January 22, 2004

MEMORANDUM FOR   Chester E. Bowie
                              Chief, Demographic Surveys Division

From: Alan R. Tupek
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Subject: American Housing Survey - National Sample (AHS-N): 2003
                              Annual Cost Estimates for Electricity and Natural Gas

I.   PURPOSE OF THESE SPECIFICATIONS

The Longitudinal Surveys Branch (LSB) of DSMD is providing you the specifications needed to obtain the estimates of annual costs for electricity and natural gas using data from the 1997 Residential Energy Consumption Survey (RECS). Use these specifications for interviewed households (HHs) in the AHS-N.

Please note, you completed the work in this specification. We updated the specification with the modifications during the computer programming process.

II.   OVERVIEW

These specifications replace the system used by AHS-N since 1993. The 1993 specifications are given in reference [1].

These specifications update two areas.

- **the coefficients when monthly cost data is provided**
- **the inflation factor**

Documentation for the inflation factor is in reference 2.

There are three additions to the utility cost system.
- **coefficients for average monthly cost**
- **coefficients for no monthly cost**
- **hot deck system for records needing a utility cost**

Specifications for the hot deck system are from reference 3.

III.   DATA CHARACTERISTICS

We used the same data characteristics to determine the annual cost estimates for electricity and natural gas.   See Attachment A–1 for the 22 data characteristics.

We created a variable called model number (model #). Each model # utilizes specific data from the record, either monthly data or average monthly data. For example, model #1 uses January, April, August, and December monthly data in the coefficient database. Model #16 uses average monthly data in the coefficient database. The coefficient for the average monthly cost is in the same field as the coefficient for the January bill. Model #17 uses no monthly data. See Attachment A–2 to identify the specific months for each model number.

A model # is unique in each census division (CD).
All records needing a utility cost must have a model #.

IV.   RECODING THE DATA CHARACTERISTICS

Use the recodes in attachment B for each data characteristic. These are the same recodes as in the previous utility system.

The recodes provided use the codebook variables and values from the automated questionnaire instrument.

All characteristics and data came from the RECS. The RECS characteristics were matched to the AHS characteristics to create the recodes needed for the utility costs.

V.   COEFFICIENTS FOR THE DATA CHARACTERISTICS

There are two files containing coefficients, one for electricity and one for natural gas.

- •   The file with the electric coefficients uses 16 data characteristics.
- •   The electric file excludes the coefficients for the billing months for natural gas.
- •   There are no intercepts on the file.

LSB provided a new file to you for the 2003 utility edits. The new file replaces the file from the previous system. See attachment C–1 for the record layout for the electricity file. See attachments C-2 to C-6 for the electricity coefficients.

- •   The file with the natural gas coefficients uses 16 data characteristics.
- •   The natural gas file excludes the four billing months for electricity.
- •   There are no intercepts on the file.

LSB provided a new file to you for the 2003 utility edits. The new file replaces the file from the previous system.   See attachment C–1 for the record layout for the natural gas

file. See attachments C-7 to C-11 for the natural gas coefficients.

NOTE: For both electric and natural gas coefficients, use the New England CD for any sample unit in Alaska and use the West South Central CD for any sample unit in Hawaii.

VI. CALCULATION OF THE REGRESSION EQUATION FOR ELECTRICITY

Determine the census division and the electric billing months for each respondent.

NOTE: Multiply all coefficients *except the billing month coefficients* by an inflation factor since the coefficients are based on 1997 RECS data.

The inflation factor is in reference [2].

A. Four or Three Billing Months Provided for Electricity (Model #1 - #4)

Perform the following steps:

1. Determine the appropriate model # for the record.

2. Multiply the coefficient by the amount for each month.

3. Add the products generated in Step (2.) to compute the total amount.

4. Check the total amount against the cutoff values.

For example, a respondent from the New England (census division = 1) gave January's bill as $103, April's bill as $88, and August's bill as $76 (model #4). Multiply the coefficients on the electric file to billing amount. Add the product from each month to compute the total amount.

JANUARY		APRIL		AUGUST		
coefficient	amount	coefficient	amount	coefficient	amount	TOTAL AMOUNT
2.95582	103	4.95712	88	3.55959	76	
304.45		436.23		270.53		1011.21

B. Two Billing Months Provided for Electricity except for January and December (Model # 5 - #7 & #9 - #11)

Perform the following steps:

1. Determine the appropriate model # for the record.

2.   Multiply the coefficient by the amount for each month.

3.   Add the products generated in Step (2.) to compute the total amount.

4.   Check the total amount against the cutoff values.

For example, a respondent from New England (CD = 1) gave January's bill as $65 and August's bill as $95 (model #7). Multiply the coefficients on the electric file to billing amount. Add the product from each month to compute the total amount.

JANUARY		AUGUST		
coefficient	amount	coefficient	amount	TOTAL AMOUNT
5.74031	65	4.69599	95	
373.12		446.12		819.24

C.   January and December Billing Months Provided for Electricity (Model #8)

If the respondent provided only January and December billing months, then:

1.   Multiply the coefficient from the electric file for January and December (model #8) by the amount given by the respondent.

2.   Determine the number of rooms and number of household members from the recodes in the attachments.

3.   Apply the current inflation factor to the coefficient from the electric file for rooms and household members. See reference [2] for the appropriate inflation factor.

4.   Multiply the product specified in Step (3.) by the number of rooms and household members.

5.   Add the four products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

NOTE: Every CD uses rooms and members in the regression equation.

For example, a respondent from New England (CD = 1) gave January's bill as $113 and December's bill as $102. The respondent had 6 rooms and 3 household members. Follow the table to find the total amount.

Variable	Coefficient	Current Inflation Factor	Recoded Value	Product
January Bill	3.45822	Not Applied	113	390.78
December Bill	4.31831	Not Applied	102	440.47
Rooms	17.88933	1.035	6	107.34
Members	34.92139	1.035	3	104.76
			TOTAL AMOUNT	1043.35

D. One Billing Month Provided for Electricity (Model #12 - #15)

If the respondent provided only one billing month, then you must determine the recode values of all the variables. No consistent pattern exists within a CD or across any month in determining the total electric amount. LSB analyzed each month separately to determine the best regression equation.

Multiply all coefficients *except the billing month* by an inflation factor since the coefficients are based on 1997 RECS data. See reference [2] for the appropriate inflation factor.

Perform the following steps to find the total electric amount:

1.   Determine which month (model #) the respondent provided:

Model #	Month Provided	Model #	Month Provided
12	January	14	August
13	April	15	December

2.   Determine the recode values of all the variables.

3.   Apply the current inflation factor to the coefficient for each variable from the electric file *except for the billing months*. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.   Multiply the product specified in Step (3.) by the recodes specified in Step (2.).

5.   Add the products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

For example, a respondent from New England (CD = 1) gave August's bill as $70. The recoded values are given in the following table:

Variable	Coefficient	Current Inflation factor	Recoded Value	Product
August Bill	7.01234	Not Applied	70	490.86
Electric Heat	339.80199	1.035	1	351.70
Gas Heat	0	1.035	0	0
Electric Hot Water	227.61084	1.035	1	235.58
Gas Hot Water	0	1.035	0	0
Year Built	0	1.035	7	0
Type of Home	0	1.035	2	0
Rooms	0	1.035	8	0
Baths	45.58996	1.035	2.5	117.96
Appliances	29.56274	1.035	7	214.18
Members	32.62334	1.035	4	135.06
			TOTAL AMOUNT	1545.34

E.   **Average Monthly Cost Provided for Electricity (Model #16)**

Calculations for the average monthly cost are new in this utility system.

If the respondent provided only an average monthly costs for electricity, then determine the annual cost using the coefficient database. This step is different from the process used before 2003.

1.   Use Model #16.

2.   Determine the recode values of all the variables.

Please note that the coefficient for the average monthly cost is in the first field. Since the average monthly cost occurs only for model #16 and there are no billing months for model #16, we placed the coefficient for average monthly cost in the first field. This would not alter the field structure of the coefficient database from the previous system.

3.   Apply the current inflation factor to the coefficient for each variable from the electric file *except for the average monthly cost*. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.   Multiply the product from Step (3.) by the recodes specified in Step (2.).

5.   Add the products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

For example, a respondent from the Pacific division (census division = 9) gave an average monthly bill for electricity as $700. The recoded values are given in the following table:

Variable	Coefficient	Current Inflation factor	Recoded Value	Product
Average Monthly Cost	10.41	Not Applied	700	7287.00
Electric Heat	87.82	1.035	1	90.89
Gas Heat	0	1.035	0	0
Electric Hot Water	57.78	1.035	1	59.80
Gas Hot Water	-72.89	1.035	0	0
Year Built	0	1.035	7	0
Type of Home	0	1.035	2	0
Rooms	18.83	1.035	8	155.91
Baths	0	1.035	2.5	0
Appliances	13.41	1.035	7	97.16
Members	-1.20	1.035	4	-4.97
TOTAL AMOUNT				7685.79

The monthly value ($640.48) from the total amount ($7685.79) exceeds the upper cutoff value ($525) in the Pacific division. Since the monthly value exceeds the upper cutoff value, then follow the procedures in section XI. In this case, the utility system assigns model #17 (no monthly cost). Then the record will exceed the lower cutoff value and go to the imputation (hot deck) system. See reference 3 for more details about the utility imputation system.

F.   No Monthly Cost Provided for Electricity (Model #17)

Determination of the utility costs for records with no monthly cost is new.

This step is different from the process used before 2003.

1.   Use Model #17, if the respondent did not provide any billing data, specific months or an average monthly cost.

2.   Determine the recode values of all the variables.

3.   Apply the current inflation factor to the coefficient for each variable from the electric file. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.   Multiply the product from Step (3.) by the recodes specified in Step (2.).

5.   Add the products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

For 2003, all the coefficient values for model # 17 are zero. So, all records using model #17 will be below the low cutoff. These records will obtain a utility cost through the hot deck system. See reference 3 for details about the hot deck system. LSB may update the coefficients on the file in future enumerations.

VII.   CUTOFF VALUES FOR ELECTRICITY

There is one procedure for all records. This is a change from the previous system. All utility cost estimates come from regression coefficients based on the 1997 RECS.

There are two cutoff values, a low cutoff value and a high cutoff value.

The low cutoff value is 4 for all records. If a record is below the low cutoff value, then blank the annual cost and impute it using the computer edits provided in reference [3]. The low cutoff value follows the consistency edit #132 from the housing cost table 2.

Table Q in Attachment D-2 contains the high cutoff values to use for the procedure. LSB modified these monthly cutoff values and you used them for each census division. Refer to Attachment D-1 for a detailed discussion of this modification. You multiplied these monthly cutoff values by both 12 and the inflation factor.

After computing the annual electricity cost using the regression equations perform the following steps:

1.   Compare the annual electricity cost to the cutoff for the CD. If it is less than or equal to the cutoff, go to the next record.

2.   If the electricity cost used model # 16 (the average monthly cost), then blank the annual cost and impute it using the computer edits provided in reference [3].

3.   If the electricity costs used a model # from 1 to 15, then check each of the months used in the regression equation. If the cost for each month used in the regression equation is less than or equal to twice the monthly average, blank the annual cost and impute it using the computer edits provided in reference [3]. Go to the next record. Compute the monthly average by dividing the results from the regression equation by 12.

(Note: We may change the multiple and how you compute the monthly average.)

4.   If the cost for any month used in the regression equation is greater than twice the monthly average:

   a.   Blank the cost reported for that month.

   b.   If there are any months left, recompute the annual cost based on the remaining months and go back to Step (1.).

   c.   If there are no months left, blank the annual cost and impute it using the computer edits. Go to the next record. Compute the monthly average by dividing the results from the regression equation by 12.

(Note: LSB may change the multiple and how you compute the monthly average.)

VIII.   AVERAGE MONTHLY COSTS FOR ELECTRICITY BY DIVISION (R_{ij})

The mover cell #10 no longer exists in the utility system.

Listed in Table B are the R_{ij} values for electricity by cell I.

(NOTE: These averages are based on the 1997 RECS data and will need to be multiplied by an inflation factor.)

Table A R_{ij} Values for Electricity

Cell	Category	R_{ij} Values	Cell	Category	R_{ij} Values
1	New England	72.04	6	East South Central	77.80
2	Middle Atlantic	72.28	7	West South Central	83.49
3	East North Central	63.10	8	Mountain	59.50
4	West North Central	65.21	9	Pacific	60.39
5	South Atlantic	85.26			

IX.   ELECTRIC INFLATION FACTOR

At each enumeration, LSB will send you a new electric inflation factor. See reference [2] for the 2003 AHS-N inflation factor. Disregard any old electric inflation factors when calculating annual electric cost estimates.

Adjust the following items with the electric inflation factor:

1. Regression coefficients for all characteristics *except electric billing months and the average billing month*
2. Cutoff values for electricity
3. Electric R_{ij} values

X.   CALCULATION OF THE REGRESSION EQUATION FOR NATURAL GAS

Determine the CD and the natural gas billing months for each respondent.

NOTE: All coefficients *except the billing month coefficients* will need to be multiplied by an inflation factor (see section XIII) since the coefficients are based on 1997 RECS data.

A.   Four or Three Billing Months Provided for Natural Gas (Model #1 - #4)

Perform the following steps:

1. Determine the appropriate model # for the record.

2. Multiply the coefficient by the amount for each month.

3. Add the products generated in Step (2.) to compute the total amount.

4. Check the total amount against the cutoff values.

For example, a respondent from the South Atlantic (census division = 5) gave January's bill as $60, April's bill as $25, and December's bill as $53 (model #3). Multiply the coefficients on the natural gas file to billing amount. Add the product from each month to compute the total amount.

JANUARY		APRIL		DECEMBER		
coefficient	amount	coefficient	amount	coefficient	amount	TOTAL AMOUNT
2.23917	60	5.16485	25	1.30399	53	
134.35		129.12		69.11		332.58

B.   Two Billing Months Provided for Natural Gas except for April and August (Model #5 - #8 & #10 - #11)

Perform the following steps:

1. Determine the appropriate model # for the record.

2. Multiply the coefficient by the amount for each month.

3.   Add the products generated in Step (2.) to compute the total amount.

4.   Check the total amount against the cutoff values.

For example, a respondent from the Mountain division (census division = 8) gave January's bill as $110 and April's bill as $62 (model #6). Multiply the coefficients on the natural gas file to billing amount. Add the product from each month to compute the total amount.

JANUARY		APRIL		
coefficient	amount	coefficient	amount	TOTAL AMOUNT
2.92647	110	6.43377	62	
321.91		398.89		720.80

C.   April and August Billing Months Provided for Natural Gas (Model #9)

If the respondent provided only April and August billing months, then perform the following steps:

1.   Multiply the coefficient from the natural gas file for April and August (model #9) by the amount given by the respondent.

2.   Determine if the respondent has gas heat (use the recodes in the attachments).

3.   Apply the current inflation factor to the coefficient from the natural gas file for gas heat.

4.   Multiply the product from Step (3.) by the recode value of gas heat.

5.   Add the three products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

For example, a respondent from West South Central (census division = 7) gave April's bill as $13 and August's bill as $37. The respondent does have gas heat. Follow the table to find the total amount.

Variable	Coefficient	Current Inflation Factor	Recoded Value	Product
April Bill	8.87840	Not Applied	13	115.42
August Bill	5.95160	Not Applied	37	220.21
Gas Heat	106.74632	1.25	1	133.43
TOTAL AMOUNT				469.06

D.   One Billing Month Provided for Natural Gas (Model #12 - #15)

If the respondent provided only one billing month, then you must determine the recode values of all the variables. No consistent pattern within a CD or across any month exists in determining the total natural gas amount. LSB analyzed each month separately to determine the best regression equation.

Perform the following steps to find the total natural gas amount:

1.   Determine which month (model #) the respondent provided:

Model #	Month Provided	Model #	Month Provided
12	January	14	August
13	April	15	December

2.   Determine the recode values of all the variables.

3.   Apply the current inflation factor to all coefficients from the natural gas file for each variable *except for the billing months*. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.   Multiply the product specified in Step (3.) by the recoded value of that variable.

5.   Add the products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

NOTE: All coefficients *except the billing month coefficients* will need to be multiplied by an inflation factor since the coefficients are based on 1990 RECS data.

For example, a respondent from the East South Central division (census division = 6) gave April's bill as $35. The recoded values are given in the following table:

Variable	Coefficient	Current Inflation Factor	Recoded Value	Product
April Bill	11.56867	Not Applied	35	404.90
Electric Heat	0.00000	1.25	0	0
Gas Heat	105.09378	1.25	1	131.37
Electric Hot Water	0.00000	1.25	1	0
Gas Hot Water	0.00000	1.25	0	0
Year Built	-12.82325	1.25	5	-80.15
Type of Home	0.00000	1.25	3	0

Variable	Coefficient	Current Inflation Factor	Recoded Value	Product
Rooms	0.00000	1.25	4	0
Baths	44.04614	1.25	1	55.06
Appliances	0.00000	1.25	3	0
Members	0.00000	1.25	2	0
			TOTAL AMOUNT	511.18

E.   **Average Monthly Cost Provided for Natural Gas (Model #16)**

Calculations for the average monthly cost are new in this utility system.

If the respondent provided only an average monthly costs for natural gas, then determine the annual cost using the coefficient database. This step is different from the process used before 2003.

1.   Use Model #16.

2.   Determine the recode values of all the variables.

Please note that the coefficient for the average monthly cost is in the first field. Since the average monthly cost occurs only for model #16 and there are no billing months for model #16, we placed the coefficient for average monthly cost in the first field. This would not alter the field structure of the coefficient database from the previous system.

3.   Apply the current inflation factor to the coefficient for each variable from the electric file *except for the average monthly cost*. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.   Multiply the product from Step (3.) by the recodes specified in Step (2.).

5.   Add the products generated in Step (4.) to compute the total amount.

6.   Check the total amount against the cutoff values.

For example, a respondent from the Pacific division (census division = 9) gave an average monthly bill for natural gas as $70. The recoded values are given in the following table:

Variable	Coefficient	Current Inflation factor	Recoded Value	Product
Average Monthly Cost	8.932	Not Applied	70	625.24
Electric Heat	0	1.25	0	0
Gas Heat	10.766	1.25	1	13.4575
Electric Hot Water	0	1.25	0	0
Gas Hot Water	41.322	1.25	1	51.6525
Year Built	-1.365	1.25	6	-10.2375
Type of Home	0	1.25	0	0
Rooms	6.3410	1.25	8	63.41
Baths	0	1.25	0	0
Appliances	0	1.25	0	0
Members	0	1.25	0	0
TOTAL AMOUNT				743.5225

## F.	No Monthly Cost Provided for Natural Gas (Model #17)

Determination of the utility costs for records with no monthly cost are new.

These are cases in which the respondent did not provide any monthly or average cost for natural gas, but indicate that he or she owns appliances that are powered by natural gas. If the respondent owns gas appliances, then in most cases he or she must pay monthly costs for natural gas.

This step is different from the process used before 2003.

1.	Use Model #17, if the respondent did not provide any billing data, specific months or an average monthly cost.

2.	Determine the recode values of all the variables.

3.	Apply the current inflation factor to the coefficient for each variable from the electric file. (NOTE: If a variable is not used, the coefficient is 0.000000 on the file.)

4.	Multiply the product from Step (3.) by the recodes specified in Step (2.).

5.	Add the products generated in Step (4.) to compute the total amount.

6.	Check the total amount against the cutoff values.

For 2003, all the coefficient values for model # 17 are zero. So, all records using model #17 will be below the low cutoff. These records will obtain a utility cost through the hot deck system.   See reference 3 for details about the hot deck system. LSB may update the coefficients on the file in future enumerations.

XI.   CUTOFF VALUES FOR NATURAL GAS

There is one procedure for all records. This is a change from the previous system. All utility cost estimates come from regression coefficients based on the 1997 RECS.

There are two cutoff values, a low cutoff value and a high cutoff value.

The low cutoff value is 4 for all records. If a record is below the low cutoff value, then blank the annual cost and impute it using the computer edits provided in reference [3]. The low cutoff value follows the consistency edit #132 from the housing cost table 2.

Table Q in Attachment D-2 contains the cutoff values to use for both these procedures. LSB modified these monthly cutoff values and you used them for each census division. Refer to Attachment D-1 for a detailed discussion of this modification. You multiplied these monthly cutoff values by both 12 and the inflation factor.

After computing the annual natural gas cost using the regression equations, perform the following steps:

1.   Compare the annual natural gas cost to the cutoff for the CD. If it is less than or equal to the cutoff, go to the next record.

2.   If the natural gas cost used model #16 (the average monthly cost), then blank the annual cost and impute it using the computer edits provided in reference [3].

3.   If the natural gas costs used a model # from 1 to 15, check each of the months used in the regression equation. If the cost for each month used in the regression equation is less than twice the monthly average, blank the annual cost and impute it using the computer edits provided in reference [3]. Go to the next record. Compute the monthly average by dividing the results from the regression equation by 12.

        (Note: We may change the multiple and how you compute the monthly average.)

4.   If the cost for any month used in the regression equation is greater than twice the monthly average:

a.   Blank the cost reported for that month.

b.   If there are any months left, recompute the annual cost based on the remaining months and go back to Step (1.).

c.   If there are no months left, blank the annual cost and impute it using the computer edits. Go to the next record. Compute the monthly average by dividing the results from the regression equation by 12.

(Note: We may change the multiple and how you compute the monthly average.)

XII.   AVERAGE MONTHLY COSTS FOR NATURAL GAS BY DIVISION (R_{ij})

The mover cell #10 no longer exists in the utility system.

Listed in Table B are the R_{ij} values for natural gas by cell I.

(NOTE: These averages are based on the 1997 RECS data and will need to be multiplied by an inflation factor.)

Table B R_{ij} Values for Natural Gas

Cell	Category	R_{ij} Values	Cell	Category	R_{ij} Values
1	New England	67.37	6	East South Central	40.33
2	Middle Atlantic	61.72	7	West South Central	36.45
3	East North Central	58.63	8	Mountain	33.76
4	West North Central	54.82	9	Pacific	30.90
5	South Atlantic	46.02			

XIII.   NATURAL GAS INFLATION FACTOR

At each enumeration, LSB will send you a new natural gas inflation factor. See reference [2] for the 2003 AHS-N inflation factor. Disregard any old natural gas inflation factors when calculating annual natural gas cost estimates.

Adjust the following items with the natural gas inflation factor:

1.   Regression coefficients for all characteristics *except natural gas billing months and the average billing month*
2.   Cutoff values for natural gas
3.   Natural gas R_{ij} values.

XIV. CALCULATION OF ADJUSTMENT FACTORS (F_{ij}) USING AVERAGE MONTHLY COSTS BY DIVISION (R_{ij})

This procedure is similar to the procedure in the previous system. Records from model #16 or hot deck records were records not using regression methods in the previous system. These records are group 2_j records. Apply the F_{ij} to these records. There is no longer a tenth cell or mover group category.

Perform the hot deck method before implementing the F_{ij} procedure.

R_{ij} values are the average monthly bills in cell I for utility j (for electricity j = 1 and for natural gas j = 2).

The universe for calculating the electric adjustment factor (F_{i1}) is all records with an electric monthly cost. (**AMTE** was calculated using the regression method or the hot deck method.)

The universe for calculating the natural gas adjustment factor (F_{i2}) is all records with a natural gas monthly cost. (**AMTG** was calculated using the regression method or the hot deck method.)

For utility j, use all records with a monthly cost obtained using model #16 or imputed from the hot deck system. Call these records group 2_j. They are records whose costs were derived using model #16 or the hot deck system. Call the remaining records group 1_j. They are records whose costs were derived using model numbers 1 - 15 in the regression coefficient method.

To implement the adjustment, certain totals must be output from the first pass of the AHS file. The actual adjustment takes place during the second pass of the file.

Cells 1 through 9 are the census divisions of the respondents.

Let F_{ij} be the adjustment factor for cell I and utility j. Calculate F_{ij} as follows:

$$F_{ij} = \frac{(n_{ij} * IF * Rij) - X_{1ij}}{X_{2ij}}$$

where:

I = 1,2,3,...,9
j = 1,2
n_{ij} = the number of records in group 1_j and group 2_j

IF = the inflation factor for that utility

X_{1ij} = sum of average monthly costs for group 1_j records in cell I for utility j

X_{2ij} = sum of average monthly costs for group 2_j records in cell I for utility j

If $F_{ij} \leq 0$, then set $F_{ij} = 1$.

Perform the adjustment process for each cell I designated in the tables.

See section VIII for the R_{ij} table for electricity.
See section XII for the R_{ij} table for natural gas.

Provide the F_{ij} values along with each component in the calculation for review. LSB will examine the F_{ij} values in each census division. Two or more census divisions may be collapsed to improve F_{ij} values by summing the components.

Calculate the collapsed F_{ij} as follows:

$$F_{ij} = \frac{\sum n_{ij} * IF * R_{ij} - \sum X_{1ij}}{\sum X_{2ij}}$$

Apply the F_{ij} values to the group 2_j records (i.e., records whose costs were derived using model #16 or imputed records using values from model #16).

Save the final F_{ij} values for the next AHS-MS enumeration.

XV.   OUTPUT REQUEST

A.   Counts

LSB wants the following counts by CD separate for electricity and natural gas:

1.   Number of records using a regression equation by model #
2.   Number of records using imputation

NOTE: Since you store the annual utility cost estimates as an average monthly cost estimate, multiply the average by 12 to provide us with the annual estimate.

B.   Data to Check Utility Costs and Cutoff Values

Provide LSB with a SAS data set with a record for each interviewed AHS-N sample unit. Include both occupied and vacant units. Do not include noninterviews (i.e., Type A, Type B, and Type C). The file should include the

control number and all the data characteristics in attachment A-1. Note that these are the recoded variables used in the regression equations. Also include all AHS-N codebook variables specified in Attachment B that went into computing these recodes.

Also include the annual utility cost computed from either the regression, reported by the respondent, or imputed. Include the costs before (i.e., the first set of costs when you compute the annual utility cost for the very first time) and after checking and adjusting for the cutoff.

You can provide one file for both electricity and natural gas but remember to provide two sets of costs, one set for each type of fuel.

LSB will check to see that:

1.   The correct model was used by using the months with utility costs reported.

2.   The values used in the regression equation were recoded properly.

3.   The annual utility costs were computed correctly using the coefficients requested in Section XV.C.

4.   The cutoff algorithm was applied correctly.

C.   File of Utility Cost Coefficients

Provide LSB with a SAS data set of all regression equations in all CDs in the same format as in Attachment C. The coefficients should have the inflation factor applied to them. Provide separate files for the electricity and natural gas coefficients. In addition to checking that the costs were computed correctly, LSB will also check to make sure the correct inflation factors were applied.

D.   Data to Check the F_{ij} Adjustment Factors

LSB needs two different sets of outputs to check the F_{ij}'s:

•   One is a hard copy of summary output that will allow us to check the computation of the F_{ij} adjustment factors.

•   Another is a file that will allow LSB to check the application of these factors.

1.   <u>Summary Output</u>

Provide the following information for each CD/mover status separately for electricity and natural gas:

a. Average monthly costs (R_{ij}), as applied by the inflation factors

b. Number of records in the utility/CD cell (n_{ij})

c. Sum of the average monthly costs for units whose costs were computed using the methods in section VI.E or X.E (i.e., supplied by the respondent or imputed) (X_{2ij})

d. Sum of the average monthly costs for all records not covered in c, above (X_{1ij})

e. Adjustment Factor (F_{ij})

2. <u>File</u>

This file should include all interviewed records (both occupied and vacant) regardless whether an F_{ij} was applied to the unit. Do not include noninterviews.

Include the following information on the file:

- Control number
- CD
- Cost before applying the F_{ij}
- Cost after applying the F_{ij}
- F_{ij} applied

E. Format of Variables in Requested Output Files

For the requested output files mentioned above, round the following information for electricity and natural gas to a specific number of decimal places:

Variables	Number of Decimal Places
Billing Month Coefficient	6
Annual Utility Costs	3
Inflation factor	7
Average Monthly Cost (R_{ij})	2

Adjustment Factor (F_{ij})   2

XVI. REFERENCES AND CONTACT PERSON

[1]   Memorandum dated May 23, 1996 from Preston Jay Waite to Chester E. Bowie, "American Housing Survey (AHS): Annual Cost Estimates for Utilities".

[2]   Memorandum for Documentation dated January 22, 2004 from Mark Gorsak, titled "American Housing Survey - National Sample (AHS-N): 2003 Inflation Factors for Electricity and Natural Gas".

[3]   Memorandum dated January 22, 2004 from Alan R. Tupek to Chester E. Bowie, titled "American Housing Survey - National Sample (AHS-N): 2003 Hot Deck System for Electricity and Natural Gas".

If you have any questions, please contact Mark Gorsak, Room 3785-3, ext. 3-8874.

Attachments (4)

cc:
C. Pritzl   (DSD)
T. Blatt (3)   "
J. Kneessi   (HHES)
D. Schwanz   (DSMD)
C. Mylet   "
A. Mason   "

DSMD:LSB:MGorsak:1/22/04:H:\UTILSPEC2003_final.WPD

Data Characteristics for Annual Cost Estimates

Census Divisions

Model #

Electric Billing Month Costs
  for January, April, August, and December

Natural Gas Billing Month Costs
  for January, April, August, and December

Average Monthly Cost for Electricity

Average Monthly Cost for Natural Gas

Electric Home Heating

Natural Gas Home Heating

Electric Water Heating

Natural Gas Water Heating

Home Year Built

Type of Home

Number of Rooms in Home

Number of Baths in Home

Number of Major Appliances in Home

Number of Household Members

Table C. Months for Model Numbers

Model #	Month			
1	January	April	August	December
2	January		August	December
3	January	April		December
4	January	April	August	
5		April	August	December
6	January	April		
7	January		August	
8	January			December
9		April	August	
10		April		December
11			August	December
12	January			
13		April		
14			August	
15				December
16	Average monthly data needed			
17	No Monthly data			

Table D. Census Divisions

Location	Recode Value
New England	1
Middle Atlantic	2
East North Central	3
West North Central	4
South Atlantic	5
East South Central	6
West South Central	7
Mountain	8
Pacific	9

Table E. Monthly Electric Costs

Month	Codebook Variable	Recode Value
January	EJAN	Amount in Codebook Variable
April	EAPR	"
August	EAUG	"[1]
December	EDEC	"

Table F. Monthly Natural Gas Costs

Month	Codebook Variable	Recode Value
January	GJAN	Amount in Codebook Variable
April	GAPR	"
August	GAUG	"[1]
December	GDEC	"

Table G. Electric Home Heating

Home Heating	Codebook Variable = Value	Recode Value
Electric	HFUEL = 1	1
Not Electric	HFUEL= 2 to 9	0

Table H. Natural Gas Home Heating

Home Heating	Codebook Variable = Value	Recode Value
Natural Gas	HFUEL= 2 and GASPIP = 1	1
Not Natural Gas	HFUEL= 1, 3 to 9 or GASPIP = 2	0

Table I. Electric Water Heating

Water Heating	Codebook Variable = Value	Recode Value
Electric	WFUEL = 1	1
Not Electric	WFUEL= 2 to 8	0

Table J. Natural Gas Water Heating

Water Heating	Codebook Variable = Value	Recode Value
Natural Gas	WFUEL= 2 and GASPIP = 1	1
Not Natural Gas	WFUEL= 1, 3 to 8 or GASPIP = 2	0

Table K. Home Year Built

Years	Codebook Variable = Value	Recode Value
Before 1940	BUILT$\leq$ 1939	1
1940 - 1949	BUILT = 1940 to 1949	2
1950 - 1959	BUILT = 1950 to 1959	3
1960 - 1969	BUILT = 1960 to 1969	4
1970 - 1979	BUILT = 1970 to 1979	5
1980 - 1984	BUILT = 1980 to 1984	6
1985 or later	BUILT = 1985 to present	7

Table L. Type of Home

Type	Codebook Variable = Value	Recode Value
Mobile Home	NUNIT2 = 4 or 5	1
One–Unit (Detached or Attached)	NUNIT2 = 1 or 2	2
Two–or–More–Units	NUNIT2 = 3	3

Table M. Number of Rooms in Home

Type of Rooms	Codebook Variable = Value	Recode Value
Bedrooms	BEDRMS = 1 to 10	Amount in Codebook Variable
Kitchens	KITCH = 1 to 5	"
Living Rooms	LIVING = 1 to 5	"
Separate Dining Rooms	DINING = 1 to 5	"
Family Rooms	FAMRM = 1 to 5	"
Recreational Rooms	RECRM = 1 to 5	"
Family Dens	DENS = 1 to 5	"
Other Finished Rooms	OTHRFN = 1 to 5	"
Total Number of Rooms	Use the Above Codebook Variables	Sum of Recoded Values[1]

[1] Use 15 as the upper limit for the total number of rooms

Table N. Number of Baths in Home

Type of Bathrooms	Codebook Variable = Value	Recode Value
Full Bathrooms	BATHS = 1 to 10	Amount in Codebook Variable
Half Bathrooms	HALFB = 1 to 10	½ x (Amount in Codebook Variable)
Total Number of Bathrooms	Use the Above Codebook Variables	Sum of Recoded Values[1]

[1] Use 7 as the upper limit for the total number of bathrooms

Table O. Number of Major Appliances in Home

Type of Appliance	Codebook Variable = Value	Recode Value
Refrigerator	REFR = 1	1
Range with Oven	COOK = 1	2
Oven	OVEN = 1	1
Cooking Burners	BURNER = 1	1
Dishwasher	DISH = 1	1
Washing Machine	WASH = 1	1
Clothes Dryer	DRY = 1	1
Total Number of Appliances	Use the Above Codebook Variables	Sum of Recoded Values

Table P. Number of Household Members

Household Members	Codebook Variable = Value	Recode Value
Total Number of Household Members	CURPER = 1 to 12	Amount in Codebook Variable[1]

[1] Use 12 as the upper limit for the total number of household members

Characteristics and Record Layout for Electric and Natural Gas Coefficients Files

Characteristic	Field Location
Census Division	1
Model Number	3-4
January Billing Month	6-13
Average Monthly Bill	6-13 for model # 16 only
April Billing Month	15-22
August Billing Month	24-31
December Billing Month	33-40
Electric Home Heating	42-49
Natural Gas Home Heating	51-58
Electric Water Heating	60-67
Natural Gas Water Heating	69-76
Home Year Built	78-85
Type of Home	87-94
Number of Rooms in Home	96-103
Number of Baths in Home	105-112
Number of Major Appliances	114-121
Number of Household Members	123-130

NOTE:As of the release of this draft memorandum, the file has not been created.

AHS-N Electric Coefficients

		January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
1	1	0.92915	3.25422	3.44819	3.51158	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	2	1.98044	0.00000	4.06928	4.41724	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	3	0.80635	6.68027	0.00000	3.61274	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	4	2.95582	4.95712	3.55959	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	5	0.00000	3.81030	3.41457	4.04834	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	6	2.85342	8.57382	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	7	5.74031	0.00000	4.69599	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	8	3.45822	0.00000	0.00000	4.31831	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	17.88933	0.00000	0.00000	34.92139
1	9	0.00000	8.83129	3.48636	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	10	0.00000	7.14610	0.00000	4.07455	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	11	0.00000	0.00000	4.24961	6.24716	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	12	6.85484	0.00000	0.00000	0.00000	-182.11764	0.00000	121.22247	0.00000	7.37335	0.00000	0.00000	0.00000	33.16128	41.32414
1	13	0.00000	10.64519	0.00000	0.00000	106.15257	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	26.45720	13.60915
1	14	0.00000	0.00000	7.01234	0.00000	339.80199	0.00000	227.61084	0.00000	0.00000	0.00000	0.00000	45.58996	29.56274	32.62334
1	15	0.00000	0.00000	0.00000	7.29779	-124.18436	0.00000	86.63734	0.00000	0.00000	0.00000	0.00000	0.00000	38.48770	24.29913
1	16	10.61000	0.00000	0.00000	0.00000	343.34000	0.00000	75.68000	-12.44000	0.00000	0.00000	5.63000	0.00000	10.84000	0.13000
1	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	1	-0.27918	1.13529	3.57387	5.76371	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	2	0.07385	0.00000	3.81017	6.06051	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	3	0.42008	4.76933	0.00000	5.30913	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	4	3.08222	3.54034	3.99861	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	5	0.00000	0.94078	3.63108	5.59344	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	6	2.74542	8.48542	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	7	4.92786	0.00000	4.87657	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	8	1.29163	0.00000	0.00000	5.41821	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42.45170	0.00000	0.00000	23.62989
2	9	0.00000	7.51235	4.03338	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	10	0.00000	4.95941	0.00000	5.62548	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	11	0.00000	0.00000	3.84571	6.12221	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	12	4.85430	0.00000	0.00000	0.00000	0.00000	0.00000	97.41199	0.00000	7.42142	0.00000	4.67591	82.04770	40.00473	40.65615
2	13	0.00000	8.07790	0.00000	0.00000	103.57080	0.00000	72.94023	0.00000	7.89986	0.00000	12.56289	70.62417	16.70534	19.53254
2	14	0.00000	0.00000	5.96082	0.00000	322.88099	0.00000	231.26173	0.00000	0.00000	0.00000	21.82774	51.88719	15.33041	24.20578
2	15	0.00000	0.00000	0.00000	6.32447	0.00000	0.00000	0.00000	0.00000	7.93686	0.00000	7.40939	48.13647	31.75921	27.71335
2	16	7.81000	0.00000	0.00000	0.00000	314.04000	0.00000	88.65000	-40.75000	0.00000	0.00000	34.21000	0.00000	15.97000	-4.00000
2	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Electric Coefficients

		January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
3	1	1.53991	-1.05052	4.35957	4.69842	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	2	1.23475	0.00000	4.10853	4.45390	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	3	1.21015	3.85618	0.00000	5.00910	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	4	4.12546	1.05848	4.60980	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	5	0.00000	0.08705	4.30998	5.43138	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	6	4.03482	6.35844	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	7	4.72320	0.00000	4.87145	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	8	2.60671	0.00000	0.00000	3.51325	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	39.28564	0.00000	0.00000	32.47425
3	9	0.00000	6.14018	4.73249	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	10	0.00000	4.67678	0.00000	5.61667	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	11	0.00000	0.00000	4.34573	5.51753	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	12	5.34633	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.29018	0.00000	11.14942	49.63511	25.16775	37.70702
3	13	0.00000	6.83279	0.00000	0.00000	224.72332	0.00000	0.00000	0.00000	0.00000	-44.87448	19.74323	72.31021	32.39231	28.78577
3	14	0.00000	0.00000	5.72325	0.00000	367.41920	0.00000	90.10436	0.00000	0.00000	0.00000	14.86404	15.66604	26.00301	36.87391
3	15	0.00000	0.00000	0.00000	6.19243	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6.70298	69.67566	25.29496	24.53043
3	16	7.16000	0.00000	0.00000	0.00000	282.77000	0.00000	-52.67000	-86.49000	0.00000	0.00000	33.14000	0.00000	14.67000	28.04000
3	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	1	1.31376	3.76451	4.38884	1.61727	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	2	1.56009	0.00000	5.24455	2.96596	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	3	1.75678	9.25161	0.00000	1.71905	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	4	2.12546	4.85191	4.35844	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	5	0.00000	4.03499	4.45778	2.75771	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	6	2.65404	10.33207	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	7	3.75213	0.00000	5.78675	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	8	2.76486	0.00000	0.00000	3.17820	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	38.38478	0.00000	0.00000	41.88447
4	9	0.00000	7.59525	4.64111	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	10	0.00000	9.79192	0.00000	3.10968	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	11	0.00000	0.00000	5.42680	4.43860	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	12	4.84007	0.00000	0.00000	0.00000	0.00000	0.00000	62.65970	0.00000	0.00000	0.00000	0.00000	70.91559	36.11695	45.27776
4	13	0.00000	8.79093	0.00000	0.00000	213.17036	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	62.62237	27.61349	29.39702
4	14	0.00000	0.00000	5.91430	0.00000	319.57616	0.00000	130.93039	0.00000	0.00000	0.00000	0.00000	43.36135	10.77802	44.21862
4	15	0.00000	0.00000	0.00000	5.66491	0.00000	0.00000	0.00000	0.00000	0.00000	15.85125	0.00000	62.96285	27.19453	47.78030
4	16	10.02000	0.00000	0.00000	0.00000	252.45000	0.00000	12.66000	-31.26000	0.00000	0.00000	6.20000	0.00000	4.03000	15.50000
4	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Electric Coefficients

	January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
5 1	1.67136	5.19434	3.76122	1.22287	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 2	2.23181	0.00000	5.14419	2.81988	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 3	1.20883	10.81836	0.00000	1.67970	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 4	2.53403	5.66701	3.75950	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 5	0.00000	5.48489	3.71261	2.75638	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 6	2.31656	11.54439	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 7	4.57516	0.00000	5.47850	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 8	2.08952	0.00000	0.00000	4.53772	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49.68469	0.00000	0.00000	58.64039
5 9	0.00000	9.19945	3.62695	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 10	0.00000	11.11633	0.00000	2.62648	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 11	0.00000	0.00000	5.25804	4.98834	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 12	5.51594	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.27193	79.00942	50.62621	65.57607
5 13	0.00000	10.77990	0.00000	0.00000	70.11633	0.00000	3.65665	0.00000	0.00000	-33.54022	19.43914	0.00000	35.40226	25.60868
5 14	0.00000	0.00000	5.75926	0.00000	268.99174	0.00000	136.98092	0.00000	-12.46689	-102.05675	34.48741	26.96844	22.29853	41.82242
5 15	0.00000	0.00000	0.00000	6.09729	0.00000	0.00000	0.00000	0.00000	0.00000	40.46983	0.00000	85.58750	34.00426	51.51824
5 16	9.07000	0.00000	0.00000	0.00000	173.41000	0.00000	15.17000	-55.12000	0.00000	0.00000	21.04000	0.00000	-5.32000	15.14000
5 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 1	1.52711	4.66846	3.97332	1.68045	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 2	2.27606	0.00000	4.93805	3.01865	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 3	0.83567	11.75972	0.00000	1.54611	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 4	2.50777	5.68618	3.91276	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 5	0.00000	5.31360	3.89461	2.88217	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 6	1.76361	12.55602	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 7	4.68558	0.00000	5.34181	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 8	2.42397	0.00000	0.00000	4.04363	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43.64893	0.00000	0.00000	53.74657
6 9	0.00000	9.78824	3.66011	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 10	0.00000	11.98887	0.00000	2.22981	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 11	0.00000	0.00000	5.01841	5.25792	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 12	5.39255	0.00000	0.00000	0.00000	0.00000	0.00000	7.14147	0.00000	0.00000	-52.18375	38.68246	110.61356	0.00000	62.71123
6 13	0.00000	11.54956	0.00000	0.00000	43.15542	0.00000	0.00000	0.00000	0.00000	-32.64118	8.86786	56.63546	25.17207	17.59685
6 14	0.00000	0.00000	6.05447	0.00000	277.75377	0.00000	132.96856	0.00000	-10.14820	-52.64249	23.01866	0.00000	17.09557	40.34263
6 15	0.00000	0.00000	0.00000	6.51868	-46.94109	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	101.47099	26.55413	53.61250
6 16	9.68000	0.00000	0.00000	0.00000	186.52000	0.00000	60.03000	-29.93000	0.00000	0.00000	6.78000	0.00000	9.54000	3.18000
6 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Electric Coefficients

	January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
7 1	2.34335	4.05206	3.82641	1.41758	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 2	2.73469	0.00000	4.80978	2.29941	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 3	1.70148	12.12083	0.00000	2.01948	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 4	3.19568	4.83939	3.85914	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 5	0.00000	4.70665	3.68765	3.37527	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 6	2.92400	13.32841	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 7	4.45905	0.00000	5.20213	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 8	1.94345	0.00000	0.00000	5.60699	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	70.16907	0.00000	0.00000	29.94147
7 9	0.00000	9.33256	3.70830	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 10	0.00000	12.33428	0.00000	3.48835	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 11	0.00000	0.00000	4.83252	4.82457	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7 12	6.87322	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-75.71847	49.72523	53.77379	49.85896	28.88016
7 13	0.00000	14.03168	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	10.36779	99.41867	0.00000	0.00000
7 14	0.00000	0.00000	6.27377	0.00000	166.38552	0.00000	190.87807	0.00000	-17.45519	-55.36890	27.07939	0.00000	19.15085	26.91175
7 15	0.00000	0.00000	0.00000	7.77670	-112.82908	0.00000	0.00000	0.00000	0.00000	0.00000	18.40963	73.68018	38.71700	29.42028
7 16	9.32000	0.00000	0.00000	0.00000	126.86000	0.00000	69.27000	-39.15000	0.00000	0.00000	9.44000	0.00000	7.10000	8.97000
7 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 1	1.18891	4.39381	4.08708	1.97877	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 2	1.95294	0.00000	4.82873	3.64299	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 3	0.54596	10.89220	0.00000	1.78214	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 4	2.31943	5.52328	4.08265	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 5	0.00000	3.79044	4.16330	3.44431	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 6	1.69970	11.70476	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 7	5.10294	0.00000	5.23694	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 8	2.67501	0.00000	0.00000	5.21754	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	25.47649	0.00000	0.00000	16.97654
8 9	0.00000	8.07524	4.18017	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 10	0.00000	9.28101	0.00000	3.36485	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 11	0.00000	0.00000	4.86263	5.50332	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8 12	6.03690	0.00000	0.00000	0.00000	150.04265	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	69.54145	25.34263	26.48202
8 13	0.00000	10.55704	0.00000	0.00000	197.79788	0.00000	0.00000	0.00000	0.00000	0.00000	25.41725	0.00000	0.00000	0.00000
8 14	0.00000	0.00000	5.46639	0.00000	179.16487	0.00000	0.00000	0.00000	0.00000	0.00000	19.46074	0.00000	36.30462	17.09247
8 15	0.00000	0.00000	0.00000	6.56618	124.76070	0.00000	59.45480	0.00000	0.00000	0.00000	0.00000	60.40733	18.17913	23.84745
8 16	8.97000	0.00000	0.00000	0.00000	119.71000	0.00000	30.05000	-63.13000	0.00000	0.00000	15.91000	0.00000	15.38000	14.54000
8 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Electric Coefficients

	January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
9 1	1.65286	3.46871	4.09981	2.20415	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 2	2.31338	0.00000	5.22107	2.98709	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 3	0.91934	8.88979	0.00000	2.29326	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 4	2.98853	4.55703	4.15285	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 5	0.00000	4.28727	3.92047	3.45113	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 6	2.44980	9.91595	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 7	4.64775	0.00000	5.86389	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 8	2.35768	0.00000	0.00000	4.39075	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	27.59596	0.00000	0.00000	30.64427
9 9	0.00000	9.32730	3.57237	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 10	0.00000	9.29341	0.00000	2.94020	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 11	0.00000	0.00000	5.32859	5.21432	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 12	5.78167	0.00000	0.00000	0.00000	0.00000	0.00000	-86.87829	0.00000	0.00000	0.00000	0.00000	64.21109	36.87396	20.24827
9 13	0.00000	10.59752	0.00000	0.00000	43.68630	0.00000	0.00000	0.00000	5.67087	0.00000	0.00000	0.00000	32.59102	0.00000
9 14	0.00000	0.00000	7.05071	0.00000	113.06033	0.00000	161.48437	0.00000	0.00000	-62.42149	39.49937	0.00000	29.42346	0.00000
9 15	0.00000	0.00000	0.00000	6.68211	0.00000	0.00000	-111.38017	0.00000	0.00000	0.00000	0.00000	43.34642	29.22036	24.20724
9 16	10.41000	0.00000	0.00000	0.00000	87.82000	0.00000	57.78000	-72.89000	0.00000	0.00000	18.83000	0.00000	13.41000	-1.20000
9 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Natural Gas Coefficients

		January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
1	1	1.80657	1.87575	7.88740	2.16143	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	2	2.25911	0.00000	9.75577	2.38491	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	3	0.92017	3.85975	0.00000	3.32844	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	4	3.15740	2.12253	9.64632	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	5	0.00000	3.04372	5.88965	4.08233	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	6	2.95142	5.07621	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	7	3.84003	0.00000	11.99033	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	8	1.67122	0.00000	0.00000	4.52212	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	9	0.00000	7.75618	4.14392	0.00000	0.00000	296.72624	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	10	0.00000	4.27630	0.00000	4.25123	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	11	0.00000	0.00000	8.53203	5.39421	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
1	12	3.69331	0.00000	0.00000	0.00000	0.00000	159.80684	0.00000	0.00000	14.53634	85.38453	0.00000	0.00000	0.00000	0.00000
1	13	0.00000	7.55437	0.00000	0.00000	0.00000	311.34243	0.00000	0.00000	0.00000	0.00000	28.36189	0.00000	0.00000	-25.67929
1	14	0.00000	0.00000	17.15608	0.00000	0.00000	703.47493	0.00000	0.00000	0.00000	-180.08338	49.13970	132.96105	0.00000	-70.19048
1	15	0.00000	0.00000	0.00000	5.18845	0.00000	105.85911	0.00000	0.00000	19.42672	33.89223	0.00000	0.00000	0.00000	17.59926
1	16	5.88600	0.00000	0.00000	0.00000	0.00000	134.79200	0.00000	69.32300	14.26200	0.00000	10.54100	0.00000	0.00000	0.00000
1	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	1	2.62103	3.83112	7.32606	-0.14570	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	2	3.68103	0.00000	9.00478	0.29987	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	3	2.65864	4.45202	0.00000	0.84807	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	4	2.53808	3.80396	7.13649	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	5	0.00000	4.89897	7.32324	2.21450	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	6	3.14489	4.83427	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	7	3.90887	0.00000	9.23127	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	8	3.97473	0.00000	0.00000	1.63929	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	9	0.00000	5.35545	7.87212	0.00000	0.00000	319.67222	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	10	0.00000	5.67732	0.00000	3.17554	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	11	0.00000	0.00000	10.66593	4.03401	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
2	12	3.14164	0.00000	0.00000	0.00000	0.00000	278.11801	0.00000	0.00000	-25.59746	0.00000	18.79592	45.90282	0.00000	27.65510
2	13	0.00000	5.86087	0.00000	0.00000	0.00000	397.58726	0.00000	-68.56473	-29.83634	0.00000	29.97232	59.06839	0.00000	0.00000
2	14	0.00000	0.00000	11.91532	0.00000	0.00000	690.97179	0.00000	-141.24609	-45.23198	-66.20763	41.53384	66.09367	0.00000	0.00000
2	15	0.00000	0.00000	0.00000	3.28451	0.00000	351.59602	0.00000	0.00000	-20.88906	0.00000	22.87735	0.00000	0.00000	33.96308
2	16	5.46960	0.00000	0.00000	0.00000	0.00000	214.82100	0.00000	1.23900	-12.50600	0.00000	33.09200	0.00000	0.00000	0.00000
2	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Natural Gas Coefficients

		January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
3	1	1.94022	3.07404	5.68967	1.52761	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.07404	0.00000	0.00000
3	2	2.36593	0.00000	8.87169	2.06689	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.36593	0.00000	0.00000
3	3	2.03596	4.37505	0.00000	1.56227	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.37505	0.00000	0.00000
3	4	2.67865	4.46904	4.78221	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.46904	0.00000	0.00000
3	5	0.00000	4.48635	6.57712	3.01054	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.48635	0.00000	0.00000
3	6	2.79564	5.59302	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.59302	0.00000	0.00000
3	7	4.00103	0.00000	8.44759	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.00103	0.00000	0.00000
3	8	2.98714	0.00000	0.00000	2.52522	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.98714	0.00000	0.00000
3	9	0.00000	8.36408	5.05755	0.00000	0.00000	164.26548	0.00000	0.00000	0.00000	0.00000	0.00000	8.36408	0.00000	0.00000
3	10	0.00000	6.19965	0.00000	3.07269	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	6.19965	0.00000	0.00000
3	11	0.00000	0.00000	12.42680	4.32965	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
3	12	3.71412	0.00000	0.00000	0.00000	0.00000	-15.26380	0.00000	0.00000	0.00000	74.79125	8.00630	-9.52705	0.00000	20.27193
3	13	0.00000	7.91604	0.00000	0.00000	0.00000	35.40884	0.00000	0.00000	0.00000	30.03804	34.33168	13.50340	-10.68342	2.34205
3	14	0.00000	0.00000	13.65919	0.00000	0.00000	240.44853	0.00000	0.00000	-32.16819	0.00000	61.02760	0.00000	0.00000	0.00000
3	15	0.00000	0.00000	0.00000	4.14535	0.00000	0.00000	0.00000	107.93191	0.00000	0.00000	21.88388	-12.52758	0.00000	18.73235
3	16	6.71700	0.00000	0.00000	0.00000	0.00000	58.00600	0.00000	70.02800	-6.66200	0.00000	14.57000	0.00000	0.00000	0.00000
3	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	1	1.93302	4.31291	2.38561	1.22636	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.31291	0.00000	0.00000
4	2	2.89980	0.00000	3.40643	1.56693	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.89980	0.00000	0.00000
4	3	1.99926	4.49794	0.00000	1.40072	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	4.49794	0.00000	0.00000
4	4	2.58765	5.02695	3.53973	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.02695	0.00000	0.00000
4	5	0.00000	7.55176	2.77108	2.16059	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.55176	0.00000	0.00000
4	6	2.78555	5.61540	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	5.61540	0.00000	0.00000
4	7	3.99622	0.00000	5.21524	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.99622	0.00000	0.00000
4	8	3.04030	0.00000	0.00000	1.85777	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.04030	0.00000	0.00000
4	9	0.00000	10.11582	1.77639	0.00000	0.00000	181.58773	0.00000	0.00000	0.00000	0.00000	0.00000	10.11582	0.00000	0.00000
4	10	0.00000	7.82416	0.00000	2.42741	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.82416	0.00000	0.00000
4	11	0.00000	0.00000	6.18232	4.42675	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
4	12	3.41428	0.00000	0.00000	0.00000	0.00000	90.40160	0.00000	83.52579	-10.89306	0.00000	6.43075	19.09701	0.00000	0.00000
4	13	0.00000	9.31400	0.00000	0.00000	0.00000	118.84351	0.00000	46.53495	-11.21772	0.00000	21.70371	0.00000	0.00000	0.00000
4	14	0.00000	0.00000	5.52583	0.00000	0.00000	262.39957	0.00000	0.00000	-29.05109	0.00000	69.99226	0.00000	0.00000	0.00000
4	15	0.00000	0.00000	0.00000	3.70536	0.00000	0.00000	0.00000	73.54120	-7.61505	93.69584	0.00000	0.00000	0.00000	0.00000
4	16	6.85900	0.00000	0.00000	0.00000	0.00000	53.60400	0.00000	75.12700	-5.10000	0.00000	15.71000	0.00000	0.00000	0.00000
4	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Natural Gas Coefficients

	January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
5 1	2.03921	3.35200	4.52819	1.51945	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 2	2.55944	0.00000	6.07562	2.11672	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 3	2.23917	5.16485	0.00000	1.30399	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 4	2.97081	4.26966	4.23837	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 5	0.00000	5.57075	4.91415	2.74051	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 6	3.01744	5.90791	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 7	4.25951	0.00000	6.16866	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 8	3.40234	0.00000	0.00000	2.24230	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 9	0.00000	9.30993	3.76713	0.00000	0.00000	152.65134	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 10	0.00000	7.57398	0.00000	2.75549	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 11	0.00000	0.00000	8.20798	4.56309	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
5 12	4.28688	0.00000	0.00000	0.00000	0.00000	-36.60739	0.00000	78.96906	-5.33395	71.22261	0.00000	0.00000	0.00000	0.00000
5 13	0.00000	9.45631	0.00000	0.00000	0.00000	123.11031	0.00000	-41.29379	-19.78618	0.00000	15.79804	53.36646	0.00000	10.77361
5 14	0.00000	0.00000	9.66793	0.00000	0.00000	337.13968	0.00000	54.67503	-45.44438	-4.63378	35.04035	0.00000	0.00000	28.08388
5 15	0.00000	0.00000	0.00000	4.49041	0.00000	60.93607	0.00000	104.48575	-11.83508	0.00000	0.00000	58.74481	0.00000	0.00000
5 16	8.13000	0.00000	0.00000	0.00000	0.00000	16.22200	0.00000	30.87800	-3.28500	0.00000	14.05300	0.00000	0.00000	0.00000
5 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 1	1.83693	4.54546	3.28992	1.48794	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 2	2.68642	0.00000	4.69847	2.08944	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 3	1.61568	5.60985	0.00000	1.81703	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 4	2.76525	5.38765	3.81261	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 5	0.00000	6.50846	2.79020	2.81922	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 6	2.73295	6.91035	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 7	4.31577	0.00000	5.88313	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 8	2.53127	0.00000	0.00000	2.92731	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 9	0.00000	11.57819	2.74325	0.00000	0.00000	86.38285	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 10	0.00000	7.17088	0.00000	2.99387	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 11	0.00000	0.00000	4.83783	5.00837	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 12	4.38933	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	107.72157	-0.94761	0.00000	0.00000	0.00000	0.00000	0.00000
6 13	0.00000	11.56867	0.00000	0.00000	0.00000	105.09378	0.00000	0.00000	-12.82325	0.00000	0.00000	44.04614	0.00000	0.00000
6 14	0.00000	0.00000	7.57024	0.00000	0.00000	126.56990	0.00000	114.66189	-17.61574	82.97516	0.00000	0.00000	0.00000	44.38349
6 15	0.00000	0.00000	0.00000	4.97565	0.00000	0.00000	0.00000	109.08216	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
6 16	8.35500	0.00000	0.00000	0.00000	0.00000	35.07200	0.00000	23.88100	-5.99800	0.00000	10.48500	0.00000	0.00000	0.00000
6 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Natural Gas Coefficients

		January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
7	1	1.40412	3.71678	6.04101	1.77536	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	2	2.20238	0.00000	8.90897	1.71080	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	3	1.59506	6.23188	0.00000	1.75070	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	4	2.92563	3.66184	6.19367	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	5	0.00000	5.02603	6.26952	2.77696	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	6	3.16851	6.07460	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	7	3.67452	0.00000	8.96486	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	8	3.69990	0.00000	0.00000	1.63106	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	9	0.00000	8.87840	5.95160	0.00000	0.00000	106.74632	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	10	0.00000	7.83690	0.00000	2.89357	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	11	0.00000	0.00000	11.38357	3.60716	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
7	12	3.63975	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	32.37006	10.79904	0.00000	0.00000	11.08980
7	13	0.00000	9.46653	0.00000	0.00000	0.00000	56.08557	0.00000	0.00000	0.00000	0.00000	22.05000	0.00000	0.00000	0.00000
7	14	0.00000	0.00000	12.20612	0.00000	0.00000	156.75264	0.00000	-1.97231	-3.84673	0.00000	24.81910	0.00000	0.00000	-4.71672
7	15	0.00000	0.00000	0.00000	3.48940	0.00000	0.00000	0.00000	0.00000	0.00000	53.11337	10.80366	0.00000	0.00000	11.75536
7	16	8.01900	0.00000	0.00000	0.00000	0.00000	11.66500	0.00000	9.32400	2.93200	0.00000	11.97700	0.00000	0.00000	0.00000
7	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	1	1.44982	4.00866	5.01511	1.74997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	2	1.73259	0.00000	7.59102	2.89007	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	3	1.71267	4.82501	0.00000	2.08943	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	4	2.39475	5.06314	6.17226	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	5	0.00000	4.47560	5.70359	2.81542	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	6	2.92647	6.43377	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	7	3.69061	0.00000	11.38860	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	8	2.20621	0.00000	0.00000	3.92553	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	9	0.00000	7.24511	7.54884	0.00000	0.00000	82.54688	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	10	0.00000	5.42793	0.00000	3.49502	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	11	0.00000	0.00000	8.90607	4.32249	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
8	12	3.95397	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41.82207	0.00000	0.00000	11.42658	29.23451	0.00000	0.00000
8	13	0.00000	8.28159	0.00000	0.00000	0.00000	99.38381	0.00000	0.00000	-10.68498	0.00000	0.00000	40.86746	0.00000	11.69203
8	14	0.00000	0.00000	15.43131	0.00000	0.00000	119.41260	0.00000	0.00000	-18.37373	0.00000	14.19863	66.64567	0.00000	-8.91679
8	15	0.00000	0.00000	0.00000	4.76174	0.00000	0.00000	0.00000	0.00000	0.00000	29.67522	5.48857	0.00000	0.00000	7.35146
8	16	8.12900	0.00000	0.00000	0.00000	0.00000	29.96700	0.00000	37.20600	-2.34500	0.00000	4.20100	0.00000	0.00000	0.00000
8	17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

AHS-N Natural Gas Coefficients

	January	April	August	December	Electric Heat	Gas Heat	Electric Hot Water	Gas Hot Water	Year Built	Home	Rooms	Baths	Appliance	Members
9 1	1.78813	3.82551	3.84683	2.17415	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 2	2.51369	0.00000	5.10858	2.56448	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 3	1.88164	6.12594	0.00000	2.16212	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 4	3.35110	4.76454	3.90780	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.90780	0.00000
9 5	0.00000	5.15162	3.95967	3.44004	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.95967	0.00000
9 6	3.42797	7.02867	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 7	4.67778	0.00000	5.55595	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 8	3.31082	3.02161	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 9	0.00000	10.52290	3.81962	0.00000	0.00000	69.82872	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.00000	0.00000
9 10	0.00000	7.58421	0.00000	3.50658	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 11	0.00000	0.00000	6.03449	4.87497	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
9 12	4.53254	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	59.48883	0.00000	0.00000	0.00000	0.00000	0.00000	19.00505
9 13	0.00000	10.27400	0.00000	0.00000	0.00000	0.00000	0.00000	65.61324	-11.36693	0.00000	0.00000	64.37190	0.00000	0.00000
9 14	0.00000	0.00000	7.01198	0.00000	0.00000	42.55555	0.00000	0.00000	-12.52522	0.00000	23.24218	76.46775	0.00000	0.00000
9 15	0.00000	0.00000	0.00000	4.59855	0.00000	23.39186	0.00000	42.77550	0.00000	11.33617	0.00000	0.00000	0.00000	17.09814
9 16	8.93200	0.00000	0.00000	0.00000	0.00000	10.76600	0.00000	41.32200	-1.36500	0.00000	6.34100	0.00000	0.00000	0.00000
9 17	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Modified Cutoff Values for Electricity and Natural Gas

We are recording the text for historical documentation purposes.

We expected a small number of records whose monthly costs for electricity and natural gas exceed the cutoff values in each census division. However, an unusually high number of records from each census division had monthly costs exceeding the cutoff values for electricity and natural gas. So, LSB modified the utility cutoff values for each census division by performing the following operations:

1.   LSB dumped records whose monthly costs exceeded the old cutoff values and sorted them on census division and original annual cost. The following items were examined:

  - 1990 Control Number
  - Census Division
  - Regression/non-regression method flag
  - Product of the old cutoff value and the current inflation factor
  - Original annual cost for electricity or natural gas (NOTE: LSB later divided the original annual cost by 12 to get the original monthly cost).

2.   If there was a "jump" in the original annual cost for a census division, the modified cutoff value was picked at the point of that "jump" in that annual cost divided by 12.

3.   Finally, the number of records exceeding the modified cutoff value for each utility were counted.

LSB compared the number of records that exceeded the modified cutoff from each census division to the following counts:

1.   Expected number of records exceeding the original cutoff values (number of records in each CD times 0.005)
2.   Number of records exceeding the original cutoff values
3.   Number of records exceeding the 1995 AHS-N cutoff values for electricity ($700) and natural gas ($500).

The number of records in each CD exceeding the "modified" cutoff values for electricity and natural gas were at least the same as those that exceeded the 1995 AHS-N cutoff values for electricity and natural gas.

Table Q on the following page lists the modified cutoff values (based on monthly costs) for electricity and natural gas by census division:

Table Q. Modified Cutoff Values for Electricity and Natural Gas by Census Division
(Monthly Value)

Census Division	Electricity Cutoff Value[1]	Natural Gas Cutoff Value[1]
1	425	350
2	525	475
3	525	430
4	450	450
5	600	450
6	450	375
7	600	300
8	550	375
9	525	425

[1] The cutoff values must be multiplied by 12 and by the inflation factor.

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