override the control?

groups

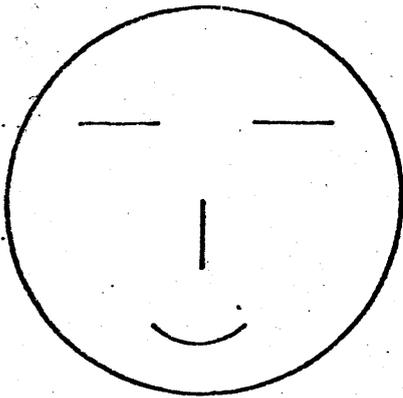
6. In the space provided below, please list the situations that caused you to override the control on your water heater. That is, why did you decide to override the control?

7. Please look at the "Faces Scale" on page 10A. Although it seems simple, it has been carefully developed to measure people's feelings about a number of different things.

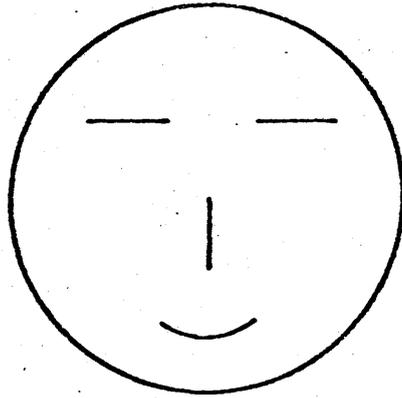
8. (A) Please choose the face which best matches your feelings about having the control equipment on your water heater, and write the number of that face in the space below.

(38)

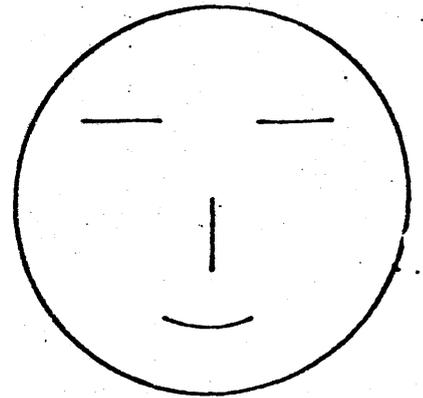
8. (B) Please choose the faces which best match your feelings about having the control equipment on your heating and air conditioning and write the



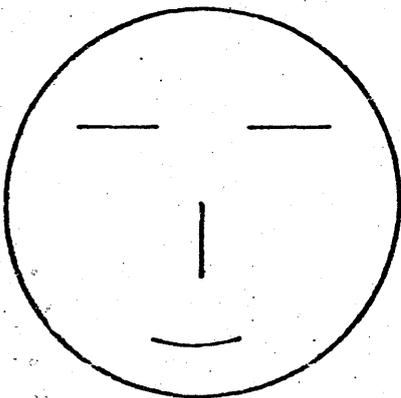
9



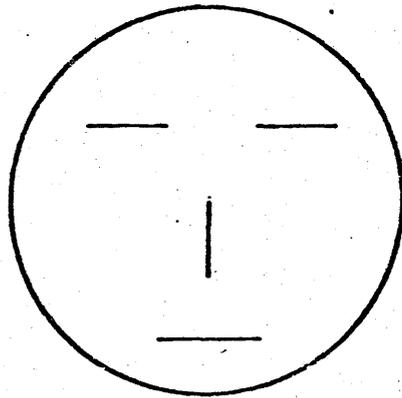
8



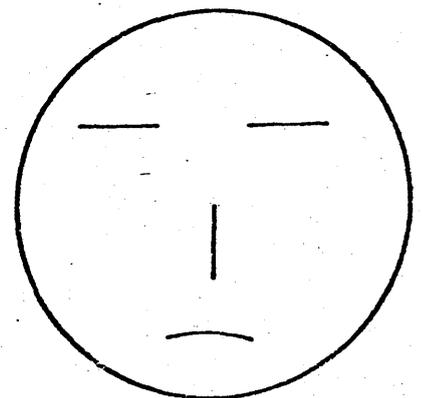
7



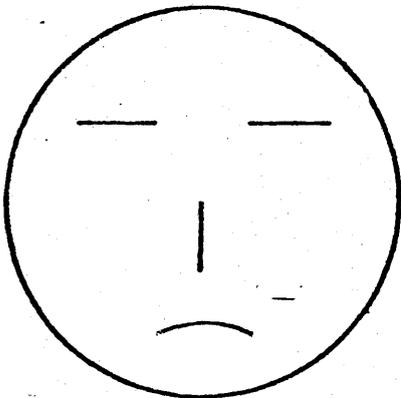
6



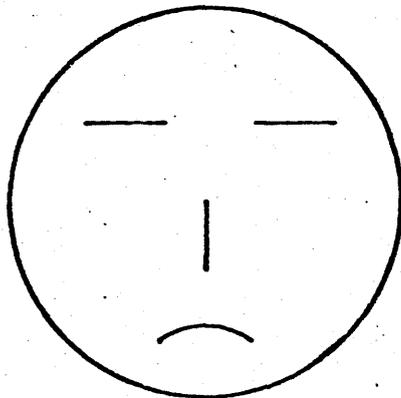
5



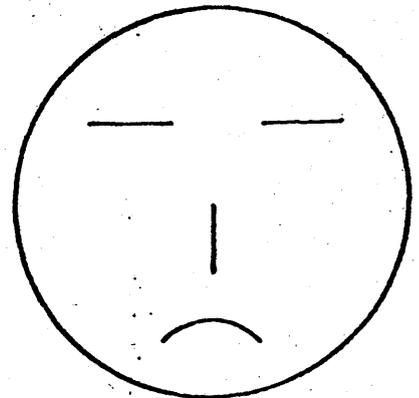
4



3



2



1

FACES SCALE

numbers of those faces in the spaces below (if you wish, you may choose different faces for heating and air conditioning):

Heating Air Conditioning

(39-40)

9. Using the faces scale again, please write the number of the face which best matches your overall feelings about the service provided by FP&L in the space below.

(41)

10. (A) Based on your experience this month, if you were offered the chance to keep the control equipment on your water heater after this project is over, what is the smallest amount of money you would want per month before you would agree to do so? (Please answer to the nearest dollar).

(42-43)

10. (B) Now please answer the same question for your air conditioner. What is the smallest amount of money you would have to have per month before you would agree to have the control on your air conditioner after this project is over?

(44-45)

10. (C) Now please answer the same question for your heating equipment. What is the smallest amount of money you would have to have per month before you would agree to have the control on your heating equipment after this project is over?

(46-47)

11. (A) What is the greatest number of interruptions to your water heater per month that you would be willing to accept for each of the following

monthly payments?

\$1.00 \$2.00 \$3.00 \$4.00 \$5.00 \$6.00 \$7.00 \$8.00 \$9.00 \$10.00

(48-49) (50-51) (52-53) (54-55) (56-57) (58-59) (60-61) (62-63) (64-65) (66-67)

11. (B) What is the greatest number of interruptions to your air conditioning per month that you would be willing to accept for each of the following monthly payments?

(Card 6)

\$1.00 \$2.00 \$3.00 \$4.00 \$5.00 \$6.00 \$7.00 \$8.00 \$9.00 \$10.00

(1) - 6

(8-9) (10-11) (12-13) (14-15) (16-17) (18-19) (20-21) (22-23) (24-25) (26-27)

(2-7)-DUP

11. (C) What is the greatest number of interruptions to your heating equipment per month that you would be willing to accept for each of the following monthly payments?

\$1.00 \$2.00 \$3.00 \$4.00 \$5.00 \$6.00 \$7.00 \$8.00 \$9.00 \$10.00

(28-29) (30-31) (32-33) (34-35) (36-37) (38-39) (40-41) (42-43) (44-45) (46-47)

12. Please check which method of payment you would like for having the control equipment in your home.

_____ 1. A check from FP&L every 3 months.

_____ 2. A reduction in your monthly bill.

_____ 3. No preference.

Keypunching Instructions

Numbers in the left hand margin indicate column numbers. The first column of each card will contain the card number. This will be noted on the questionnaire. Unless otherwise indicated, leave a blank if there is no response to an item. All entries should be right justified.

Special Problems:

Card 1

Cols. 2-4. This contains the Subject Code (SC) which should be written on the questionnaire. Col. 2 designates the experimental condition for the subject:

- 1 - Experimental
- 2 - "Everything But" Control
- 3 - Waiting List Control
- 4 - Minimal Involvement Control

Cols. 3-4 contains the subject number. Subjects in each condition should be numbered consecutively starting with 01.

Cols. 5-7 contain the month/year code. Months should be coded 01 through 12 and punched in Cols. 5-6. The last digit of the year should be punched in column 7.

Columns 2-7 will be duplicated on later cards (DUP is noted on the questionnaire).

Cols. 54-71 contain responses to question 4, Part 1. The columns listed refer only to responses in the temperature and humidity columns. Punch a 1 anytime a column is checked, a zero otherwise. However, if both temperature and humidity columns are blanks for a given item leave both columns blank for that item.

Card 2

Cols. 8-64 contain responses to question 5A, Part 1. Each item is punched in three columns. The first column should be punched with a 1 if there is a check for the item, otherwise a zero should be punched. If the column is checked, also punch the convenience rating. If not, leave the last two columns for the item blank.

Card 3

Cols. 8-61 should be punched the same as cols. 8-64 on Card 2.

Cols. 65-68. Cols. 65-66 are for hours, cols. 67-68 are for minutes.

Card 4

Cols. 8-39 are for question 1 of Part 2. Four columns are devoted to each item. The first two columns contain the number of times the subject ran out of hot water. The second two columns are for the convenience rating. If the number of times is zero, leave the convenience columns blank for that item.

Cols. 42-74 and Card 5, Cols. 8-16. See instructions for Card 2, Cols. 8-64.

Cols. 19-20 contain the response to question 6 of Part 2. Punch a zero if not certain is circled, a 16 if "more than 15" is circled.

Cols. 21-24. See instructions for Card 3, Cols. 65-68.

Cols. 39-40. Col. 39 contains the response for heating while col. 40 contains the response for air conditioning.