

**First Year Load Impact Study of  
Southern California Gas Company's  
1995 Industrial Energy Management  
Services Program**

**CPUC Study Identification Number 710.0**

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**February, 1997**

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## Summary

First-year load impacts for Southern California Gas Company's 1995 Industrial Energy Management Services Program (IEMS) are presented below. IEMS efforts provided gas energy conservation information to core industrial customers throughout SoCalGas's service territory. The information is provided in person, typically by a SoCalGas account executive. The SoCalGas representative conducts an on-site inspection of the customer's facility and recommends actions that would reduce natural gas consumption. The recommendations are based upon the SoCalGas representative's review of the customer's gas-using equipment and equipment practices. The results of these audits were expected to achieve average annual savings of 1000 therms per audited customer.

The IEMS impacts are provided in Table 1. Table 1 summarizes total program results and impacts for a typical audited customer in the following subgroups:

- Total Survey Respondents
- Survey Respondents Who Recalled the SoCalGas Audit
- Survey Respondents Who Recalled Audit and Implemented Recommendations
- Non-Respondents
- Small Customers (<1,000 therms annual consumption)

**Table 1**  
**Participant Therm Savings -**  
**Customer Impacts, Customer Counts and Program Impacts**

Group	Ex-Post Audit Impact (therms)	Ex-Post Audit Impact (% of usage)	Ex-Post Customer Count	Ex-Post Program Impact
Survey Respondents, Total	1,832	2.6%	209	382,898
Recalled Audit	1,415	2.4%	98	183,326
Recalled Audit & Implementation	456	0.6%	35	44,645
Non-Respondents (>1000 Therms)	45	0.1%	818	36,406
Small Customers (<1000 Therms)	23	6.7%	266	6,080
<b>All Participants<sup>a</sup></b>	<b>254</b>	<b>0.6%</b>	1293	328,613

Notes: a Audit impact per customer determined using the percentage savings from the "Recalled Audit & Implementation" group

$$\frac{254 \text{ therm} \times 1293 \text{ cust}}{1} = 328,613 \text{ prog. savings}$$



Annual-first year therm savings from 1995 program efforts averaged 254 therms per IEMS program participant. This estimate is based upon savings calculated from survey respondents who recalled the 1995 audit and implemented recommendation(s). The aggregate therm savings from this group was divided by the total consumption of survey respondents who recalled the audit, irrespective of whether they implemented any recommendations.

The ex ante goal of 1,250 IEMS audits was accomplished. The 1995 IEMS participant list included 1,551 customers. After removing non-core customers (some of whom may have been core customers during 1995 or were associated with core accounts), 1,362 audited customers remained.

The ex post estimate of average annual industrial audit savings was lower than the 1,000 therm ex ante estimate for three major reasons. First, separation of audit effects from production effects was only partially accomplished. Second, SoCalGas has been very diligent in auditing its largest customers – to the point where diminishing returns would be expected from incremental audits. Third, the average annual consumption of audited customers is significantly less than was anticipated when the program was designed. It must also be emphasized that the audit savings estimates are imprecise. The confidence bounds on the savings estimates are quite wide. They encompass the ex ante estimate of 1,000 therms per audit and zero for some groups (see Table 9, p.33).

Table 2 shows pre and post audit annualized consumption for the three major subgroups and for the survey respondents who were able to recall the 1995 SoCalGas audit when surveyed in the fall of 1996.

**Table 2  
Annual Therm Usage Pre and Post Audit  
Per Participant**

<b>Group</b>	<b>Pre Audit</b>	<b>Post Audit</b>
Survey Respondents, Total	64,444	70,828
Recalled Audit & Implementation	84,509	90,297
Non-Respondents (>1000 Therms)	46,439	52,557
Small Customers (<1000 Therms)	582	370
<b>All Participants</b>	<b>39,915</b>	<b>44,774</b>

A net-to-gross assessment was not conducted for the 1995 IEMS Program since a suitable comparison group was not available. All large SoCalGas industrial customers have been audited during the last two years. Only a subset of very small customers have not been audited by SoCalGas at some point over the last few years. Since the smaller customers tend to be space heating customers, rather than industrial process customers, a reasonable control group cannot be defined from among SoCalGas customers.

It is possible that positive spillover impacts could have occurred due to SoCalGas effort. For example, it is likely that individual's responsible for reviewing and implementing audit recommendations will carry an enhanced awareness of energy saving actions to any facility at which he or she works. It is also likely that geographically proximate businesses that do not directly compete with one another will occasionally share cost saving advice, such as energy audit information. The effort required to estimate spillover impacts was felt to be too expensive relative to the potential benefits. Direct audit savings for industrial sector customers are very challenging to quantify with any degree of accuracy. Quantification of spillover effects is much more difficult. Consequently no estimation of spillover effects was attempted.

Therm values defining the 90% and 80% confidence levels for each customer group are provided in the section entitled Usage Estimates and Therm Savings Impacts (see Tables 7, 8, and 9).

## **Introduction**

The 1995 Industrial Energy Management Services Program (IEMS) provided energy saving information for core industrial customers throughout SoCalGas's service territory. The information consisted, primarily, of recommendations aimed at using natural gas more efficiently in industrial customers' key pieces of equipment. The major types of equipment targeted in the industrial core markets are: process boilers, space heating boilers, water heaters, space heating furnaces, dryers, kilns, ovens, and prime movers (i.e., gas-fired engines used primarily for pumping).

### *Audit Delivery*

SoCalGas account executives assigned to core industrial customers have the primary responsibility for conducting energy audits under the Company's IEMS program. The majority of the account executives are engineers by training. They are all trained on:

- General principles of combustion and combustion technology
- Conservation technologies, including building shell efficiency measures
- Pipe insulation measures
- Gas equipment technologies, including flue gas analysis of said equipment

In addition they have access to a SoCalGas technical staff with knowledge of industry-specific energy technologies. SoCalGas staff are particularly well-acquainted with energy-efficient process cooking equipment, gas-fired melting technologies, gas engines, furnaces, and boilers.

The account executives are assigned groups of customers to whom they are responsible for providing energy efficiency advice, arranging for SoCalGas energy service technicians to conduct flue gas analyses and equipment adjustments, answering billing questions, and arranging for changes in service. Depending upon the size of the customer and customer's particular needs, they will typically meet with the customer annually. On average, audits are conducted once every two years for customers using greater than

50,000 therms annually; smaller customers are visited less frequently. Some large customers receive audits more often than once every two years. This is most typical of customers with extensive equipment holdings and with customers who have recently added additional equipment.

The account executives are assisted by SoCalGas interns assigned to the various SoCalGas field offices.. Interns are engineering undergraduates drawn from local colleges and universities. The interns are trained to conduct energy analyses and to make recommendations for energy efficiency improvements.

Interns are placed at a SoCalGas field office and assigned a geographic area. The interns first generate a list of possible audit candidates using the MAS database. To do so they identify their geographic area of interest and customers within that area who have not received an audit within the past 12 months. The generated customer list is sorted by street address. The interns call groups of physically proximate customers to schedule free energy audits to customers on their list. The audits take anywhere from 30 minutes to two days to complete, depending upon the complexity of the customer's operations and the extent to which the customers are willing to take time with the energy auditor. While they focus their efforts primarily upon commercial customers, they also assist account executives in conducting industrial audits.

SoCalGas customer representatives, both account executives and interns, have a set of two recommendation checklists that can be employed as an aid to the audit process. One checklist, used overwhelmingly for commercial sector customers, rather than industrial customers, is for kitchen equipment. The second recommendation checklist is more generally used across all non-residential customer groups. A copy is shown in Figure 1.

**Figure 1  
Audit Recommendation Checklist**

**COMMERCIAL/INDUSTRIAL ENERGY EFFICIENCY ANALYSIS  
RECOMMENDATION CHECKLIST**

NAME OF BUSINESS _____		GAS ACCOUNT NUMBER _____		DIVISION _____	
BUSINESS ADDRESS _____			CITY _____		ZIP CODE _____
PERSON CONTACTED _____			PHONE NUMBER _____		
<b>ACTION CODES</b> Y= CUSTOMER HAS TAKEN ACTION PRIOR TO ANALYSIS N= NO ACTION TAKEN, AND NO RECOMMENDATION... R= ADVISED TO TAKE THIS ACTION A= ACTION TAKEN SINCE INITIAL SURVEY (ANALYSIS REVIEW ONLY)			YEAR _____ MONTH _____ THERMS _____		
			ANALYSIS <input type="checkbox"/> ANALYSIS REVIEW <input type="checkbox"/>		
<b>BOILERS</b> 01 FREQUENT ADJUSTMENT/CLEANING OF BURNERS) EITHER AUTOMATICALLY WITH AN OXYGEN TRIM SYSTEM OR MANUALLY UTILIZING A FLUE GAS ANALYZER ON A STRICT SCHEDULE (3-6%) _____ 02 INSTALLATION OF STEAM/HOT WATER PIPE INSULATION (AND INSULATION ON OTHER COMPONENTS SUCH AS THE REHEATER TANK, CONDENSATE RETURN LINE AND END USE APPLIANCE WHERE APPROPRIATE) (2-10%) _____ 03 INSTALLATION OF CONDENSATE RETURN LINES WHERE SIGNIFICANT VOLUMES EXIST (5-20%) _____ 04 INSTALLATION OF PROPERLY FUNCTIONING STEAM TRAPS (2-5%) _____ 05 INSTALLATION OF WATER SOFTENER AND/OR FREQUENT REMOVAL OF SCALE FROM HEAT EXCHANGE SURFACES (3-10%) _____ 06 USE OF LOWEST TEMPERATURE-PRESSURE OF HOT WATER STEAM THAT PROCESS WILL ALLOW (1-3%) _____ 07 INSTALLATION OF TURBULATORS IN FIRE TUBES TO IMPROVE HEAT TRANSFER (2-8%) _____ 08 PREHEAT FEEDWATER WITH WASTE HEAT ECONOMIZER OR BLOWDOWN RECOVERY) -- DO NOT INCLUDE HEATING DEAERATOR TANK WATER WITH BOILER STEAM (5-15%) _____ 09 TIMERS ON HOT WATER CIRCULATING PUMPS (20-30%) _____ IF BOILER IS USED FOR SPACE HEATING ADD: 10 SPACE HEATING SHUT OFF (OR VERY LOW) AFTER HOURS AND DAYS CLOSED (10-20%) _____ 11 THERMOSTATS SET LOW ( 68°F) DURING HEATING SEASON (4%) _____ 12 ROOF/CEILING/ATTIC INSULATION ( R 19; (10-20%) _____ 13 TIGHT BUILDING SHELL WITH CLOSED WINDOWS AND DOORS AND WEATHERSTRIPPING/CAULKING (5-10%) _____ 14 USE OF ACTIVE SOLAR SPACE HEATING (50%) _____ 15 OTHER _____			<b>WATER HEATERS</b> 01 WATER TEMPERATURE SET AS LOW AS POSSIBLE ( 120°F) FOR NON-SANITARY USES (5-10%) _____ 02 INSTALLATION OF FLOW RESTRICTORS WHERE APPLICABLE (SHOWERS, WASH BASINS ETC.) (UP TO 50%) _____ 03 INSTALLATION OF WATER HEATER BLANKET (3%) _____ 04 REGULARLY CLEAN HEAT EXCHANGE SURFACES (BY DE-CALMING AND/OR USING WATER SOFTENER) (10-15%) _____ 05 SHUT CIRCULATING PUMPS OFF AFTER HOURS WHERE APPLICABLE (CLOSED LOOP SYSTEMS) (20-30%) _____ 06 INSTALLATION OF HOT WATER PIPE INSULATION (ESPECIALLY FOR CIRCULATING, CLOSED LOOP SYSTEMS) _____ 07 CALL GAS COMPANY CUSTOMER SERVICES FOR FREE BURNER CALIBRATION _____		
<b>OTHER EQUIPMENT</b> <input type="checkbox"/> KITCHEN <input type="checkbox"/> DRYERS <input type="checkbox"/> PRIME MOVERS <input type="checkbox"/> FURNACES <input type="checkbox"/> HEATER <input type="checkbox"/> OTHER _____			<input type="checkbox"/> TANKS (SOLUTION) <input type="checkbox"/> WASHERS <input type="checkbox"/> KILNS <input type="checkbox"/> ATMOSPHERIC GENERATOR <input type="checkbox"/> OVENS <input type="checkbox"/> TORCHES		
<b>SPACE HEATERS</b> 01 THERMOSTATS SET LOW ( 68°F) DURING HEATING SEASON (4%) _____ 02 SPACE HEATING SHUT OFF (OR VERY LOW) AFTER HOURS AND DAYS CLOSED (10-30%) INVESTIGATE INSTALLATION OF TIMERS _____ 03 TURN PILOTS OFF IN SUMMER MONTHS OR USE ID S _____ 04 ROOF/CEILING/ATTIC INSULATION ( R 19; (10-20%) _____ 05 TIGHT BUILDING SHELL WITH CLOSED WINDOWS AND DOORS AND WEATHERSTRIPPING/CAULKING (5-10%) _____ 06 EXISTENCE OF DUCT INSULATION WHERE DUCTS RUN THROUGH UNCONDITIONED AREAS (5-15%) _____ 07 OTHER _____			<b>AIR CONDITIONERS</b> 01 THERMOSTATS SET HIGH ( 78°F) DURING COOLING SEASON (0-10%) _____ 02 EQUIPMENT SHUT OFF AFTER-HOURS AND DAYS CLOSED (5-10%) _____ 03 ROOF/CEILING/ATTIC INSULATION ( R 19) (5-15%) _____ 04 TIGHT BUILDING SHELL WITH CLOSED WINDOWS AND DOORS AND WEATHERSTRIPPING/CAULKING (2-5%) _____ 05 INSULATED DUCTS IN NON-CONDITIONED AREAS (2-5%) _____ 06 REGULAR/AUTOMATIC USE OF AN ECONOMIZER CYCLE (20-50%) _____		
REMARKS _____ _____ _____ _____ _____ _____ _____ _____			YES NO OBSOLETE EQUIPMENT REPLACEMENT SUGGESTED? <input type="checkbox"/> <input type="checkbox"/> CUSTOMER REQUIRES FOLLOW-UP? <input type="checkbox"/> <input type="checkbox"/> IF YES, DESCRIBE _____ _____ _____ _____ _____ _____		
SURVEY CONDUCTED BY _____ DATE _____			X _____ CUSTOMER SIGNATURE YES NO SEND LETTER? <input type="checkbox"/> <input type="checkbox"/>		

As seen in Figure 1, conservation measures are identified for boilers (process), space heating boilers, generic space heaters, and water heating energy use. Generic air conditioning (either gas-fired or electric) recommendations are also made when appropriate. The boiler measures include pipe insulation, burner adjustments, steam trap cleaning and repair, and scale removal, among others. Space heating-related measures include ceiling insulation, weather-stripping, caulking, and duct insulation. The water heating-related measures included: water heater blankets, faucet aerators, and pipe insulation. The form contains space for the suggestion of conservation measures for specialized equipment such as dryers, prime movers, furnaces, and ovens.

The audit is not limited to these recommendations. The auditors are free to make any suggestions that are appropriate given the customers actual equipment holdings, business processes, and energy-using practices. The form provides a convenient reminder of actions that should be routinely undertaken by each customer. In fact, much of the benefit of SoCalGas audit actions is the constant energy efficiency reminder they provide customers.

### ***Report Objectives***

This report summarizes the results of a statistical analysis aimed at estimating the first year load impacts of the SoCalGas 1995 IEMS Program. The Protocols do not require calculation of equipment or end-use specific audit impacts. End-use specific estimates are required for “lighting, motors, and other.” Since there are no gas lights or motors (or at best very few) on SoCalGas customer premises, all end-uses fall into the “other” category, functionally equivalent to calculating aggregate audit impacts .

In spite of this the original intent was to provide end-use specific impacts, if possible. The effort required to obtain robust estimates of natural gas audit savings for industrial (i.e., process) customers is extensive. A key element is obtaining equipment-specific production information for customers used in the analytic data set. Without knowing

when production changes affected energy use and by how much the production changes use, audit impacts are masked.

Industrial customers are very reticent about providing production information to outsiders. Knowing this prompted an attempted census of all program participants in order to maximize the size of the analytic dataset. In spite of this intent to contact each program participant, we were able to contact only 214 program participants. This relatively small sample, plus a high non-response rate to key production questions limited the audit assessment techniques available to us.

We were unable to employ conditional demand analysis (CDA), a statistical technique that disaggregates monthly therm consumption data into appliance-specific average usage. The technique uses individual customer recorded monthly therm usage both before and after the audit combined with customer-specific equipment holdings to estimate changes in energy usage. Customer-specific production information and regional weather data are also directly employed in the CDA estimation process. We could not obtain a sufficiently large sample of detailed equipment information and equipment-specific production data to undertake the CDA approach.

In spite of this limitation, audit savings estimates have been developed using customer-specific time series regression models. The data employed in the analysis, and its development, are outlined below in the section entitled Analytic Data Set Development. The estimation of the regression model is described in the section entitled Model Development and load impacts are included in the section entitled Usage Estimates and Therm Savings Impacts. Appendices include the participant survey instrument and detailed regression results. The analytic dataset (merged billing data and survey data), SAS program files used to prepare the analytic dataset and run the final regressions, and the SAS System output for the final set of customer specific models are filed with this report.



## **Analytic Data Set Development**

This section describes the development of the data used in the analysis of the 1995 IEMS gas savings impacts. The required analytic data set was created from the integration of four separate data sets: the 1995 program participant list from the MAS database, SoCalGas's monthly customer billing file, the heating degree day file, and the 1995 IEMS Participants Survey file. The relationship of these datasets with respect to the development of the analytic data set is shown in Figure 2. A brief description of each data set follows.

### ***Program Participation Records***

SoCalGas has historically maintained IEMS program tracking on the mainframe-based Commercial Industrial Gas Use System (CIGUS). During 1995 program, tracking was given over to the new, PC based Market Analysis System. This was necessary because support for CIGUS was being eliminated with the installation of a new customer information system. CIGUS was functionally linked to the older customer information system. Integrating the CIGUS database system with the new customer information system was too costly to pursue, hence much of the activities formerly managed within CIGUS were given over to MAS. IEMS audit logging and tracking was one of these activities.

The MAS system is intended to log the date of initial audits, post audit visits, and other interactions with SoCalGas customers, as well as specific information about each of those types of interactions. They also provide links necessary to obtain billing data for each audited customer, who is the responsible account executive or representative, and where hardcopy customer files would be located.

The Program participation files contain data vital to the estimation of load impacts. There are data fields for the following:

- Audit date

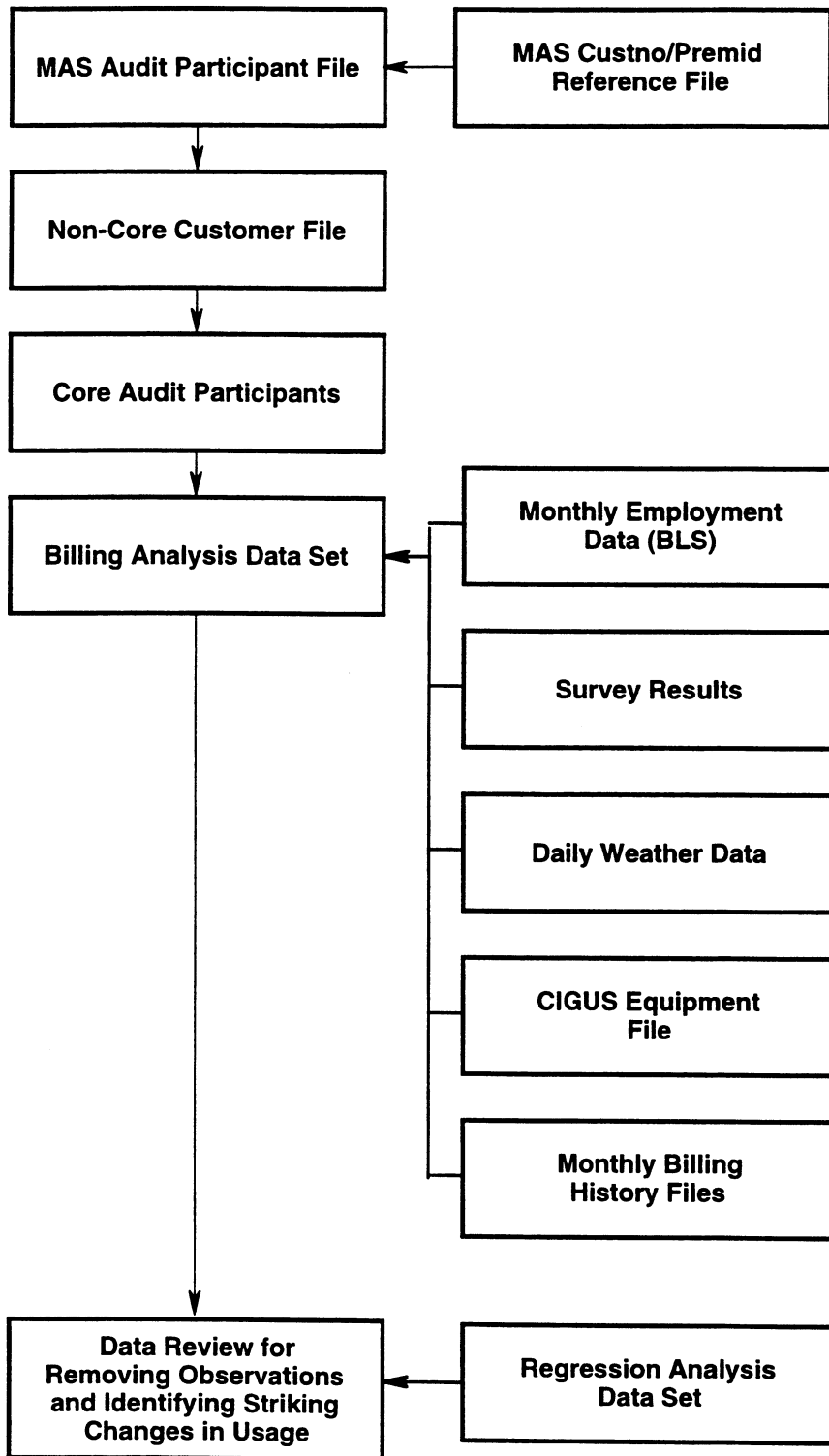
- Premise and account identification numbers (used to match billing records to the customer)
- Customer name
- Customer contact
- Customer phone number
- Address (used to assign weather data and used in the participant survey implementation)
- Equipment holdings (type and number)

Figure 2 displays a flow diagram of the analytic dataset development process. The MAS Audit Participant data file has a MAS customer number that allowed it to be merged with a MAS Customer Number/Premise Identification (Premid) reference file to obtain the Premid variable needed to obtain billing history data. The Premid was also used to merge the participant data with the Noncore Customer list.

A total of 1,551 industrial and water pump customers were included in the 1995 IEMS file ( MAS Audit Participant file). After removing observations having multiple audit visits during 1995, 1,434 records remained.

Customers having volumes billed at Noncore rates (e.g. G30 and G50) were not included in the impact analysis. These customers may have been core customers at the time of the audit or they may have been non core accounts associated with core accounts at the same facility. We could not identify which situation existed for each non-core participant, consequently all were removed from further analysis. After removing customers with noncore volumes, 1,362 records exist in the participant data base.

**Figure 2**  
**Analytic Data Set Development**



### ***Billing Data***

Gas consumption data was obtained from the customer billing files maintained by SoCalGas. The customer billing file contains monthly therm usage for each SoCalGas customer. The correct billing data for each program participant was obtained by matching the premise and customer identification numbers on the IEMS participation file derived from the MAS database with those on the customer billing file. Matching by premise ID is superior to matching upon account number because account numbers may change as accounts are refolioed. Monthly 1995 billing history information for 21 of the 1362 participants was not found in company billing files and these 21 participants were removed from further analysis.

Key participant-specific information obtained from the customer billing files included:

- monthly therm consumption for each 1995 IEMS participant from January, 1994 through November, 1996
- meter read dates
- monthly billing days

### ***Weather Data***

Weather variables were created to account for the effect of weather on space heating energy use and on water heating energy use. For space heating, a set of climate area and billing cycle-specific "heating degree days" variables with a 65 degree Fahrenheit base were created. Daily high and low temperatures were employed to create daily heating degree variables over the billing data time frame. These daily values were aggregated into monthly values for each combination of six SoCalGas weather zones and each possible billing cycle. Normalized weather data were not employed since the selected models did not interact the conservation variable with heating degree days.

The heating degree day variable was merged with the IEMS participant and billing data using address and billing cycle information. The "actual" variables were used for estimation of savings.

### ***Program Participants Survey***

The aim of the survey was to obtain production data, equipment data, and equipment utilization information needed to estimate a regression model of monthly gas consumption that would allow conservation impacts to be identified. The first step involved employing annual 1995 usage to identify which customers used less than 1,000 therms per year, as well as customer over 50,000 therms per year (target market of IEMS program). Of the remaining 1,341 participants after non-core participants were removed, 289 used less than 1,000 therms in 1995. The consumption records for these customers was reviewed and their usage patterns were indicative of space heater use. Owing to their very low annual consumption (lower than average residential levels) and the high likelihood that their major gas using equipment is a residential size space heater, these customers were not surveyed. Their total annual consumption represents less than 0.2% of the total consumption of the 1995 audited group.

The remaining 1,052 customer names (including telephone numbers and addresses when available) were presented to Guideline Research Company. A census of these customers was sought. The major reason for not conducting on-site surveys was to provide sufficient resource to contact as many of the program participants as was possible.

Guideline Research Company was able to obtain valid, working telephone numbers for 981 of the 1,052 participants. Prior to beginning the telephone contacts, a letter was sent to each customer from SoCalGas explaining that they would be shortly contacted by Guideline Research staff to answer a few questions regarding their 1995 SoCalGas IEMS audit. The purpose of the survey was identified as were the key pieces of information desired. The confidentiality of the survey effort was stressed.

In October 1996, approximately 5-10 working days after the letter had arrived, Guideline Research Company began a phone survey of the remaining 981 IEMS program participants. The survey instrument is provided in Appendix A. The phone survey effort resulted in 216 completed phone interviews, although two of these were later found to be duplicates, resulting in a final count of 214 completes. This represents slightly higher than a 22% response rate, quite typical for non-residential customers, although less than hoped for.

There were 27 initial refusals with no reason given. An additional 77 refused to answer questions because: 1) they did not recall the 1995 audit, or 2) they were not apprised of the 1995 audit, or 3) they were uncomfortable providing the information requested.

The remaining 661 telephone contacts were unresolved. Most typically, the appropriate respondent did not return the phone message to contact Guideline Research. An average of 12 attempts were made to contact the 661 unresolved participants. In retrospect the choice to substitute a telephone survey for on-site visits was the correct choice. Given the difficulty in obtaining respondents to a simple telephone survey, the likelihood of obtaining a reasonable onsite sample would have been virtually non-existent.

Establishing appointments with any of the 661 unresolved participants would have been unlikely.

The *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management Programs as adopted by CPUC D. 93-05-063* (Protocols), imply that a comparison group of non-participants be included in the IEMS evaluation. Given the heterogeneity of industrial customers and given the fact that the target group of customers using more than 50,000 therms annually is audited at least once every two years, a suitable comparison group was impossible to identify within the service territory. Only a subset of small space heating customers with industrial SICs have not been audited over the past few years.

Table 3 provides the distribution of SoCalGas industrial customers, audit participants, survey respondents, non respondents, and small customers (i.e., audited customers with

annual consumption less than 1000 therms) by two digit Standard Industrial Classification (SIC). The distribution is reasonably consistent for each category/group, although survey respondents tended to have higher average consumption than non respondents. The small customer distribution was most consistent with the total SoCalGas core customer distribution, owing to the large number of small customers with industrial SICs.

**Table 3**  
**1995 Audit Participants by Industry Group**

<b>SIC Code</b>	<b>SCG Core Customers</b>	<b>Total Audit Group</b>	<b>Survey Respondents</b>	<b>Non Respondents</b>	<b>Small Customers</b>
<b>20 – Food Products</b>	1,328 5.9%	155 11.6%	36 16.8%	104 12.4%	15 5.2%
<b>22 – Textiles</b>	508 2.2%	60 4.5%	18 8.4%	34 4.1%	8 2.8%
<b>23 – Apparel</b>	1,843 8.2%	95 7.1%	3 1.4%	61 7.3%	31 10.7%
<b>24 – Lumber</b>	463 2.0%	17 1.3%	1 0.5%	10 1.2%	6 2.1%
<b>25 – Furniture</b>	781 3.5%	39 2.9%	5 2.3%	25 3.0%	9 3.1%
<b>26 – Paper</b>	319 1.4%	17 1.3%	0 0.0%	13 1.6%	4 1.4%
<b>27 – Printing</b>	2,473 10.9%	68 5.1%	8 3.7%	29 3.5%	31 10.7%
<b>28 – Chemicals</b>	973 4.3%	76 5.7%	10 4.7%	46 5.5%	20 6.9%
<b>29 – Petroleum</b>	146 0.6%	6 0.4%	3 1.4%	2 0.2%	1 0.3%
<b>30 – Rubber &amp; Plastics</b>	990 4.4%	64 4.8%	15 7.0%	37 4.4%	12 4.2%
<b>31 – Leather</b>	98 0.4%	2 0.1%	1 0.5%	1 0.1%	0 0.0%
<b>32 – Stone, Clay &amp; Glass</b>	757 3.4%	55 4.1%	13 6.1%	36 4.3%	6 2.1%
<b>33 – Primary Metals</b>	615 2.7%	77 5.8%	16 7.5%	53 6.3%	8 2.8%
<b>34 – Fabricated Metals</b>	2,386 10.6%	202 15.1%	27 12.6%	151 18.1%	24 8.3%
<b>35 – Machinery</b>	4,069 18.0%	125 9.3%	16 7.5%	66 7.9%	43 14.9%
<b>36 – Electronics</b>	1,769 7.8%	98 7.3%	16 7.5%	55 6.6%	27 9.3%
<b>37 – Transportation Eqp.</b>	1,088 4.8%	64 4.8%	9 4.2%	47 5.6%	8 2.8%
<b>38 – Instruments</b>	972 4.3%	42 3.1%	7 3.3%	23 2.8%	12 4.2%
<b>39 – Misc.</b>	1,017 4.5%	40 3.0%	5 2.3%	24 2.9%	11 3.8%
<b>Other (Pumping)</b>	NA NA	37 2.8%	5 2.3%	19 2.3%	13 4.5%
<b>Total</b>	<b>22,595</b>	<b>1,339</b>	<b>214</b>	<b>836</b>	<b>289</b>



The surveys were directly entered into a database as they were conducted. The database was preloaded with the original list of participants with associated premise IDs and account numbers, allowing the survey results to be easily merged with the billing data, and weather data described above.

### ***Regional Employment Data***

Monthly employment for Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties at the 2 digit SIC level was obtained from the Bureau of Labor Statistics from 1993 through September, 1996. These data were used as a proxy for customer-specific production data.

Monthly production data from the participant survey was the preferred production variable. If the respondent did not provide monthly production data, quarterly data was employed. If quarterly data was not provided, pre and post audit production values was selected. If no production or employment data was provided by the respondent (or if the program participant was a non-respondent or small customer), BLS employment data was used as a proxy for production data.

### **Respondent and Non-respondent Usage Comparison**

After the completed surveys were coded and a database of respondents was created, t tests were performed to make certain that the survey respondents accurately represent the 1995 participant population. The t tests were performed by comparing average 1995 respondent usage to average 1995 usage of the non-respondents for each of four therm usage strata. Annual average usage values were created by calculating average use per day and scaling by 365.

Using the average annual usage values and standard deviations, t-ratios were generated and the null hypothesis that no significant difference existed between respondent and non-respondent average use was tested. The null hypothesis was rejected when the test statistic value was greater than 1.96. Table 4 shows the results of the t tests for the four therm consumption bands.

**Table 4  
Respondent vs. Non-respondent 1995 Usage Comparison**

Therm Band	Average Annual Therm Usage		t-Test
	Respondents	Non-Respondents	
Under 3,000	1,742	2,006	1.71
3,000-50,000	21,768	18,952	-1.72
50,000-250,000	120,520	111,243	-1.64
Over 250,000	318,000	340,636	.32

The fact that the absolute value of the t-test numbers for the four size bands are each less than 1.96 suggests that respondent group is not unrepresentative of the non-responding program participants from the standpoint of annual natural gas consumption.

#### **Inconsistency and Consumption History Screens**

The survey results and customer billing histories were reviewed for obvious anomalies. Particular attention was paid to variables that were known to be important in the subsequent statistical assessment, most importantly monthly billing data.

After reviewing the individual customer data series, 23 of the under 1,000 therm customers were dropped from the regression analysis, 5 of the survey respondent customers were removed, and 20 of the non-responding customers over 1,000 therms were removed. Customers were removed if it was obvious from their billing history that they had ceased operations at the facility in question. Their inclusion would have biased audit savings estimates upward.

The Protocols require a minimum of twelve months of pre installation consumption history and nine months of post installation period consumption history for inclusion in the conditional demand analysis. Billing history information was collected from January, 1994 through November, 1996. A total of 9 survey respondents, 46 customers in the non-respondent group, and 90 members of the small customer group did not meet these criteria. Most failed to meet the criteria by only one or two months of pre- or post-

consumption history. Because of the small number of program participants, particularly among the survey respondents, these customers with truncated billing histories were retained in the analysis. Their exclusion would not have altered the overall results.

The Protocols state that the sample employed in the calculation of program impacts should yield consumption estimates meeting a 90% confidence interval with 10 % precision criterion. The 1995 IEMS Participants Survey was intended to provide a census of audit participants whose consumption exceeded 1,000 therms annually.

#### **Estimation of Missing Values**

Missing values were not a problem owing to the simplicity of the model structures employed. Billing data and weather data were complete with the exception of truncated billing histories for a small percentage of customers. No attempt was made to estimate missing billing values.

Customer-specific, monthly production data were generally missing. Bureau of Labor Statistics two-digit SIC code employment data for Southern California counties were used as a proxy for missing production data.

1. A significant portion of builder participation in SoCalGas' 1994 Residential New Construction program occurred in the final quarter of 1994. Given that there is a lag between new construction and home occupancy, it would be difficult, if not impossible, for SoCalGas to obtain a minimum of nine months of sufficient post-installation data for a representative sample.
2. In order to have sufficient energy consumption data for a minimum of nine months, SoCalGas will have to utilize the consumption data during some months of the second impact year, 1995.
3. It has been SoCalGas' experience that a load impact study requires at least one year to complete. Given that sufficient consumption data will not be available for the first impact year, part of the second impact year will also be utilized. Consequently, SoCalGas will need the additional year for the consumption data requirement to be fulfilled.

SoCalGas plans to estimate the first year load impacts associated with the Energy Advantage Home Program for Program Year 1994. The 1994 Energy Advantage Home Program was designed to encourage builders to construct homes that exceeded existing efficiency Title 24 building standards by: (1) installing natural gas appliances which are more energy efficient and use less source energy than the appliances that would have been installed otherwise, and (2) exceeding current standards for air distribution efficiency. In addition to providing builders with financial incentives for participating in the Energy Advantage Home Program, informational and training workshops were conducted throughout the year for builders and contractors to educate them on the energy and economic benefits of energy efficient natural gas equipment and properly installed air duct systems.

The study will comply with the Protocols to estimate net program load impacts.

Study Title: First Year Load Impact Study of Southern California Gas  
Company's 1995 Industrial Energy Management Services Program  
Study Id: 710

SoCalGas completed the first year load impacts associated with the Industrial Energy Management Services Program for Year 1995. IEMS program was designed to provide energy efficiency services to customers in industrial facilities. This included the relative costs and benefits of installing measures or adopting energy management practices which increased energy efficiency and reduced the customer's utility bill. The program focused on encouraging customers to modernize their entire process, not just the end-use equipment itself; but also, to optimize energy efficiency and productivity.

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This study evaluates the load impact of Southern California Gas Company's 1994 Home Energy Fitness (HEF). This evaluation was performed in compliance with the requirements of the Protocols for Verification of Demand-Side Management (DSM) programs, which govern the procedures that the California investor-owned utilities must use in evaluating their programs.

The HEF Program promotes the adoption of energy efficient measures and actions by providing informational audits to residential customers.

The objective of the impact evaluation was to estimate the natural gas savings that resulted from the 1994 HEF program audits. The study estimated the gross and net savings attributable to the HEF program by examining the consumption patterns for a representative sample of participants and non-participants over a three year period spanning the receipt of the audits. Several regression models were estimated on these data, and they produced estimates of gross, as well as, net annual savings. The net savings are the reductions in gas consumption from the program, after controlling for "naturally occurring" conservation and background economic trends.

The analysis technique employed is a Load Impact Regression Model as defined in the Protocols. Tests of important statistical issues that could arise in the estimation of model parameters were performed, and appropriate procedures were used to correct any significant problems were identified. All of the regression models that were estimated prior to selection of the final model are presented in this study along with the associated confidence statistics and related information.

Load impact results will be finalized by March 1, 1996, when the report will be filed with CPUC as mandated in the Protocols.

Study Title: Estimation of Spillover Savings For the Commercial Market  
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The objective of this study is to estimate spillover savings associated with the most important measures covered under SoCalGas' commercial equipment replacement DSM conservation programs. This study is the second phase of a two-phase project to rigorously estimate spillover savings pursuant to Advice No. 2231. The first phase (Study Id: 700) provided a comprehensive theoretical review of the methods and data requirements for estimating spillover effects. Drawing on the recommended methods and data requirements identified in the first phase, this study empirically estimates spillover effects.

As discussed in the first phase report (Study Id: 700), spillover is measured through indirect method (i.e., subtracting participant net savings from total net savings). "Participant net savings" is savings due to the program-induced installation of measures covered under the program. "Total net savings" is the savings produced by the program beyond the savings that would have occurred naturally (it is the sum of participant net savings and spillover savings). Spillover is defined as the reduction in energy consumption due to a DSM program, beyond the program-induced savings by participants from the installation of measures covered under the program.

Total net savings is estimated using models that use time as a control. Participant net savings is estimated using two methodologies: i) the one prescribed in the M&E Protocols and ii) by subtracting naturally-occurring savings by participants from the gross savings of participants. The methodology in the M&E Protocols involves subtracting the change in energy consumption of nonparticipants from the change in the energy consumption of participants. The advantage of this approach is its simplicity. The disadvantage is that it makes the questionable assumption that nonparticipants can be used as a proxy for the behavior of participants in the absence of the program.

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The Measurement Staff will work on the following M&E studies scheduled to be filed with the Commission on March 1, 1997:

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SoCalGas requested to be able to file the study at a later date in order to allow SoCalGas to comply with the Protocol requirement of using 9 months of billing data. The reasons for SoCalGas' request were as follows:

## DEMAND-SIDE FORECASTING AND PLANNING

Demand-Side Forecasting and Planning consists of those activities supporting data collection projects that are of common interest across all demand analysis activities within the utility, including demand forecasting, program evaluation, measure evaluation, and other ongoing efforts. These activities are significantly affected by two California Energy Commission(CEC) regulations which mandate various kinds of specific data to be collected and transmitted to the CEC for use in energy planning proceedings. In addition, Demand-Side Forecasting and Planning includes activities necessary to design new DSM programs. There are five subcategories in Demand-Side Forecasting and Planning: Load Metering, Saturation Surveys, Market Assessment and Other Research and Analysis, New Technology Evaluation, and Long-Run Planning.

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## *MARKET DEVELOPMENT ACTIVITIES*

In 1995, SoCalGas underwent a reorganization that positioned the market development activities under the Technology Development group. Technology Development continued to support the Marketing departments in their efforts to identify, measure and evaluate, and bring to market new, energy efficient and low emission gas technologies.

During 1995, the Technology Development group initiated high efficiency, state-of-the-art gas technology demonstration projects under the mandates of the "Select Technologies" program, consistent with Commission directives. Several technology demonstration projects have progressed to the point of requiring measurement and evaluation support to document increased energy efficiency, low emission levels and productivity improvements under the mandates of the "New Technology Evaluation" M&E program.

The following section discusses measurement and evaluation activities conducted during 1995 under the New Technology Evaluation category.

### *New Technology Development Valuation and Prioritization*

Technology Development, continuing the role of the former Market Development group, continued to institutionalize a cross-departmental process to identify, evaluate and prioritize new technology development, demonstration and commercialization activities. This technology evaluation process is conducted on a continuous basis to update and prioritize which activities SoCalGas should pursue in the best interest of ratepayers. Technology Development continues to comply with the California Public Utilities Commission's decree that demonstration projects conducted under the mandate of SoCalGas' Select Technologies Program demonstrate the potential to pass DSM cost-effectiveness tests, and in assuring that measurement and evaluation testing met the protocols dictated by the California Public Utilities Commission.

### *Energy Efficient Space Conditioning*

Technology Development evaluated the commercialization of gas cooling, heating and dehumidification systems in response to consumer demand. The objective of these evaluations were to develop a plan to demonstrate, measure and evaluate gas-fired heat pumps, absorption chillers, and desiccant based dehumidifiers which could possibly provide a highly efficient alternative to electric air conditioning for residential and light commercial customers.

## Carpet Demonstration Project

Technology Development is demonstrating and evaluating the use of the latest, state-of-the-art air/fuel ratio controllers and catalyst emissions control systems on a 600 horsepower natural gas cogeneration engine. The objective of this field demonstration is to determine which combination of air/fuel ratio controllers and catalysts achieve the highest combustion efficiency while maintaining the lowest emission levels possible. Regulations continued to evolve in 1995 and so greater demand was placed on these controllers to operate within finer tolerances and smaller ranges than ever before. It is the expectation that additional projects at other sites will be needed to achieve the goals of this effort as greater emissions reductions will be expected of these critical systems.

## Plastics Industry Technology Study

Technology Development initiated a study to document technology and needs assessment of the plastics processing industries within SoCalGas' service territory. The study characterizes the types of plastics processing equipment in Southern California and presents analysis of the opportunities within the plastics industry.

## Consortium Memberships

Technology Development participated in numerous natural gas industry consortiums, which insure that SoCalGas leverages its investment with other utilities to promote the development and commercialization of new, energy efficient, gas technologies which may be incorporated in DSM programs in the future. Technology development maintained memberships in American Gas Cooling Center (AGCC), which promotes commercialization of energy efficient gas cooling technologies; Industrial Gas Technology Commercialization Center (IGTCC); which promotes commercialization of energy efficient, advanced combustion, and control systems.

## *LONG-RANGE PLANNING AND FORECASTING*

Long-Run Planning consists of projects related to end-use forecasting, cost-effectiveness analyses, and least-cost planning and methodology development. This category also includes California Conservation Inventory Projects, planning model development and system impact assessments, as well as other projects with a generally longer-term and system-wide focus than Program Measurement projects. Planning model development is the development, improvement, or enhancement of end-use forecasting, integrated resource planning, and emission projection models for the purposes of baseline demand forecasts, committed and uncommitted DSM projections, DSM potential evaluations, or comparative studies of DSM versus generation resource additions. System impact assessments consist of activities related to use of energy demand forecasting, load impact estimation, resource planning, or emission projection models to evaluate the system impacts of DSM measures and technologies.

## DSM Cost-effectiveness Analysis Model

SoCalGas made additional improvements to the DSM cost-effectiveness model that was developed in 1993. Several of these improvements were necessary to reflect the cost-effectiveness criteria and incentive mechanisms established in Commission decision D.94-10-059.

### SoCalGas Electric UEG Customer End-Use Specific Avoided Energy, Generation, Transmission and Distribution Costs and Emissions

SoCalGas updated the estimates of avoided electric generation, transmission and distribution costs and avoided emissions for selected end-uses for the major electric utilities operating in SoCalGas' service territory (Southern California Edison Company, L.A. Department of Water & Power, San Diego Gas & Electric Company, Pacific Gas & Electric Company, the City of Glendale and Imperial Irrigation District). This study employed the latest cost forecasts and resource plans provided by each utility. Avoided costs and emissions were estimated by matching hourly end-use load profiles with the marginal hourly dispatch and system requirements for each day of the year. The results of this study can be selected as inputs to the DSM cost-effectiveness model described above.

### DSM Strategies to Reduce Peak-Day Gas Loads

This report was largely completed in 1994. The report provides an analysis of Demand-Side Management (DSM) options to reduce peak-day gas loads. The report examines DSM measures within four primary categories:

1. Conservation/energy efficiency;
2. Peak shifting;
3. Peak shaving; and
4. Off-peak load building.

### DATA ANALYSIS

The Data Analysis group developed the equipment audit tracking module to Market Analysis System (MAS). This database was designed to track industrial/commercial new audits and construction tagging for follow-up analysis on customer M&E studies. General information about customer equipment holdings can also be easily updated and retrieved with this system.

Data Analysis provided the Core Markets group with annual DSM Customer Audit Summary Reports for audits performed by marketing contact groups through the energy management services programs. These reports consist of a summary report count of DSM audits by market segment and marketing contact groups; and a detailed Summary Report of Audits by rates and equipment type.

Monthly Audit Summary and Detail Reports for energy audits performed by Customers Operations were prepared. The summary report contains the number of audits by region and marketing representative. The detail report lists customers that have been audited by region and marketing representative. These reports are used to determine progress in meeting audit goals.

Peak day estimates were prepared for the core market segment using daily and hourly meter reads from a random sample of 3,500 homes and businesses. Reads are collected by remote metering

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The following section discusses measurement and evaluation activities conducted during 1995 under the New Technology Evaluation category.

### *New Technology Development Valuation and Prioritization*

Technology Development, continuing the role of the former Market Development group, continued to institutionalize a cross-departmental process to identify, evaluate and prioritize new technology development, demonstration and commercialization activities. This technology evaluation process is conducted on a continuous basis to update and prioritize which activities SoCalGas should pursue in the best interest of ratepayers. Technology Development continues to comply with the California Public Utilities Commission's decree that demonstration projects conducted under the mandate of SoCalGas' Select Technologies Program demonstrate the potential to pass DSM cost-effectiveness tests, and in assuring that measurement and evaluation testing met the protocols dictated by the California Public Utilities Commission.

### *Energy Efficient Space Conditioning*

Technology Development evaluated the commercialization of gas cooling, heating and dehumidification systems in response to consumer demand. The objective of these evaluations were to develop a plan to demonstrate, measure and evaluate gas-fired heat pumps, absorption chillers, and desiccant based dehumidifiers which could possibly provide a highly efficient alternative to electric air conditioning for residential and light commercial customers.

## Carpet Demonstration Project

Technology Development is demonstrating and evaluating the use of the latest, state-of-the-art air/fuel ratio controllers and catalyst emissions control systems on a 600 horsepower natural gas cogeneration engine. The objective of this field demonstration is to determine which combination of air/fuel ratio controllers and catalysts achieve the highest combustion efficiency while maintaining the lowest emission levels possible. Regulations continued to evolve in 1995 and so greater demand was placed on these controllers to operate within finer tolerances and smaller ranges than ever before. It is the expectation that additional projects at other sites will be needed to achieve the goals of this effort as greater emissions reductions will be expected of these critical systems.

## Plastics Industry Technology Study

Technology Development initiated a study to document technology and needs assessment of the plastics processing industries within SoCalGas' service territory. The study characterizes the types of plastics processing equipment in Southern California and presents analysis of the opportunities within the plastics industry.

## Consortium Memberships

Technology Development participated in numerous natural gas industry consortiums, which insure that SoCalGas leverages its investment with other utilities to promote the development and commercialization of new, energy efficient, gas technologies which may be incorporated in DSM programs in the future. Technology development maintained memberships in American Gas Cooling Center (AGCC), which promotes commercialization of energy efficient gas cooling technologies; Industrial Gas Technology Commercialization Center (IGTCC); which promotes commercialization of energy efficient, advanced combustion, and control systems.

## *LONG-RANGE PLANNING AND FORECASTING*

Long-Run Planning consists of projects related to end-use forecasting, cost-effectiveness analyses, and least-cost planning and methodology development. This category also includes California Conservation Inventory Projects, planning model development and system impact assessments, as well as other projects with a generally longer-term and system-wide focus than Program Measurement projects. Planning model development is the development, improvement, or enhancement of end-use forecasting, integrated resource planning, and emission projection models for the purposes of baseline demand forecasts, committed and uncommitted DSM projections, DSM potential evaluations, or comparative studies of DSM versus generation resource additions. System impact assessments consist of activities related to use of energy demand forecasting, load impact estimation, resource planning, or emission projection models to evaluate the system impacts of DSM measures and technologies.

## DSM Cost-effectiveness Analysis Model

SoCalGas made additional improvements to the DSM cost-effectiveness model that was developed in 1993. Several of these improvements were necessary to reflect the cost-effectiveness criteria and incentive mechanisms established in Commission decision D.94-10-059.

### SoCalGas Electric UEG Customer End-Use Specific Avoided Energy, Generation, Transmission and Distribution Costs and Emissions

SoCalGas updated the estimates of avoided electric generation, transmission and distribution costs and avoided emissions for selected end-uses for the major electric utilities operating in SoCalGas' service territory (Southern California Edison Company, L.A. Department of Water & Power, San Diego Gas & Electric Company, Pacific Gas & Electric Company, the City of Glendale and Imperial Irrigation District). This study employed the latest cost forecasts and resource plans provided by each utility. Avoided costs and emissions were estimated by matching hourly end-use load profiles with the marginal hourly dispatch and system requirements for each day of the year. The results of this study can be selected as inputs to the DSM cost-effectiveness model described above.

### DSM Strategies to Reduce Peak-Day Gas Loads

This report was largely completed in 1994. The report provides an analysis of Demand-Side Management (DSM) options to reduce peak-day gas loads. The report examines DSM measures within four primary categories:

1. Conservation/energy efficiency;
2. Peak shifting;
3. Peak shaving; and
4. Off-peak load building.

### DATA ANALYSIS

The Data Analysis group developed the equipment audit tracking module to Market Analysis System (MAS). This database was designed to track industrial/commercial new audits and construction tagging for follow-up analysis on customer M&E studies. General information about customer equipment holdings can also be easily updated and retrieved with this system.

Data Analysis provided the Core Markets group with annual DSM Customer Audit Summary Reports for audits performed by marketing contact groups through the energy management services programs. These reports consist of a summary report count of DSM audits by market segment and marketing contact groups; and a detailed Summary Report of Audits by rates and equipment type.

Monthly Audit Summary and Detail Reports for energy audits performed by Customers Operations were prepared. The summary report contains the number of audits by region and marketing representative. The detail report lists customers that have been audited by region and marketing representative. These reports are used to determine progress in meeting audit goals.

Peak day estimates were prepared for the core market segment using daily and hourly meter reads from a random sample of 3,500 homes and businesses. Reads are collected by remote metering

## **Energy Use Model Development**

The initial objective of the monthly energy use model developed from the merged survey and billing record data base (i.e., the analytic data set) was to measure the impact of audit recommendations on energy use for specific types of space conditioning and process equipment. Due to a lack of equipment-specific production data, only customer level audit effects could be estimated.

Audit impacts are provided in Table 1 within the Summary section of this report. They are also included in Tables 7, 8, and 9 within Usage Estimates and Therm Savings Impacts, following this section.

A discussion of the IEMS monthly energy use and load impact equation is provided in this section. An overview of the estimation technique and data sources employed is described first, then the overall energy use equation is presented. Finally, the average equation results are presented with an interpretation of the coefficients.

### ***Estimation Process***

The estimation technique used in this study is a straightforward time series regression analysis. A simple time series regression model was used in lieu of other approaches for two reasons. First, the approach has been successfully employed to assess the impact of conservation actions on monthly energy consumption. Second, other approaches were not feasible given available data.

In this billing analysis, customer-specific models were estimated because detailed building characteristics, production/employment, and equipment holding data was unavailable for all of the customers visited in the 1995 IEMS program. Since customers under 1,000 therms per year were not surveyed, the 1995 IEMS participants were separated into three groups for reporting billing analysis results. The groups are:

1. Customers using less than 1,000 therms a year (Group 1),

2. Customers over 1000 therms, who responded to the phone survey (Group 2), and
3. Customers over 1,000 therms that did not respond to the phone survey (Group 3).

Monthly billing information was extracted for each customer from January, 1994 through November, 1996. Utilizing the billing read dates and number of days in the bill information, the number of heating degree days (base 65) were computed for each customer specific billing period. Close to 46,000 separate monthly billing period observations were extracted. The IEMS program participation data base provided the source for audit date information. Equipment holding information (including year the equipment was purchased) was obtained from the SoCalGas CIGUS system.

The regression model for each customer in the 1995 IEMS program takes the form:

$$\text{Use} = a + b * \text{HDD} * \text{HEQUIP} + c * \text{EMP (or PRODUCT)} + d * \text{CHG95} + e * \text{CHG96} + f * \text{POST}$$

where:

<b>Variable</b>	<b>Definition</b>
Use	natural gas usage in billing period
HDD	heating degrees in billing period
HEQUIP	indicator taking the value 1 if space heating equipment exists, zero otherwise
EMP	monthly Southern California industrial employment for the 2 digit SIC of the audit participant
PRODUCT	monthly production level reported by surveyed participants
CHG95	indicator taking the value 1 if a striking change in usage occurred in 1994-1995 or new equipment purchased in 1995
CHG96	indicator taking the value 1 if a striking change in usage occurred in 1996 or new equipment purchased in 1996
POST	indicator taking the value 1 after audit visit, zero otherwise
a, b, c, d, e, f	parameter estimates

Note that all the customers under 1000 therms per year are assumed to have space heating equipment. Monthly production level information was only obtained from customers that

responded to the phone survey. The CHG95 and CHG96 indicators were extracted from CIGUS equipment holding information maintained by SoCalGas and by reviewing the customer specific monthly usage series.

A two stage estimation process was employed to obtain a regression model from which reasonable appliance usage estimates and therm savings impacts could be determined. In addition to employing a sound, established theoretical framework, reasonable estimates from an econometric standpoint are estimates of regression coefficients that are unbiased and consistent. An unbiased estimate fairly represents the true value of what it is estimating; drawing repeated samples of the same number of program participants and recalculating audit savings would yield, on average, an unbiased estimate. Consistency refers to sampling distribution. As the sample size grows, a consistent estimator is one in which the sample distribution becomes more tightly concentrated around the true value of what is being estimated, rather than concentrating around another value.

Traditional econometric theory clearly defines how the properties (e.g., unbiasedness and consistency) of estimated regression coefficients and their estimated standard errors depend on the error structure of the model employed. If the regression error terms are serially correlated (i.e., the value of residuals follow a pattern determined by the value of preceding residuals) or heteroskedastic (i.e., the magnitude of residual values are related to the value of some other variable), the estimated coefficients can be unbiased and consistent, but the standard errors of the coefficients are inconsistent. If the standard errors are inconsistent, hypothesis tests conducted with them may be inaccurate. Of more direct importance to this study, the 90% and 80% confidence intervals developed around the usage and savings estimates would be inaccurate.

The error structure of a model based on a simple time-series data set is likely to be time-wise autoregressive. Heteroskedasticity is not likely to be a problem since customer-specific models have been estimated. A CDA model requires a pooled cross-section and time-series data set. Consequently, a CDA model should be tested for serial correlation and heteroskedasticity. The customer-specific time-series regression models employed

estimate conservation savings due to the IEMS need only be corrected for the presence of serial correlation in the error structure.

Serial correlation was discovered during the estimation of the regression models for the 1995 IEMS program. The rho values varied depending primarily upon the existence of seasonal gas use patterns, or lack thereof, due to weather (e.g., space heating loads) or due to seasonal production schedules. This prompted the use of a two-stage process to develop acceptable estimates of conservation savings. The first stage involved the development of the basic model, its estimation using ordinary least squares, and testing for serial correlation. The second stage involved correcting the first stage results for the presence of serial correlation. The summary conservation impacts provided in this report employ the second stage model results.

This first stage involved the estimation of a regression equation using ordinary least squares. The initial assumption was that the error terms were not serially correlated, nor heteroskedastic.

The IEMS Program equations were estimated using January, 1994 through November, 1996 billing year data. Virtually all participants had at least one year of consumption history prior to the installation of conservation and at least nine months of post conservation installation consumption history.

The second stage was begun with the estimation of respondent-specific rho values. The predicted values from each initial energy usage equation was used to estimate the level of correlation in the error term over time for each. This was done by fitting an autoregressive model of order one, an AR(1) model, for each respondent.

The AR(1) model can be described as follows:

$$e_{i,t} = \rho_i * e_{i,t-1} + \eta_{i,t}$$

where:

$e_{i,t}$  is the regression error term from the first stage for the  $i^{\text{th}}$  respondent in month  $t$

$\eta_{i,t}$  is a "white noise" error term for the  $i^{\text{th}}$  respondent in month  $t$

Estimates of  $\rho_i$ ,  $\rho_i$ , are obtained by regressing residuals from the first stage OLS model on the residuals values lagged one period. This is done separately for each respondent.

The estimated  $\rho_i$  values are used to transform the dependent variable and all the regressors. It is important to remember that each regressor shown above has a time ( $t$ ) subscript attached to it. These subscripts were left out of the equation for presentation purposes.

Next each energy demand equation was re-estimated using the transformed variables to correct for the correlation in the error term. This correction generates more consistent regression parameter estimates. Appendix B contains the regression coefficients,  $t$  statistics, and selected summary statistic for each second stage customer model. The coefficients generally retained the same signs and magnitudes. The parameter estimates from this second stage set of models were used to calculate program impacts.

### ***Regression Results***

Table 5 below shows the average values for parameters a, b, c, d, e, and f by group after correcting for the correlations in the error terms. Note that customers having an initial negative coefficient value for the EMP/PRODUCT term had that term removed from the regression model since a negative value goes against the economic assertion that a positive relationship exists between energy use and employment/production level increases.

The values indicate that the average value of parameter a is negative for all three groups. The average values for parameters b and c are positive for all groups. The average



impact of changes in equipment or usage patterns in 1995 (parameter d) is negative for Groups 1 and 3 and positive for Group 2, while the 1996 impact is positive for both Groups 2 and 3. This is not surprising since the dummy variable was used to denote both significant short term drops and increases in consumption.

The average post audit visit (parameter f) value is negative for all three groups. The annual average savings per customer resulting from the f parameter is 253 therms for Group 1, 1,832 therms for Group 2 and just 44 therms for group 3. The average model R-Squared values is highest for the under 1,000 therm customer group and, somewhat surprisingly, the lowest for the Group 2 survey respondents. It should be noted that the values presented in Tables 5 and 6 are simple averages; a different weighting would yield different The R-Squared values.

**Table 5**  
**1995 IEMS Program Participants**  
**Average Regression Coefficient Values – Final Model Specification**

<b>Regression Term</b>	<b>Group 1 ≤ 1000</b>	<b>Group 2 &gt; 1000, Respondent</b>	<b>Group 3 &gt; 1000, Non-Respond</b>
<b>a</b>	-87.70	-146.76	-4123.48
<b>b * HDD * HEQUIP</b>	.22	1.05	1.97
<b>c * EMP/PRODUCT</b>	.004	.444	.313
<b>d * CHG95</b>	-.012	40.04	-26.26
<b>e * CHG96</b>	0	117.15	33.91
<b>f * POST</b>	-21.15	-152.67	-3.71
<b>Model R-Squared</b>	.51	.31	.36
<b>Number of Customers</b>	289	214	838

An alternative billing analysis model specification was undertaken using the variables mentioned above plus a number of months since the audit term (parameter g). The time since audit term captures the impact on usage for implementing audit recommendations over time. In this version, total savings from the audit is the combined effects of parameters f and g.

Table 6 shows the average values for parameters a, b, c, d, e, f, and g by group after correcting for the correlations in the error terms for the alternative billing analysis specification.

The values for parameter a became more negative for all three groups. The values of parameters b through f remained quite similar to the average values found in Table 6. The average value of parameter g is negative for all three groups and except for Group 3, the average parameter value for parameter f is negative. The annual average savings per customer resulting from the f and g parameters is 155 therms for Group 1; 2,207 therms for Group 2; and dissavings of 47 therms for Group 3. The average model R-Squared values are higher in the alternative specification than in the first specification presented.

**Table 6**  
**1995 IEMS Program Participants**  
**Average Regression Coefficient Values – Alternative Model Specification**

Regression Term	Group 1 ≤ 1000	Group 2 > 1000, Respondent	Group 3 > 1000, Non-Respond
a	-109.95	-694.16	-4284.42
b * HDD * HEQUIP	.22	1.02	1.96
c * EMP/PRODUCT	.004	.563	.310
d * CHG95	-.026	44.19	-13.79
e * CHG96	0	113.39	69.42
f * POST	-12.09	-183.87	19.00
g * POST * TIME	-.895	-.042	-15.09
Model R-Squared	.56	.35	.40
Number of Customers	289	214	838

It was expected that the sign of coefficient g would be positive, alluding to a declining audit impact through time. Consequently, savings estimates from the Table 5 specification were preferred in spite of the slightly greater explanatory power of the alternative specification.

## Usage Estimates and Therm Savings Impacts

This section of the report presents the annual audit saving impacts from all IEMS program efforts. The section is organized as follows: first, the method used to estimate appliance usage and associated savings are discussed, and second, the usage and conservation savings estimates are presented.

### Usage Savings Estimates

Equipment-specific annual energy use values are provided below. Table 7 displays the annual audit savings estimates for six groups of customers along with  $\pm$  therm savings that define the 90% and 80% confidence intervals.

**Table 7**  
**1995 IEMS Program Annualized Therm Savings<sup>a</sup>**

	Total Audit Group	Non-Response Group <i>1000 &lt; x</i>	Small Customer Group <i>x &lt; 1000</i>	Surveyed Group <i>1000 &lt; x</i>	Surveyed Group, Recall	Surveyed Group, Recall & Implement
90% Upper Confidence Bound	1,311,212	866,950	12,848	690,866	363,590	190,349
80% Upper Confidence Bound	1,115,732	683,674	11,360	622,910	323,810	158,201
Total Savings	425,384	36,406	6,080 <sup>b</sup>	382,898 <sup>c</sup>	183,326 <sup>c</sup>	44,645
80% Lower Confidence Bound	(264,964)	(610,862)	800	142,886	42,842	(68,911)
90% Lower Confidence Bound	(460,444)	(794,138)	(688)	74,930	3,062	(101,059)

**Notes:**

- a) After correcting for serial correlation; negative values imply dissavings
- b) Savings are significantly different from zero at the 80% level
- c) Savings are significantly different from zero at the 80% and 90% levels

The confidence intervals were calculated by  $(\sum a_i^2)^{.5}$ , where  $a_i$  is one-half of the confidence bound for customer  $i$ 's regression. This formulation ignores correlation between the individual regression estimates, for which there is no estimate. Positive correlation would rapidly widen the estimated confidence bounds.

The total audit group mean savings are shown as the sum of the savings from the non respondent group, small customer group, and surveyed group. Table 8 shows per customer annualized therm savings by dividing the Table 7 values by the number of customers shown in the first row of Table 8.

**Table 8**  
**1995 IEMS Per Customer Annualized Therm Savings<sup>a</sup>**

	Total Audit Group	Non-Response Group	Small Customer Group	Surveyed Group	Surveyed Group, Recall	Surveyed Group, Recall & Implement
Customers	1,293	818	266	209	98	98
90% Upper Confidence Bound	1,014	1,060	48	3,306	3,710	1,942
80% Upper Confidence Bound	863	836	43	2,980	3,304	1,614
Mean Savings	329	45	23	1,832	1,871	456
80% Lower Confidence Bound	(205)	(747)	3	684	437	(703)
90% Lower Confidence Bound	(356)	(971)	(3)	359	31	(1,031)

Notes:

- a) After correcting for serial correlation; negative values imply dissavings

Table 9 converts the per customer annualized therm savings of Table 8 into percentage savings of total use per customer. This is done by dividing the Table 8 values by the average usage values in the first row of Table 9.

**Table 9**  
**1995 IEMS Per Customer Therm Savings Share of Annual Usage <sup>a</sup>**

	Total Audit Group	Non-Response Group	Small Customer Group	Surveyed Group	Surveyed Group, Recall	Surveyed Group, Recall & Implement
<b>Average Usage</b>	43,247	50,576	340	69,172	77,520	77,520
<b>90% Upper Confidence Bound</b>	2.3%	2.1%	14.2%	4.8%	4.8%	2.5%
<b>80% Upper Confidence Bound</b>	2.0%	1.7%	12.6%	4.3%	4.3%	2.1%
<b>Mean Savings</b>	0.8%	0.1%	6.7%	2.6%	2.4%	0.6%
<b>80% Lower Confidence Bound</b>	-0.5%	-1.5%	0.9%	1.0%	0.6%	-0.9%
<b>90% Lower Confidence Bound</b>	-0.8%	-1.9%	-0.8%	0.5%	0.0%	-1.3%

**Notes:**

- a) After correcting for serial correlation; negative values imply dissavings

The mean savings value percentage associated with the survey respondents who recalled having the audit and implement some conservation recommendation (0.6%), represents the best estimate of average savings per customer from the 1995 IEMS program. This value is most appropriate because it accurately reflects savings from the group about which we have the best data. The percentage savings value was used to derive the ex post savings estimate of 254 therms. Use of the actual value from Table 8 would have overstated savings by not adequately accounting for the larger than average consumption of the survey respondents.

It is very important to note that the confidence interval for the respondent group encompasses zero and the ex ante savings estimate of 1,000 therms per customer. Finer resolution of savings was not possible with the data that was able to be collected.

***Implications***

All of the therm savings are lower than those employed previously. This is due to lower-than-expected average consumption among the audited customers. The program was

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originally designed under the assumption that the typical audited industrial customers would average 50,000 therms annual consumption and would yield 1,000 therms annual savings per audit. The program does reach virtually 100% of the customers using over 50,000 therms annually every two years (Table 10). Assuming half are audited each year, only 465 customers of the 1,250 IEMS program goal meet the size criteria upon which the 1,000 therms/customers average savings estimate was based.

**Table 10**  
**SoCalGas Industrial Customer Distribution**  
**1995 Industrial Audits**

Therm Band	Audited Customers	%	Total Customers	%	Audit Share of Total
<i>Under 1,000 therms</i>	289	21.6	14,848	65.7	1.9%
<i>1,000-10,000 therms</i>	347	25.9	5,149	22.8	6.7%
<i>10,000-15,000 therms</i>	66	4.9	486	2.2	13.6%
<i>15,000-25,000 therms</i>	99	7.4	529	2.3	18.7%
<i>25,000-50,000 therms</i>	134	10.0	600	2.7	22.3%
<i>50,000-75,000 therms</i>	103	7.7	291	1.2	35.4%
<i>75,000-100,000 therms</i>	86	6.4	209	.9	41.1%
<i>100,000-150,000 therms</i>	115	8.6	249	1.1	46.2%
<i>150,000-250,000 therms</i>	87	6.5	202	.9	43.1%
<i>Over 250,000 therms</i>	15	1.1	32	.1	46.9%
<b>Total</b>	<b>1,341</b>	<b>100.0</b>	<b>22,595</b>	<b>100.0</b>	<b>5.9%</b>

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If the program were to be refocused on larger customers, the goal number of audits would have to be reduced. Alternatively, the expected savings per audit should be lowered.

Consideration should also be given to reducing the program life used in the annual cost effectiveness analysis. A reduction from 3 years to 2 years seems appropriate given the fact that the largest customers are audited once every two year on average

It might also be useful to place screening mechanisms in the MAS database in order to prevent audits of the same customer in subsequent years. MAS could also be modified to

flag non-core customers. Granted, these are smaller problems, but institution of these MAS modifications would reduce field staff efforts with little loss of them savings.





## **APPENDIX C**

### **Protocol Table 6 and Table 7**

**TABLE 6 PROTOCOLS FOR REPORTING OF RESULTS OF IMPACT MEASUREMENT STUDIES USED TO SUPPORT AN EARNINGS CLAIM**

**1. Average Participant Group and Average Comparison Group Usage (therms)**

	<b>Unit type</b>	<b>Annual Therms</b>
<b>A. Pre installation usage</b>	average audited industrial account	39,915
<b>B. Post installation usage</b>	average audited industrial account	44,774

Notes: There is no comparison group

**2. Average net and gross end use load impacts (therms) for the 1994 program year.**

	<b>Unit type</b>	<b>Total</b>
<b>A.&amp;B. Avg. load impacts</b>	average audited industrial account	254
<b>C. Percent change in usage</b>	average audited industrial account	0.6%
<b>D. Realization rates</b>	average audited industrial account	25.4%

Notes: There is no comparison group.

**3. Net to Gross Ratio: uncertain**

Impacts in Section 2 above are net impacts. The savings from the survey group who both recalled the audit and implemented actions was divided by the total consumption of all respondents who recalled the audit. Savings for the sub-group who recalled the audit, but took no action based upon the audit, were not included in the ex post savings estimate.

**4. Designated Unit Intermediate Data**

Billing data, employment data, production data (where available), and audit data are all included in the machine-readable file, USAGE.CSV, which is included with this report.

**5. Precision of Load Impact Estimates**

The precision of the audit impact estimates at the 90% and 80% confidence levels are shown (on a per customer basis) in Table S2.

**6. Measure Count Data**

Measure count data for program participants was not available from the SoCalGas audit records nor from the participant survey. Table S1 provides audit counts by major group. The market segment data shown below in section 7 provides audit counts by two-digit SIC.

7. Market Segment Data –1995 Audit Participants by Industry Group

SIC Code	SCG Core Customers	Total Audit Group	Survey Respondents	Non Respondents	Small Customers
<b>20 – Food Products</b>	1,328 5.9%	155 11.6%	36 16.8%	104 12.4%	15 5.2%
<b>22 – Textiles</b>	508 2.2%	60 4.5%	18 8.4%	34 4.1%	8 2.8%
<b>23 – Apparel</b>	1,843 8.2%	95 7.1%	3 1.4%	61 7.3%	31 10.7%
<b>24 – Lumber</b>	463 2.0%	17 1.3%	1 0.5%	10 1.2%	6 2.1%
<b>25 – Furniture</b>	781 3.5%	39 2.9%	5 2.3%	25 3.0%	9 3.1%
<b>26 – Paper</b>	319 1.4%	17 1.3%	0 0.0%	13 1.6%	4 1.4%
<b>27 – Printing</b>	2,473 10.9%	68 5.1%	8 3.7%	29 3.5%	31 10.7%
<b>28 – Chemicals</b>	973 4.3%	76 5.7%	10 4.7%	46 5.5%	20 6.9%
<b>29 – Petroleum</b>	146 0.6%	6 0.4%	3 1.4%	2 0.2%	1 0.3%
<b>30 – Rubber &amp; Plastics</b>	990 4.4%	64 4.8%	15 7.0%	37 4.4%	12 4.2%
<b>31 – Leather</b>	98 0.4%	2 0.1%	1 0.5%	1 0.1%	0 0.0%
<b>32 – Stone, Clay &amp; Glass</b>	757 3.4%	55 4.1%	13 6.1%	36 4.3%	6 2.1%
<b>33 – Primary Metals</b>	615 2.7%	77 5.8%	16 7.5%	53 6.3%	8 2.8%
<b>34 – Fabricated Metals</b>	2,386 10.6%	202 15.1%	27 12.6%	151 18.1%	24 8.3%
<b>35 – Machinery</b>	4,069 18.0%	125 9.3%	16 7.5%	66 7.9%	43 14.9%
<b>36 – Electronics</b>	1,769 7.8%	98 7.3%	16 7.5%	55 6.6%	27 9.3%
<b>37 – Transportation Eqp.</b>	1,088 4.8%	64 4.8%	9 4.2%	47 5.6%	8 2.8%
<b>38 – Instruments</b>	972 4.3%	42 3.1%	7 3.3%	23 2.8%	12 4.2%
<b>39 – Misc.</b>	1,017 4.5%	40 3.0%	5 2.3%	24 2.9%	11 3.8%
<b>Other (Pumping)</b>	NA	37	5	19	13
<b>Total</b>	22,595	1,339	214	836	289

**Table S1  
Participant Therm Savings -  
Customer Impacts, Customer Counts and Program Impacts**

Group	Ex-Post Audit Impact (therms)	Ex-Post Audit Impact (% of usage)	Ex-Post Customer Count	Ex-Post Program Impact
Survey Respondents, Total	1,832	2.6%	209	382,898
Recalled Audit	1,415	2.4%	98	183,326
Recalled Audit & Implementation	456	0.6%	98	44,645
Non-Respondents (>1000 Therms)	45	0.1%	818	36,406
Small Customers (<1000 Therms)	23	6.7%	266	6,080
<b>All Participants<sup>a</sup></b>	<b>254</b>	<b>0.6%</b>	<b>1293</b>	<b>328,613</b>

**Notes:**

a Audit impact per customer determined using the percentage savings from the respondents who recalled the audit and implemented actions

**Table S2  
1995 IEMS Per Customer Annualized Therm Savings<sup>a</sup>**

	Total Audit Group	Non-Response Group	Small Customer Group	Surveyed Group	Surveyed Group, Recall	Surveyed Group, Recall & Implement
<b>Customers</b>	<b>1,293</b>	<b>818</b>	<b>266</b>	<b>209</b>	<b>98</b>	<b>98</b>
<b>90% Upper Confidence Bound</b>	<b>1,014</b>	<b>1,060</b>	<b>48</b>	<b>3,306</b>	<b>3,710</b>	<b>1,942</b>
<b>80% Upper Confidence Bound</b>	<b>863</b>	<b>836</b>	<b>43</b>	<b>2,980</b>	<b>3,304</b>	<b>1,614</b>
<b>Mean Savings</b>	<b>329</b>	<b>45</b>	<b>23</b>	<b>1,832</b>	<b>1,871</b>	<b>456</b>
<b>80% Lower Confidence Bound</b>	<b>(205)</b>	<b>(747)</b>	<b>3</b>	<b>684</b>	<b>437</b>	<b>(703)</b>
<b>90% Lower Confidence Bound</b>	<b>(356)</b>	<b>(971)</b>	<b>(3)</b>	<b>359</b>	<b>31</b>	<b>(1,031)</b>

**Notes:**

a) After correcting for serial correlation; negative values imply dissavings

## **TABLE 7 DOCUMENTATION PROTOCOLS FOR DATA QUALITY AND PROCESSING**

### **A. OVERVIEW INFORMATION**

#### **1. Study title**

First Year Load Impact Study of Southern California Gas Company's 1995 Industrial Energy Management Services Program

**Study ID 710.0**

#### **2. Program/program year**

Industrial Energy Management Services (IEMS), Program Year 1995

#### **Program description**

SoCalGas' 1995 IEMS program provided energy efficiency information (via direct contact with SoCalGas account executives and interns) to the Company's core industrial customers (SIC 20-39 and pumping).

#### **3. End uses covered**

End uses – other

#### **4. Methods and models used**

Customer-specific, time series regression analysis models; specification discussed on pages 19-20 of the report.

#### **5. Participant and comparison group definition**

Participants included SoCalGas nonresidential core customers whose two digit SIC code was 20-39. There was no comparison group since only sub groups of very small industrial customers had not been audited by SoCalGas within the last 2-3 years.

#### **6. Analysis sample size**

The analysis group included 1293 program participants. This was virtually a census. Survey respondents represented 214 customers. An average of 33 months of consumption data was available for each participant.

## **B. DATABASE MANAGEMENT**

### **1. Flow chart illustrating the relationships between data elements**

Included on page 11 of the report.

### **2. Identify the specific data sources ...**

See pages 9-16 of the report. Primary sources were monthly billing data, a participant survey, weather data (HDD), and Bureau of Labor Statistics monthly employment data.

### **3. Diagram and describe the data attrition process...**

Discussion of the attrition process is included on pages 17-18 of the report. Few customers were deleted from the analysis, primarily because they were non-core customers or had very anomalous consumption patterns.

### **4. Describe the internal/organizational data quality checks...**

See pages 17-18 of the report. Dummy variables were added to account for anomalous consumption in individual monthly records for a subset of customers. The DATAPREP.JOB text file included on the data diskette submitted with this report provides the SAS program code identifying each use of dummy variables.

### **5. Provide a summary of the data collected specifically ...**

Survey data not used in the analysis included measures adopted and equipment holdings of customers. The main reason for not including measures adopted was the poor response rate to the question (due to failed memory of the audit). Equipment holdings were not included because there was insufficient data to conduct a conditional demand analysis. Employed survey data are included in the analytic dataset, USAGE.CSV. A copy of the raw survey responses can be obtained from L. Villarreal of SoCalGas.

## **C. SAMPLING**

### **1. Sampling procedures and protocols**

A census was attempted of all participants whose annual consumption exceeded 1,000 therms.

### **2. Survey information**

Appendix A is the survey instrument. The survey is discussed on pages 13-16.

### **3. Statistical descriptions**

Only a limited amount of production data was employed from the survey. The BLS employment data was used a proxy when customer-specific production data was not available. Other than response rates, summary statistics were not useful.

## **D. DATA SCREENING AND ANALYSIS**

### **1. Describe procedures used for the treatment of outliers...**

See pages 17-18 of the report and the DATAPREP.JOB text file for how anomalous consumption data was treated. Only 3 customers were deleted from the analytic data set because of their consumption pattern. These were deleted because the usage dramatic reduction demonstrated in their consumption history could not have been due to an audit response

### **2. Describe what was done to control for the effects of ...**

Changes in weather effects were incorporated, as were changes in production/employment levels.

### **3. Describe procedures, including those identified in Table C-12, ...**

See pages 10-18 of the report (and the DATAPREP.JOB text file for SAS code that eliminated observations).

### **4. Regression statistics**

See pages 24 and 25 of the report, as well as the regression output in appendix B for each customer.

### **5. Specification**

See Energy Use Model Development (pages 19-25) of the report.

During the initial stage of the assessment pooled cross-sectional time series models were considered. In particular the use of a CDA model was considered. It quickly became clear that the use of a CDA model be impossible given the lack of equipment data. Pooling was dropped because of the size and equipment heterogeneity in this sector, and because pooling would have involved a loss of information from a dataset that was already smaller than we had hoped for.

### **6. Error in measuring variables**

It was not believed that measurement error presented a significant problem for this analysis with the exception of customer specific production data. The lack of monthly production data for the majority of participants severely impacted the error bounds on the savings estimates.

### **7. Autocorrelation**

See page 21-23 of the report.



## **8. Heteroscedasticity**

The use of customer-specific models prevented traditional heteroscedasticity problems typical of cross-sectional models.

## **9. Collinearity**

Collinearity was not believed to be a significant problem with the chosen model specification.

## **10. Influential data points**

Outliers were not believed to be a problem given that customer-specific models were employed

## **11. Missing data**

See pages 18 of the report.

## **12. Precision**

See pages 26-27.

## **E. DATA INTERPRETATION AND APPLICATION**

### **1. For all program participants and at the end use level, ...**

Net impacts were calculated by:

1. Calculating average percentage saved as savings from the "survey respondents who recalled the audit and took actions" divided by the total annual therm consumption of respondents who remember the audit (irrespective of whether they took any action)
2. Applying the percentage saved (0.6%) times total IEMS participant consumption
3. Dividing the calculated savings for the IEMS participant group by the number of participants.

### **2. Describe the process, choices made, and rationale for ...**

There was no comparison group, since it was impossible to find a suitable control group among SoCalGas core customers. Of the limited customer information available, the most complete, accurate data was had for survey respondents. The impact of the audit can be most clearly defined for this subset of program participants who recalled having the audit. Those that recalled the audit and recalled taking actions from the audit were clearly influenced by the audit. Those that recalled the audit, but took no action based upon the audit may still have taken other actions, but their savings should not be considered due to the audit.

Savings estimates derived from the respondent group who recalled the audit would have been greater than the final estimate provided, but including savings from survey respondents who claimed they took no action would be inappropriate.

## **APPENDIX A**

### **Participant Survey Questionnaire**

# THE GAS COMPANY

## 1995 Industrial Energy Management Tracking Survey

May I please speak to [CUSTOMER CONTACT NAME FROM SAMPLE]?

[IF AVAILABLE, CONTINUE WITH S1. IF NOT, GO TO S2.]

S1. Hello, this is [INTERVIEWER FIRST AND LAST NAME], calling on behalf of Southern California Gas Company. I am calling to discuss your experience with SoCalGas' 1995 Industrial Audit Program. You should have received a letter from SoCalGas discussing our need to contact you.

Our records indicate that this facility had an energy audit performed by SoCalGas in 1995. Are you familiar with the 1995 SoCalGas Audit of your facility?

1. Yes [CONTINUE]
2. No [ASK TO SPEAK TO THE PERSON WHO IS FAMILIAR WITH THE 1995 SOCALGAS AUDIT OF THE FACILITY AT THIS LOCATION] If other person is unavailable, get name [and telephone number if different]. and schedule a callback.
3. Refused [TERMINATE]

Briefly, this study is required by the California Public Utility Commission in order to assess our program efforts. We are charged with estimating the energy savings that result from our customer audits. We would like to briefly discuss the results of that audit with you. We would also like to obtain information that will allow us to estimate energy savings that may have resulted. Your answers will have no bearing on your current or future involvement with SoCalGas programs, and all of the information will be kept strictly confidential. Is now a good time for you? [IF YES, CONTINUE WITH Q.1, IF NOT, SCHEDULE CALLBACK].

S2. [INTERVIEWER NOTE: IF CUSTOMER CONTACT FROM SAMPLE IS NOT AVAILABLE, THEN INDICATE YOU'RE CALLING ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY AND ASK TO SPEAK WITH SOMEONE WHO IS FAMILIAR WITH THE 1995 SOCALGAS AUDIT OF THIS FACILITY. IF CONNECTED GO TO S3, IF NOT GET NAME AND TELEPHONE NUMBER AND SCHEDULE A CALLBACK]

**S3. AFTER YOU HAVE REACHED THE CORRECT INDIVIDUAL . . . SAY**

Hello, this is [INTERVIEWER FIRST AND LAST NAME], calling on behalf of Southern California Gas Company. I am calling to discuss your experience with SoCalGas' 1995 Industrial Audit Program. Our records indicate that this facility had an energy audit performed by SoCalGas in 1995.

Briefly, this study is required by the California Public Utility Commission in order to assess our program efforts. We are charged with estimating the energy savings that result from our customer audits. We would like to briefly discuss the results of that audit with you. We would also like to obtain information that will allow us to estimate energy savings that may have resulted. Your answers will have no bearing on your current or future involvement with SoCalGas programs, and all of the information will be kept strictly confidential. Is now a good time for you? [IF YES, CONTINUE WITH Q.1, IF NO, SCHEDULE CALLBACK].

1. Do you recall the 1995 SoCalGas audit?
  - 1 Yes
  - 2 No [SKIP TO Q.4]
  
2. Approximately what date did the audit take place? [RECORD VERBATIM.]
 

Month \_\_\_\_\_ Day \_\_\_\_\_
  
3.
  - A. What energy conservation actions were suggested? [USE CODING LIST TO RECORD; DO NOT READ]
  - B. Which pieces of natural-gas using equipment were affected by [INSERT MEASURE, USE CODING LIST TO RECORD; DO NOT READ]

[INTERVIEWER NOTE: REPEAT 3B-3G FOR EACH MEASURE]

  - C. Was this measure adopted by your firm? [1=YES, 2=NO] [IF YES, ASK When? RECORD START DATE].
  - D. Is the measure still in effect? [1=YES, 2=NO] [IF NO, ASK When was the measure discontinued? RECORD STOP DATE].
  - E. Would you have implemented the measure without the SoCal Gas audit? [1=YES, 2=NO].
  - F. Were you planning to implement the measure prior to receiving the SoCalGas energy audit? [1=YES, 2=NO].
  - G. Would you have implemented the measure at the same time if you had not received the SoCalGas energy audit? [1=YES, 2=NO] [IF NO, ASK When? RECORD DATE].

	3A	3B	3C		3D		3E	3F	3G	
	Audit Measure	Affected Equipment	Adopted?		Discontinued?		Would have Done W/O Audit? Y/N	Planned Prior to Audit? Y/N	Same time W/O Audit?	
			Y/N	Date	Y/N	Date			Y/N	Date
1										
2										
3										
4										
5										

**[DO NOT READ TO PARTICIPANT] Coding List 3A - Audit Measures  
Recommended**

**Boilers**

- 1=Frequent adjustment/cleaning of burners
- 2=Installation of steam/hot water pipe insulation or other components
- 3=Installation of condensate return lines where significant volumes exist
- 4=Installation of properly functioning steam trap
- 5=Installation of water softener and/or frequent removal of scale from heat exchange surfaces
- 6=Use of lowest temperature/pressure of hot water/steam that processes will allow
- 7=Installation of turbulators in firetubes to improve heat transfer
- 8=Preheat feedwater with waste heat (economizer or blowdown recovery)
- 9=Timers on hot water circulating pumps
- 10=Space heating shut-off (or very low) after hours and days closed
- 11=Thermostats set low during heating season
- 12=Roof/ceiling insulation
- 13=Tight building shell with closed windows and doors and weatherstripping/caulking
- 14=Use of active solar space heating

**Water Heating**

- 15=Water heater temperature set as low as possible
- 16=Installation of flow restrictors where applicable
- 17=Installation of water heater blanket
- 18=Regularly clean heat exchanger surfaces (by deliming and/or using water softener)
- 19=Shut circulating pumps off after hours, where applicable (closed loop systems)
- 20=Installation of hot water pipe insulation (especially for circulating, closed loop systems)
- 21=Call Gas Co. Customer Services for free burner calibration

**Space Heaters**

- 22=Thermostats set low during heating season
- 23=Space heating shut off or very low after hours and days closed; investigate timers
- 24=Turn pilots off in summer months or use IID's
- 25=Roof/ceiling/attic insulation
- 26=Tight building shell with closed windows and doors and weatherstripping/caulking
- 27=Existence of duct installation where ducts run through unconditioned areas

**Air Conditioning**

- 28=Thermostats set high
- 29=Equipment cut off after hours and days closed
- 30=Roof/ceiling/attic insulation
- 31=Tight building shell with closed windows and doors and weatherstripping/caulking
- 32=Insulated ducts in non-conditioned areas
- 33=Regular/automatic use of an economizer cycle

99=Other [PLEASE RECORD VERBATIM DESCRIPTION]

**[DO NOT READ TO PARTICIPANT] Coding List 3B Equipment in Facility**

Non-manufacturing equipment

- 1=Space heating
- 2=Space cooling
- 3=Water heating
- 4=Cooking (non-process) equipment
- 5=Refrigeration equipment
- 6=Clothes drying equipment
- 7=Water pumping equipment

Manufacturing Equipment

- 8=Kiln Equipment
- 9=Cooking (process equipment)
- 10=Drying (non-clothes) equipment
- 11=Evaporation/Distillation equipment
- 12=Metal melting processes
- 13=Forming and shaping equipment
- 14=Heat treating equipment
- 15=Process cooling equipment
- 16=Boilers/steam systems (manufacturing purposes only)
- 17=Incineration equipment

18=Other natural gas using equipment [PLEASE RECORD VERBATIM DESCRIPTION]

4. [INTERVIEWER READ] SoCalGas also needs information on your firm's gas using equipment and on the historic use of that equipment. This information is needed in order to calculate estimates of energy savings that are not not related to production increases or equipment changes.

A. Please indicate how many of the following pieces of natural gas using equipment you had in your facility during 1995. [READ LIST AND RECORD NUMBER OF UNITS.]

For each piece of equipment, ask what is the approximate:

B. connected load (Mbtuh) and [RECORD ANSWER]

C. utilization rate (%) [RECORD ANSWER]

Q16: EQUIPMENT IN FACILITY DURING 1995

EQUIPMENT TYPES		Q1A RECORD # OF PIECES	Q1B CONNECTED LOAD Mbtuh	Q1C UTILIZATION RATE (%)
NOTE: EQUIPMENT TYPES 1 - 10 ARE FOR MANUFACTURING ONLY				
1	<input type="checkbox"/> KILN EQUIPMENT			
2	<input type="checkbox"/> COOKING (PROCESS) EQUIPMENT			
3	<input type="checkbox"/> DRYING (NON-CLOTHES) EQUIPMENT			
4	<input type="checkbox"/> EVAPORATION/DISTILLATION EQUIPMENT			
5	<input type="checkbox"/> METAL MELTING PROCESSES EQUIPMENT			
6	<input type="checkbox"/> FORMING AND SHAPING EQUIPMENT			
7	<input type="checkbox"/> HEAT TREATING EQUIPMENT			
8	<input type="checkbox"/> PROCESS COOLING EQUIPMENT			
9	<input type="checkbox"/> BOILERS/STEAM SYSTEMS (MANUFACTURING PURPOSES ONLY)			
10	<input type="checkbox"/> BOILERS/STEAM SYSTEMS (MANUFACTURING PURPOSES ONLY)			
NOTE: EQUIPMENT TYPES 11 -17 ARE FOR NON-MANUFACTURING ONLY				
11	<input type="checkbox"/> PRIMARY SPACE HEATING EQUIPMENT			
12	<input type="checkbox"/> PRIMARY SPACE COOLING EQUIPMENT			
13	<input type="checkbox"/> PRIMARY WATER HEATING EQUIPMENT			
14	<input type="checkbox"/> COOKING (NON-PROCESS) EQUIPMENT			
15	<input type="checkbox"/> REFRIGERATION EQUIPMENT			
16	<input type="checkbox"/> CLOTHES DRYING EQUIPMENT			
17	<input type="checkbox"/> WATER PUMPING EQUIPMENT			
18	DO YOU HAVE ANY OTHER MAJOR ENERGY-USING EQUIPMENT THAT I DIDN'T MENTION: [RECORD DESCRIPTION]			
	<input type="checkbox"/> 1 _____	_____	_____	_____
	<input type="checkbox"/> 2 _____	_____	_____	_____
	<input type="checkbox"/> 3 _____	_____	_____	_____



5. Finally, we need an estimate of the monthly production from your facility. [INTERVIEWER NOTE: IF DOMESTIC HOT WATER AND SPACE HEATING ARE MORE THAN 50% OF TOTAL MBUTH OF EXISTING EQUIPMENT, GO TO Q5C]. You may use any scale. For example, units produced, sales dollars or an index. Be assured that these data will be kept strictly confidential and will only be used to help distinguish audited-induced energy savings from energy use changes due to production shifts. First, can you provide me an estimate by individual piece of gas manufacturing equipment? [IF YES, GO TO 5A. IF NO, GO TO 5B.]

5A. Can you provide monthly data? [IF YES, GO TO GRID 5AA. IF NO, GO TO GRID 5AB.]

5AA. Tell me your total monthly production for [ENTER TYPE FROM Q4A] for each month in 1994, 1995 and so far in 1996. [FILL MONTHLY GRID; REPEAT FOR EACH PIECE THAT PARTICIPANT HAS INFORMATION ON IN Q4A; UPON COMPLETION, GO TO CLOSING]

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1994												
1995												
1996												

5AB. Can you provide it quarterly? [IF NO, GO TO 5B, IF YES CONTINUE] Tell me your total quarterly production for [ENTER TYPE FROM Q4A] for each quarter in 1994, 1995 and so far in 1996. [FILL QUARTERLY GRID; REPEAT FOR EACH PIECE THAT PARTICIPANT HAS INFORMATION ON IN Q4A; UPON COMPLETION, GO TO CLOSING]

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1994				
1995				
1996				

5B. Can you provide total facility monthly data? [IF YES, GO TO GRID 5BA. IF NO, GO TO GRID 5BB.]

5BA. Tell me your total monthly production for [ENTER TYPE FROM Q4A] for each month in 1994, 1995 and so far in 1996. [FILL MONTHLY GRID; UPON COMPLETION, GO TO CLOSING]

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1994												
1995												
1996												

5BB. Can you provide it quarterly? [IF NO, GO TO 5C, IF YES CONTINUE] Tell me your total quarterly production for each quarter in 1994, 1995 and so far in 1996. [FILL QUARTERLY GRID; UPON COMPLETION, GO TO CLOSING]

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1994				
1995				
1996				

5C. Can you provide total employment monthly data? [IF YES, GO TO GRID 5CA. IF NO, GO TO GRID 5CB.]

5CA. Tell me your total monthly employment for each month in 1994, 1995 and so far in 1996. [FILL MONTHLY GRID; UPON COMPLETION, GO TO CLOSING]

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1994												
1995												
1996												

5CB. Can you provide it quarterly? [IF NO, GO TO 5D, IF YES CONTINUE] Tell me you total quarterly employment for each quarter in 1994, 1995 and so far in 1996. [FILL QUARTERLY GRID; UPON COMPLETION, GO TO CLOSING]

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
1994				
1995				
1996				

5D. Can you provide me with either total production and/or employment prior to the audit and after the audit? [RECORD INFORMATION; GO TO CLOSING]

	Total Production	Total Employment
Pre-Audit		
Post-Audit		

**CLOSING; READ THE FOLLOWING:** Thank you very much for the time and effort you gave in completing this interview. Your efforts will help SoCalGas to continue its industrial audit program.

[INTERVIEWER NOTE: INDICATE IF INTERVIEWER NOTES ATTACHED: 1=YES, 2=NO]

**PLEASE ATTACH FOLLOWING FROM SAMPLE TO EACH COMPLETED SURVEY:**

Customer Name	
Account Number	
Premise ID	
Contact Name	Contact Phone Number
SoCalGas Representative	Phone Number
Survey ID	

## **APPENDIX B**

### **Customer Specific Regression Results**

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
1	SURVEY	25	08/10/95	56.54	0.79	1000	18.117	1.537	23.244	1.417	1.135	10.604	0	0	0	0	0	0	0	0
2	LARGE	20	09/20/95	2.41	0.14	49000	-7774.622	-1.406	-569.506	-0.889	0	0	0.362	1.805	0	0	0	0	0	0
3	LARGE	20	09/20/95	0.2	0.01	123000	3636.266	28.597	-229.945	-0.444	0	0	0	0	0	0	0	0	0	0
4	LARGE	22	07/19/95	2.83	0.23	98000	-18963.077	-2.919	-2436.256	-2.211	-7.301	-1.127	3.154	1.24	0	0	0	0	0	0
5	LARGE	23	09/13/95	16.16	0.52	5000	286.332	21.243	-2.789	-0.124	0.77797	5.627	0	0	0	0	0	0	0	0
6	SMALL	23	09/13/95	7.24	0.41	87	-6.606	-0.558	0.478	0.032	0.35349	3.8	0	0	0	0	0	0	0	0
7	LARGE	23	09/13/95	25.71	0.73	1000	-240.647	-1.303	-18.657	-0.625	8.73	0.003	1.178	0	0	0	0	0	0	0
8	LARGE	20	06/20/95	9.75	0.39	8000	426.728	7.786	62.866	0.809	2.19791	4.403	0	0	0	0	0	0	0	0
9	SMALL	36	09/20/95	71.76	0.84	953	7.7	6.738	0.989	0.32526	11.974	0	0	0	0	0	0	0	0	0
10	LARGE	20	11/17/95	7.69	0.34	33000	-10020.47	-1.956	1097.097	3.813	0	0	0.267	2.378	0	0	0	0	0	0
11	LARGE	34	11/16/95	0.35	0.02	47000	-33.822	-0.005	99.894	0.675	0	0	0.069	0.406	0	0	0	0	0	0
12	LARGE	33	11/16/95	3.06	0.24	64000	-11802.295	-1.431	-164.618	-0.377	1.931	1.614	0.986	1.979	0	0	0	0	0	0
13	LARGE	34	11/17/95	0	0	29000	1529.638	0.333	-8.562	-0.07	0	0	0.001	0.008	0	0	0	0	0	0
14	SURVEY	38	06/26/95	0.51	0.03	167000	13.562	1111.244	1.011	1.38662	0.317	0	0	0	0	0	0	0	0	0
15	LARGE	38	11/03/95	34.42	0.71	8000	-161.158	-1.305	156.742	0.703	7.45741	8.257	0	0	0	0	0	0	0	0
16	LARGE	20	08/30/95	2.53	0.14	111000	7899.199	20.353	897.16	1.754	5.63126	1.662	0	0	0	0	0	0	0	0
17	LARGE	22	06/20/95	1.41	0.05	110000	7228.839	34.413	-456.658	-1.187	0	0	0	0	0	0	0	0	0	0
18	LARGE	25	09/13/95	6.19	0.29	61000	5020.655	21.522	-1075.128	-3.216	2.08314	0.977	0	0	0	0	0	0	0	0
19	LARGE	30	12/19/95	0.71	0.07	19000	-5314.876	-1.007	47.609	0.363	0.621	0.799	0.197	1.272	0	0	0	0	0	0
20	LARGE	33	06/27/95	0.19	0.01	50000	3289.61	11.908	-148.201	-0.311	-1.68242	-0.587	0	0	0	0	0	0	0	0
21	LARGE	20	12/08/95	2.45	0.14	27000	1773.435	23.065	-57.385	-0.421	1.74067	2.168	0	0	0	0	0	0	0	0
22	LARGE	27	08/22/95	0	0	110000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	LARGE	35	08/22/95	10.45	0.52	1000	-3514.686	-1.453	0.24	0.003	2.455	5.451	0.057	1.467	0	0	0	0	0	0
24	LARGE	11	09/01/95	3.66	0.27	102000	-27365.77	-2.472	2166.256	1.124	0	0	5.567	2.989	0	0	0	0	2989.88	1.622
25	LARGE	33	10/16/95	33.59	0.78	58000	-43610.825	-7.003	421.12	0.754	9.266	3.373	2.284	7.353	0	0	0	0	0	0
26	LARGE	39	08/24/95	39.02	0.72	18000	659.66	13.067	76.894	0.651	5.62409	8.826	0	0	0	0	0	0	0	0
27	LARGE	38	08/24/95	67.63	0.82	3000	40.982	1.383	53.307	1.364	2.98051	11.616	0	0	0	0	0	0	0	0
28	LARGE	20	08/22/95	1.82	0.17	1000	-0.599	-0.004	-4.842	-0.591	0.373	2.332	0.001	0.095	0	0	0	0	0	0
29	LARGE	28	10/04/95	2.72	0.16	121000	5254.839	15.569	-447.23	0.591	9.34484	2.224	0	0	0	0	0	0	0	0
30	LARGE	34	08/23/95	1.33	0.12	115000	-12297.063	-0.715	1552.808	1.699	-1.663	-0.408	0.694	0.909	0	0	0	0	0	0
31	LARGE	35	10/12/95	42.78	0.82	54000	-1626.976	-0.277	1372.659	4.309	0	0	0.079	0.824	0	0	0	0	834.705	2.549
32	LARGE	25	10/03/95	12.07	0.29	82000	7401.115	44.539	910.599	3.475	0	0	0	0	0	0	0	0	0	0
33	SMALL	35	07/28/95	4.18	0.31	491	-1059.637	-2.119	-13.285	-0.569	0.348	2.965	0.028	2.194	0	0	0	0	0	0
34	LARGE	34	10/12/95	8.21	0.47	13000	-6161.235	-1.353	339.811	4.394	0.697	1.34	0.151	1.53	0	0	0	0	0	0
35	LARGE	34	09/17/95	27.88	0.64	10000	91.644	1.107	224.719	1.554	4.55474	7.467	0	0	0	0	0	0	0	0
36	LARGE	34	07/13/95	2.35	0.22	128000	-67329.488	-1.257	1285.579	2.124	8.388	1.463	1.365	1.444	0	0	0	0	0	0
37	LARGE	34	08/09/95	0.17	0.01	45000	3651.294	13.482	-215.171	-0.417	0	0	0	0	0	0	0	0	0	0
38	LARGE	35	10/11/95	4.06	0.3	163000	4581.16	0.272	1240.49	2.344	8.522	2.701	0.089	0.334	0	0	0	0	0	0
39	LARGE	28	12/19/95	2.48	0.14	30000	401.734	2.554	-944.254	-0.938	6.87865	2.205	0	0	0	0	0	0	0	0
40	LARGE	34	10/24/95	4.07	0.3	78000	3678.92	0.158	-994.844	-2.319	-6.60538	-2.328	0.04349	0.083	0	0	0	0	0	0
41	SMALL	34	10/24/95	16.12	0.66	172	-55.696	-0.208	-2.89	-0.84	0.144	6.354	0.001	0.24	0	0	0	0	0	0
42	LARGE	34	10/19/95	7.07	0.32	56000	4058.648	43.888	259.079	1.851	3.03343	3.38	0	0	0	0	0	0	0	0
43	LARGE	33	10/23/95	1.38	0.09	140000	-21041.198	-1.266	-703.942	-0.256	0	0	4.068	1.555	0	0	0	0	0	0
44	LARGE	35	11/16/95	1.37	0.13	3000	-690.203	-0.84	33.792	1.253	-0.159	-1.007	0.016	1.114	0	0	0	0	0	0
45	LARGE	44	10/06/95	2.18	0.19	143000	-22009.781	-0.835	-3903.445	-2.111	5.704	0.563	4.633	1.163	0	0	0	0	0	0
46	LARGE	22	08/10/95	3.93	0.36	175000	-5435.967	-0.521	2117.892	1.681	3.036	0.927	0.409	1.142	0	0	0	0	2425.08	1.942
47	LARGE	34	08/23/95	111.4	0.88	3000	75.12	7.485	30.169	2.061	0.92142	14.893	0	0	0	0	0	0	0	0
48	LARGE	36	10/24/95	21.86	0.6	41000	-11192.724	-1.411	1833.373	3.971	0	0	0.235	1.673	0	0	0	0	0	0
49	LARGE	36	10/04/95	1.01	0.07	17000	515.758	3.52	-335.125	-0.811	1.64312	1.18	0	0	0	0	0	0	0	0
50	LARGE	28	05/12/95	28.32	0.67	33000	628.854	2.021	-72.658	-0.143	15.37696	7.181	0	0	0	0	0	0	0	0
51	LARGE	36	11/14/95	12.49	0.57	12000	-5128.4	-3.439	178.415	1.494	0.536	1.621	0.141	3.69	0	0	0	0	0	0
52	LARGE	30	05/19/95	8.05	0.37	4000	37.905	0.982	430.297	3.83	0.76167	2.111	0	0	0	0	0	0	0	0
53	LARGE	32	10/02/95	0.57	0.04	3000	-948.947	-0.799	21.354	0.576	0	0	0.061	1.031	0	0	0	0	0	0
54	LARGE	32	10/02/95	1.57	0.23	124000	-3519.743	-0.919	1339.8	0.753	2.77126	0.363	0.69857	0.336	274.443	0.166	3821.62	2.057	0	0
55	LARGE	34	12/07/95	2.84	0.17	9000	391.463	4.001	-101.324	-0.4	3.08506	2.38	0	0	0	0	0	0	0	0
56	LARGE	34	12/07/95	5.41	0.27	72000	-1091.684	-0.1	1527.386	3.266	0	0	0.141	0.343	0	0	0	0	0	0
57	LARGE	39	09/14/95	148.43	0.91	9000	156.39	2.116	-92.93	-0.942	10.87834	16.942	0	0	0	0	0	0	0	0
58	LARGE	23	09/15/95	15.97	0.54	10000	152.452	1.054	-882.542	-1.99	10.77614	5.407	0	0	0	0	0	0	0	0
59	LARGE	34	07/31/95	4.54	0.32	20000	-10870.437	-1.3	392.962	2.292	3.609	3.213	0.302	1.395	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat
60 10096750	SURVEY	32	07/13/95	0	0	5000	0	0	0	0	0	0	0	0	0	0	0	0
61 10097768	LARGE	34	02/23/95	0.6	0.02	2000	40.045	6.412	-19.892	-0.776	0	0	0	0	0	0	0	0
62 10109244	LARGE	30	12/19/95	3.09	0.2	32000	3086.041	11.268	905.015	1.862	2.29303	0.902	0	0	0	0	0	0
63 10113849	SMALL	27	10/13/95	15.75	0.63	68	-6.709	-0.773	0.008	0.902	0.008	6.951	0	0	0	0	0	0
64 10115713	SMALL	27	10/17/95	25.55	0.71	103	-1.026	-0.666	0.971	0.193	0.10472	6.959	0	0	0	0	0	0
65 10132693	SMALL	20	09/30/95	6.09	0.39	640	-350.937	-0.664	14.749	0.515	0.451	4.215	0.008	0.693	0	0	0	0
66 10132694	SMALL	20	09/30/95	61.76	0.82	146	5.62	5.259	4.104	3.728	0.05289	10.716	0	0	0	0	0	0
67 10139153	SMALL	33	03/29/95	11.93	0.53	718	10.33	1.225	-36.709	-1.411	0.32663	4.602	0	0	0	0	0	0
68 10144893	LARGE	49	01/17/95	28.47	0.65	127000	6258.33	8.823	-1815.901	-1.015	0	0	0	0	0	0	-9215.3	-7.317
69 10146352	LARGE	38	12/19/95	22.47	0.71	49000	-9890.426	-4.443	1068.182	5.897	2.518	4.055	0.149	6.369	0	0	0	0
70 10155723	SMALL	37	05/15/95	66.01	0.89	689	-264.518	-0.652	-6.046	-0.408	0.376	12.834	0.005	0.724	0	0	0	0
71 10170599	LARGE	34	05/30/95	4.24	0.22	2000	137.982	7.815	6.826	0.365	0.23597	2.852	0	0	0	0	0	0
72 10174190	LARGE	36	08/17/95	160.92	0.92	7000	139.606	3.026	-29.928	-0.539	4.18267	17.804	0	0	0	0	0	0
73 10176444	SURVEY	33	07/17/95	5.94	0.03	35000	2511.543	17.009	512.175	2.583	-1.44241	-1.714	0	0	0	0	0	0
74 10176445	SMALL	28	10/01/95	0.57	0.05	95	-25.582	-0.719	-8.612	-0.076	0.35214	1.068	0	0	0	0	0	0
75 10176497	SURVEY	34	10/18/95	3.74	0.37	40000	1087.261	3.888	527.224	1.044	-1.61981	-1.423	0.00927	2.546	0	0	0	0
76 10176555	LARGE	28	01/12/95	93.09	0.86	4000	1022.688	12.386	-1463.26	-12.598	1.6325	3.546	0	0	0	0	0	0
77 10176563	SURVEY	36	06/15/95	9.3	0.4	54000	2943.379	15.537	-9.53	-0.029	5.24341	4.179	0	0	0	0	0	0
78 10176571	LARGE	39	06/15/95	12.34	0.57	8000	-2025.675	-1.33	513.797	2.696	2.044	4.102	0.153	1.397	0	0	0	0
79 10176604	LARGE	35	03/09/95	44.6	0.75	23000	331.922	1.876	106.351	0.399	9.93981	9.286	0	0	0	0	0	0
80 10176605	LARGE	37	05/31/95	47.19	0.83	3000	-591.635	-0.818	175.609	2.818	1.911	11.893	0.006	0.881	0	0	0	0
81 10176667	LARGE	35	08/10/95	17.15	0.53	23000	429.871	2.169	186.852	0.615	7.2386	5.832	0	0	0	0	0	0
82 10176709	SMALL	36	05/31/95	112.87	0.89	607	-10.356	-1.136	3.988	-0.399	0.45071	14.55	0	0	0	0	0	0
83 10177067	SMALL	36	07/17/95	18.32	0.56	29000	1064.298	8.108	-96.216	-0.591	5.4321	5.848	0	0	0	0	0	0
84 10177399	SMALL	27	10/02/95	11.24	0.58	607	-665.304	-1.109	26.733	0.531	0.644	5.691	0.025	1.111	0	0	0	0
85 10177463	LARGE	31	08/23/95	22.83	0.72	3000	-701.721	-0.771	2.839	0.028	2.503	8.199	0.277	0.737	0	0	0	0
86 10177463	SURVEY	28	08/23/95	27.62	0.73	1000	-33.084	-1.12	50.579	1.242	1.24191	7.375	0	0	0	0	0	0
87 10177553	LARGE	31	05/30/95	52.95	0.78	1000	-1.703	-0.083	5.801	0.24	1.03408	9.837	0	0	0	0	0	0
88 10177597	LARGE	34	07/19/95	1.43	0.14	21000	-3766.482	-1.498	51.647	0.396	0.523	1.352	0.188	1.75	0	0	0	0
89 10177618	LARGE	27	06/13/95	0.09	0.01	6000	-169.419	-0.126	-15.858	-0.126	0	0	0.015	0.262	0	0	0	0
90 10177619	LARGE	27	06/13/95	20.8	0.69	33000	-6771.036	-0.645	-59.956	-0.105	11.132	7.255	0.195	0.774	0	0	0	0
91 10177636	LARGE	37	11/14/95	43.35	0.86	104000	10828.806	16.774	-1465.329	-1.07	9.18466	2.582	0	-7552.9	-5.699	-3362	-2.104	
92 10187422	LARGE	49	08/10/95	2.06	0.06	179000	9054.921	12.756	2286.423	1.435	0	0	0	0	0	0	0	0
93 10187432	LARGE	33	08/11/95	58.8	0.86	9000	-654.881	-0.28	160.807	1.681	5.027	13.162	0.032	0.268	0	0	0	0
94 10205737	LARGE	28	08/08/95	21.15	0.58	22000	1216.51	14.686	26.697	0.246	3.02443	6.372	0	0	0	0	0	0
95 10205930	SURVEY	36	07/19/95	7.92	0.35	107000	11266.314	23.72	-826.002	-1.546	-9.26538	-3.938	0	0	0	0	0	0
96 10210302	LARGE	25	07/20/95	1.95	0.06	93000	5036.498	26.405	576.927	1.395	0	0	0	0	0	0	0	0
97 10215174	LARGE	33	06/15/95	6.44	0.3	2000	13.497	0.468	81.537	1.815	0.63673	3.483	0	0	0	0	0	0
98 10215744	SMALL	20	07/14/95	18.69	0.57	793	7.473	0.945	14.462	1.224	0.31916	6.09	0	0	0	0	0	0
99 10216088	LARGE	38	12/18/95	170.99	0.95	25000	-5682.329	-2.181	35.448	0.158	24.943	21.943	0.07	2.405	0	0	0	0
100 10233465	LARGE	34	05/05/95	1.47	0.09	32000	-10568.323	-1.028	510.678	1.388	0	0	0.408	1.121	0	0	0	0
101 10239530	SMALL	35	09/15/95	14.57	0.54	780	-3.737	-0.349	-8.243	-0.363	0.43568	5.382	0	0	0	0	0	0
102 10240968	SMALL	23	03/31/95	14.84	0.69	490	-244.214	-1.193	-28.822	-1.068	0.37	5.956	0.003	1.318	0	0	0	0
103 10246065	LARGE	22	10/06/95	0.07	0.0	158000	7215.102	10.449	435.922	0.255	0	0	0	0	0	0	0	0
104 10254549	LARGE	23	09/13/95	0.05	0	6000	799.379	2.323	-83.023	-0.22	0	0	0	0	0	0	0	0
105 20001277	SURVEY	105	02/01/95	11.48	0.45	1000	129.421	10.617	-49.791	-4.102	0.15418	1.781	0	0	0	0	0	0
106 20001499	LARGE	35	01/12/95	1.33	0.12	31000	1390.028	0.419	-700.271	-1.053	-1.524	-0.871	0.005	0.087	0	0	0	0
107 20001578	LARGE	22	02/01/95	13.05	0.51	18000	-13614.077	-3.838	-291.449	-2.03	0	0	1.439	4.313	0	0	0	0
108 20001703	SMALL	22	02/01/95	31.37	0.77	371	-41.631	-0.451	-3.4	-0.804	0.234	8.973	0.006	0.616	0	0	0	0
109 20001704	LARGE	22	02/01/95	5.12	0.43	172000	-14280.689	-1.208	1178.116	0.736	2.237	0.356	4.145	1.664	0	0	0	0
110 20001742	LARGE	23	08/08/95	0.11	0.01	2000	34.017	0.16	-12.99	-0.397	0	0	0.001	0.347	0	0	0	0
111 20003584	LARGE	111	11/21/95	18.03	0.66	116000	-8428.916	-0.833	467.864	0.571	0	0	0.316	1.641	0	0	2852.67	3.721
112 20003594	LARGE	30	11/21/95	2.75	0.16	17000	1759.55	8.117	-822.683	-2	3.45237	1.367	0	0	0	0	0	0
113 20038227	SURVEY	37	10/24/95	0	0	26000	0	0	0	0	0	0	0	0	0	0	0	0
114 20041211	LARGE	39	10/24/95	10.73	0.42	19000	552.35	5.955	-296.918	-1.104	4.32444	4.497	0	0	0	0	0	0
115 20041214	LARGE	34	11/02/95	19.98	0.68	13000	-2923.525	-1.716	-8.583	-0.08	2.82	7.696	0.157	1.868	0	0	0	0
116 20041297	LARGE	27	11/07/95	4.2	0.32	25000	-1615.35	-0.298	279.142	0.476	4.952	3.296	0.089	0.354	0	0	0	0
117 20041515	LARGE	36	09/05/95	11.89	0.64	86000	-416.846	-0.049	2085.76	3.215	5.949	3.24	0.081	0.375	0	0	1250.67	1.92
118 20041520	LARGE	36	11/13/95	13.16	0.59	7000	-1810.971	-0.868	-1.111	-0.009	2.445	6.236	0.037	0.946	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
119 20042344	LARGE	37	05/23/95	3.69	0.28	4000	-618.257	-1.1	-71.868	-0.855	-0.317	-1.485	0.015	1.486	0	0	0	0	0	0
120 20047554	LARGE	22	12/07/95	1.91	0.12	190000	-46870.529	-1.435	-1779.869	-0.965	0	0	7.011	1.765	0	0	0	0	0	0
121 20049525	SURVEY	33	10/03/95	0.19	0.01	56000	3277.909	0.489	-188.258	-0.466	0	0	0.00442	0.009	0	0	0	0	0	0
122 20049575	LARGE	33	11/03/95	23.86	0.61	126000	6990.908	21.149	773.219	0.591	0	0	0	0	0	0	4833.67	3.532	0	0
123 20073539	LARGE	33	05/24/95	4.25	0.22	259000	21807.557	22.94	-2762.641	-2.512	3.60759	0.753	0	0	0	0	0	0	0	0
124 20091504	SMALL	30	08/28/95	9.14	0.45	470	7.424	0.796	-27.137	-1.518	0.40538	4.033	0	0	0	0	0	0	0	0
125 20092020	LARGE	30	03/02/95	24.68	0.62	89000	7870.192	10.541	-1458.416	-2.428	0	0	0.14	0.366	0	0	0	0	0	0
126 20092058	LARGE	36	08/31/95	4.52	0.24	89000	-1909.42	-0.141	-2869.244	-2.795	0	0	0.312	0.349	0	0	0	0	0	0
127 20092240	LARGE	34	05/24/95	5.25	0.27	136000	-2893.571	-0.082	-2466.9	-3.178	-0.39036	-0.841	0	0	0	0	0	0	0	0
128 20092270	LARGE	32	10/26/95	17.5	0.54	5000	231.713	4.244	671.727	5.802	-0.39036	-0.841	0	0	0	0	0	0	0	0
129 20092276	LARGE	27	07/11/95	10.39	0.41	166000	11028.374	14.398	-5416.402	-4.544	-5.66854	-1.103	0	0	0	0	0	0	0	0
130 20111596	LARGE	36	09/19/95	2.17	0.13	99000	-16678.001	-1.741	67.83	0.062	0	0	0.871	1.932	0	0	0	0	0	0
131 20111674	LARGE	33	05/17/95	6.42	0.17	43000	2162.576	10.456	-1139.681	-2.533	0	0	0	0	0	0	0	0	0	0
132 20112187	LARGE	28	03/28/95	10.72	0.42	3000	48.547	4.16	-48.796	-1.024	0.71296	4.497	0	0	0	0	0	0	0	0
133 20112188	LARGE	28	05/12/95	0.05	0	73000	-8976.089	-0.214	-743.316	-0.268	0	0	1.215	0.291	0	0	0	0	0	0
134 20114506	LARGE	20	06/15/95	1.13	0.11	37000	-7896.695	-1.099	219.523	0.48	3.63	1.545	0.252	1.354	0	0	0	0	0	0
135 20114603	SURVEY	34	05/31/95	0.71	0.07	101000	-24135.812	-1.003	1559.97	1.052	0	0	1.1889	1.171	-1484.9	-1.057	0	0	0	0
136 20114627	LARGE	20	05/31/95	1.22	0.07	168000	4963.021	13.678	-1631.576	-1.091	-6.39709	-1.285	0	0	0	0	0	0	0	0
137 20114645	SMALL	3	12/29/95	14.36	0.66	3	-51.575	-3.079	0.118	0.425	0.008	6.264	0.001	4.576	0	0	0	0	0	0
138 20130947	LARGE	28	08/30/95	0	0	0	-17.921	-1.002	0	0	0	0	0	0	0	0	0	0	0	0
139 20134861	SMALL	35	09/07/95	1.24	0.12	79	13.142	1.655	0.241	1.788	0	0	0	0	0	0	0	0	0	0
140 20144002	SMALL	32	02/21/95	43	0.82	464	-12.795	-0.089	-9.064	-1.409	0.255	10.537	0.002	0.223	0	0	0	0	0	0
141 20144003	LARGE	32	02/21/95	0.4	0.03	107000	2591.133	0.2	-808.524	-0.758	0	0	0.213	0.171	0	0	0	0	0	0
142 20147325	SMALL	24	09/28/95	24.58	0.75	56	-3.927	-0.228	0.209	0.115	0.057	8.439	0	0	0	0	0	0	0	0
143 20151147	LARGE	33	10/05/95	52.36	0.78	242000	19351.505	45.241	876.442	1.105	0	0	0	0	0	0	0	0	0	0
144 20151902	LARGE	20	07/24/95	0.31	0.02	93000	2200.354	12.209	-614.839	-0.757	0.26996	0.142	0	0	0	0	0	0	0	0
145 20152726	LARGE	34	08/01/95	32.37	0.73	2000	-9.644	-0.408	35.947	0.8	1.36068	7.993	0	0	0	0	0	0	0	0
146 20152727	LARGE	34	08/01/95	4.37	0.27	14000	1109.901	16.336	-189.961	-1.945	0	0	0	0	0	0	0	0	0	0
147 20159235	LARGE	37	07/12/95	2.11	0.18	107000	-12578.375	-0.584	-157.697	-0.038	0	0	0.434	0.73	-4658.7	-2.254	0	0	-15158	-9.905
148 20159236	LARGE	37	01/09/95	0.06	0	39000	1060.8	1.946	-433.396	-0.242	0	0	0	0	0	0	0	0	0	0
149 20159255	LARGE	37	07/13/95	4.89	0.34	10000	-739.585	-0.595	43.79	0.156	1.319	3.769	0.031	0.706	0	0	0	0	0	0
150 20166516	SURVEY	20	08/01/95	5.01	0.43	248000	8955.245	1.642	981.669	1.556	1.37099	0.51	0.00892	0.052	0	0	1718.73	2.672	0	0
151 20171056	LARGE	20	04/10/95	8.67	0.48	2000	-26.62	-0.225	-0.779	-0.112	0.112	4.536	0.003	1.044	0	0	0	0	0	0
152 20175739	SURVEY	34	10/03/95	871.76	0.99	10000	952.177	7.209	-122.779	-0.481	-0.47601	-0.621	0	0	0	0	0	0	0	0
153 20176926	SURVEY	37	03/17/95	1.89	0.25	33000	1519.734	0.157	-121.707	-1.404	1.20174	0.757	0.00776	0.049	0	0	0	0	0	0
154 20178332	SMALL	23	02/03/95	7.77	0.53	0	33.667	4.706	3.032	0.375	0	0	0.497	0	0	0	0	0	0	0
155 20189784	LARGE	36	08/11/95	5.51	0.36	93000	-9484.908	-0.906	-116.149	-0.181	10.078	3.712	0.257	1.253	0	0	0	0	0	0
156 20189785	LARGE	36	01/10/95	28.44	0.76	4000	-1424.464	-0.78	-89.03	-0.926	2.007	8.945	0.024	0.822	0	0	0	0	0	0
157 20189786	LARGE	36	01/10/95	78.53	0.84	19000	934.832	14.722	-204.42	-2.488	6.0918	11.791	0	0	0	0	0	0	0	0
158 20189820	SURVEY	37	09/05/95	8.35	0.46	15000	-1253.856	-0.471	29.631	0.113	5.55005	4.656	0.02127	0.69	0	0	0	0	0	0
159 20189929	SURVEY	36	12/20/95	2.05	0.12	77000	3750.36	17.389	752.541	1.436	-3.93007	-1.4	0	0	0	0	0	0	0	0
160 20189930	SMALL	36	12/20/95	1.5	0.11	276	9.143	2.239	-9.665	-0.69	0.10064	1.658	0	0	0	0	0	0	0	0
161 20189931	SMALL	36	12/20/95	142.24	0.93	565	-3.692	-0.829	-17.137	-2.266	0.64132	16.647	0	0	0	0	0	0	0	0
162 20192734	LARGE	36	07/12/95	5.78	0.28	3000	145.551	9.537	27.904	1.53	0.28077	3.375	0	0	0	0	0	0	0	0
163 20197295	SURVEY	34	08/16/95	0.33	0.01	2000	156.519	17.747	9.613	0.578	0	0	0	0	0	0	0	0	0	0
164 20197504	LARGE	23	09/12/95	3.74	0.11	19000	471.995	5.675	517.817	1.935	0	0	0	0	0	0	0	0	0	0
165 20198737	SMALL	20	08/10/95	24.98	0.64	598	5.867	1.54	0.56	0.055	0.26073	7.043	0	0	0	0	0	0	0	0
166 20205596	LARGE	20	12/27/95	24.08	0.62	324000	12315.49	1.428	-14571.91	-1.261	0	0	0	0	0	0	101743	6.86	0	0
167 20211511	SMALL	36	12/27/95	35.2	0.76	570	10.632	1.692	-39.172	-3.026	0.53861	8.332	0	0	0	0	0	0	0	0
168 20211906	LARGE	23	02/28/95	2.34	0.2	11000	138.13	0.198	-100.62	-1.012	-0.691	-2.439	0.008	0.959	0	0	0	0	0	0
169 20222651	LARGE	34	06/19/95	0.94	0.06	10000	-2555.084	-0.779	242.407	1.184	0	0	0.132	0.857	0	0	0	0	0	0
170 20222826	LARGE	23	08/31/95	49.81	0.77	7000	144.673	1.884	-109.729	-0.989	4.70536	9.49	0	0	0	0	0	0	0	0
171 20223144	LARGE	20	09/14/95	6.11	0.4	46000	-2081.686	-0.778	-602.392	-1.705	3.651	1.349	0	0	0	0	0	0	0	0
172 20229529	SMALL	39	10/16/95	34.47	0.78	93	16.589	3.226	1.92	6.348	0.008	7.072	0	0	0	0	0	0	0	0
173 20245433	LARGE	36	12/27/95	27.09	0.64	229000	-81551.355	-5.189	15.759	0.019	0	0	1.424	6.01	0	0	0	0	0	0
174 20247471	LARGE	36	12/27/95	0.5	0.02	15000	763.519	8.318	204.442	0.704	0	0	0	0	0	0	0	0	0	0
175 30000636	LARGE	37	06/06/95	10.24	0.41	2000	-349.461	-1.82	-11.657	-0.599	0	0	0.006	2.567	0	0	0	0	0	0
176 30001422	LARGE	39	01/20/95	1.6	0.05	7000	376.172	7.245	104.39	1.265	0	0	0	0	0	0	0	0	0	0
177 30001424	LARGE	33	01/14/95	0.02	0	3000	50.104	2.698	14.02	0.172	-0.01572	-0.071	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
178 30001557	SURVEY	23	01/07/95	1.89	0.17	6000	188.17	0.381	-15.96	-0.279	0.36369	2.354	0.00256	0.543	0	0	0	0	0	0
179 30001593	LARGE	23	01/09/95	0.77	0.05	2000	-234.823	-0.764	-39.595	-0.742	0	0	0.005	1.081	0	0	0	0	0	0
180 30001622	LARGE	23	01/03/95	4.13	0.15	1000	61.999	4.058	-106.034	-2.032	0	0	0	0	0	0	0	0	0	0
181 30005270	SMALL	23	02/28/95	51.94	0.83	405	245.561	12.964	-274.218	-10.182	-0.39084	-2.171	0	0	0	0	0	0	0	0
182 30005508	LARGE	23	01/09/95	3.78	0.21	7000	191.666	0.34	-225.74	-1.731	0	0	0.003	0.263	0	0	0	0	0	0
183 30005510	SMALL	23	01/09/95	20.68	0.6	376	10.848	2.535	-7.018	-0.873	0.23636	6.353	0	0	0	0	0	0	0	0
184 30005514	LARGE	34	01/09/95	493.36	0.97	2000	101.442	10.806	4.981	0.599	1.73152	31.006	0	0	0	0	0	0	0	0
185 30005572	LARGE	23	01/09/95	0.97	0.09	3000	134.136	0.313	-8.183	-0.118	0.306	1.665	0.001	0.171	0	0	0	0	0	0
186 30005573	LARGE	22	02/22/95	0.78	0.08	13000	-1087.42	-0.937	60.782	0.777	0.03471	0.084	0.24208	1.455	0	0	0	0	0	0
187 30005579	SURVEY	23	01/09/95	2.51	0.07	2000	132.389	6.101	-60.802	-1.584	0	0	0	0	0	0	0	0	0	0
188 30005586	SMALL	23	01/09/95	26.11	0.75	21	382.303	8.268	-398.366	-6.962	-0.1469	-0.395	0	0	0	0	0	0	0	0
189 30005597	LARGE	23	02/28/95	4.09	0.12	2000	163.874	17.742	-22.988	-2.022	0	0	0	0	0	0	0	0	0	0
190 30034714	LARGE	28	09/05/95	50.48	0.77	65000	4554.084	15.958	249.035	0.962	12.12548	9.935	0	0	0	0	0	0	0	0
191 30041804	LARGE	37	09/19/95	4.11	0.31	23000	-6668.487	-0.492	-284.705	-0.297	9.807	2.881	0.062	0.586	0	0	0	0	0	0
192 30041807	LARGE	37	09/19/95	0	0	195000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
193 30042011	LARGE	25	09/13/95	40.22	0.85	256000	21489.832	10.982	8913.671	2.574	16.75917	1.445	0	0	-24565	-9.1	0	0	0	0
194 30047078	LARGE	33	11/15/95	0.01	0	23000	2062.328	16.98	12.952	0.077	-0.10546	-0.099	0	0	0	0	0	0	0	0
195 30048329	LARGE	33	12/20/95	0.79	0.08	37000	-28307.32	-1.051	-302.625	-0.255	1.789	0.393	1.526	1.136	0	0	0	0	0	0
196 30048333	LARGE	34	06/28/95	3.98	0.3	81000	-48408.633	-1.908	1445.804	2.686	0.946	2.686	1.339	2.084	0	0	0	0	0	0
197 30050738	LARGE	34	10/13/95	6.93	0.32	16000	1701.106	21.579	-242.024	-2.876	1.2145	2.137	0	0	0	0	0	0	0	0
198 30050754	LARGE	23	10/18/95	0.36	0.04	85000	705.803	0.068	348.737	0.217	4.69	0.691	0.055	0.416	0	0	0	0	0	0
199 30050818	LARGE	33	09/01/95	8.28	0.42	156000	8850.112	18.696	-845.313	-0.581	0	0	0	0	-5348.9	-3.943	0	0	0	0
200 30050850	LARGE	37	12/11/95	10.91	0.42	17000	1168.394	11.473	-260.257	-1.785	3.9013	4.285	0	0	0	0	0	0	0	0
201 30050852	LARGE	37	12/11/95	38.22	0.8	3000	-328.343	-0.393	71.563	0.522	5.428	10.061	0.006	0.346	0	0	0	0	0	0
202 30050873	LARGE	36	08/30/95	4.77	0.24	109000	5660.773	10.316	-2857.099	-2.403	11.28364	1.664	0	0	0	0	0	0	0	0
203 30050887	LARGE	22	06/30/95	3.13	0.18	70000	-314.89	-0.05	-1026.018	-2.277	0	0	0.586	0.613	0	0	0	0	0	0
204 30050892	LARGE	32	07/20/95	3.53	0.2	19000	1386.985	11.435	-412.718	-1.879	0	0	0	0	0	0	0	0	0	0
205 30050899	SURVEY	20	12/19/95	2.3	0.1	70000	-16525.371	-1.519	-53.912	-0.133	-1.02091	-0.417	0.36039	2.147	0	0	0	0	0	0
206 30060881	LARGE	34	12/12/95	49.54	0.84	54000	-4036.851	-0.32	-223.253	-1.167	14.044	11.176	0.139	0.591	0	0	0	0	0	0
207 30092566	LARGE	22	05/09/95	8.6	0.36	169000	10181.153	21.121	-3587.998	-4.103	-2.0389	-0.398	0	0	0	0	0	0	0	0
208 30092591	LARGE	25	10/24/95	213.13	0.93	83000	4338.965	22.087	232.8	0.883	35.36872	20.644	0	0	0	0	0	0	0	0
209 30092599	SURVEY	37	05/30/95	0.02	0	185000	4995.2	3.04	-549.636	-0.18	-1.70394	-0.154	0.00086	0.211	0	0	0	0	0	0
210 30092676	SURVEY	38	11/16/95	20.3	0.59	10000	259.498	8.386	77.247	0.733	2.97678	6.189	0	0	0	0	0	0	0	0
211 30092728	LARGE	38	12/15/95	18.96	0.67	5000	-331.104	-0.635	-158.95	-1.959	2.373	7.119	0.011	0.883	0	0	0	0	0	0
212 30092751	SURVEY	34	10/03/95	25.09	0.79	21000	-10284.976	-1.558	392.744	4.161	0.27592	0.471	0.19036	1.779	420.626	4.602	0	0	0	0
213 30092756	LARGE	35	11/01/95	27.49	0.65	18000	1247.009	18.397	116.703	1.277	4.40609	7.346	0	0	0	0	0	0	0	0
214 30092757	SMALL	35	11/01/95	19.23	0.65	178	3.383	1.514	10.958	1.935	0.1427	4.989	0	0	0	0	0	0	0	0
215 30110260	SURVEY	20	04/27/95	5.31	0.27	53000	2698.963	6.286	-490.024	-0.757	11.84661	2.924	0	0	0	0	0	0	0	0
216 30115086	LARGE	28	08/10/95	14.14	0.49	79000	4684.523	24.149	-110.643	-0.364	10.02621	5.172	0	0	0	0	0	0	0	0
217 30115087	LARGE	36	05/22/95	1.25	0.12	56000	-14995.151	-1.443	-874.553	-1.226	-3.036	-1.171	0.418	1.693	0	0	0	0	0	0
218 30115297	SURVEY	39	05/19/95	41.88	0.74	76000	4017.315	10.581	-866.479	-1.647	28.49594	8.282	0	0	0	0	0	0	0	0
219 30115327	LARGE	34	05/31/95	17.51	0.54	9000	863.873	7.818	-1702.363	-5.863	-0.45032	-0.33	0	0	0	0	0	0	0	0
220 30115329	LARGE	34	05/19/95	12.16	0.64	100000	-19165.357	-0.653	2066.151	1.891	6.672	1.466	0.644	0.758	3267.63	3.075	0	0	0	0
221 30115436	SMALL	33	05/22/95	29.64	0.76	284	-144.196	-1.567	2.953	0.529	0.297	9.053	0.011	1.611	0	0	0	0	0	0
222 30115438	LARGE	33	05/22/95	4.12	0.31	186000	-18913.133	-1.402	-2305.678	-2.594	0	0	2.004	2.453	1401.7	1.482	0	0	0	0
223 30115466	LARGE	35	06/27/95	109.38	0.93	1000	-2213.147	-3.126	-1.485	-0.092	1.904	17.447	0.026	3.108	0	0	0	0	0	0
224 30115467	LARGE	35	06/27/95	2.58	0.22	16000	-2090.913	-0.492	165.499	1.426	1.951	2.599	0.045	0.852	0	0	0	0	0	0
225 30115547	SURVEY	32	04/23/95	3.92	0.3	90000	-663.537	-0.179	1487.55	3.379	0.67495	0.37	0.65313	0.852	0	0	0	0	0	0
226 30115642	LARGE	35	12/15/95	27.28	0.75	2000	-1593.341	-1.521	-1.904	-0.084	1.279	8.891	0.018	1.612	0	0	0	0	0	0
227 30115693	SURVEY	35	12/15/95	0	0	16000	168.975	1.532	0	0	0	0	0	0	0	0	0	0	0	0
228 30115724	LARGE	35	04/06/95	2.1	0.12	28000	564.816	5.121	795.995	1.732	-1.46055	-0.992	0	0	0	0	0	0	0	0
229 30115743	LARGE	39	12/22/95	2.53	0.16	8000	-2079.284	-1.405	226.334	0.986	0	0	0.219	1.541	0	0	0	0	0	0
230 30115788	LARGE	10	05/17/95	6.75	0.31	90000	2776.583	10.978	60900.338	1.935	0	0	0	0	0	0	-58113	-1.864	0	0
231 30115790	SMALL	33	05/17/95	32.48	0.75	50	-0.437	-0.494	-916.061	-1.363	0.06907	8.035	0	0	0	0	0	0	0	0
232 30115869	LARGE	34	05/19/95	12.42	0.57	76000	-10305.452	-0.494	-916.061	-1.363	0	0	0.433	0.794	-2193.5	-3.154	0	0	0	0
233 30115877	LARGE	33	05/17/95	0	0	91000	1832.608	7.233	49.963	0.053	0	0	0	0	0	0	0	0	0	0
234 30115878	SURVEY	33	05/17/95	1.22	0.08	110000	-1063.398	-0.343	-357.806	-0.292	0	0	32.4912	1.408	0	0	0	0	0	0
235 30126339	LARGE	49	08/29/95	13.83	0.31	29000	1413.087	6.204	-2356.162	-3.718	0	0	0	0	0	0	0	0	0	0
236 30132656	LARGE	49	01/12/95	1.12	0.07	172000	7686.195	6.986	2183.755	1.259	6.75056	0.988	0	0	0	0	0	0	0	0



APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Thermo	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
237 30137730	SMALL	35	03/29/95	78.69	0.85	903	22.557	3.066	-3.03	-0.316	0.49719	12.145	0	0	0	0	0	0	0	0
238 30137731	LARGE	34	03/31/95	1.29	0.12	20000	-1469.467	-0.339	275.393	0.461	0	0	0.137	0.421	0	0	0	0	-919	-1.842
239 30142192	LARGE	35	11/20/95	35.95	0.71	7000	576.449	30.44	-11.086	-0.527	0.76824	8.412	0	0	0	0	0	0	0	0
240 30158140	LARGE	20	07/31/95	5.07	0.27	119000	5728.445	16.789	830.344	1.274	7.63505	3.039	0	0	0	0	0	0	0	0
241 30158165	LARGE	35	07/25/95	11.06	0.66	3000	-3941.398	-23.969	-23.969	-0.183	1.923	5.336	0.085	1.966	0	0	0	0	0	0
242 30164224	SMALL	26	07/10/95	5.04	0.26	252	18.654	41.228	-1.277	-2.058	0.00524	1.92	0	0	0	0	0	0	0	0
243 30164225	LARGE	26	07/10/95	0.47	0.01	7000	683.594	16.93	-39.568	-0.683	0	0	0	0	0	0	0	0	0	0
244 30175513	SMALL	23	09/11/95	1.23	0.15	52	61.832	1.335	3.355	0.667	0.019	1.406	0	0	0	0	0	0	0	0
245 30178438	SMALL	27	01/23/95	6.26	0.45	79	-45.355	-0.334	-4.842	-1.059	0.062	3.912	0.001	0.441	0	0	0	0	0	0
246 30178439	SMALL	36	01/23/95	7.44	0.5	21	-153.317	-1.482	-5.791	-0.843	0.034	2.995	0.003	1.332	0	0	0	0	0	0
247 30178444	SMALL	35	01/23/95	21.18	0.6	556	13.552	1.387	-13.154	-1.192	0.28789	6.195	0	0	0	0	0	0	0	0
248 30206710	SMALL	35	01/23/95	87.21	0.92	274	-125.745	-0.902	-0.952	-0.319	0.192	15.912	0.001	0.665	0	0	0	0	0	0
249 30206710	SMALL	27	02/06/95	70.63	0.87	224	-0.287	-0.066	-6.646	-1.508	0.22694	11.722	0	0	0	0	0	0	0	0
250 30215990	LARGE	35	05/22/95	9.45	0.25	2000	78.676	4.45	-184.642	-3.074	0	0	0	0	0	0	0	0	0	0
251 30216437	SMALL	34	04/05/95	19.74	0.74	68	29.684	0.97	0.425	0.159	0.031	7.126	0	0	0	0	0	0	0	0
252 30228218	LARGE	23	10/18/95	0.05	0	7000	234.128	2.362	-76.001	-0.225	0	0	0	0	0	0	0	0	0	0
253 30242125	LARGE	37	10/30/95	3.42	0.27	3000	-597.378	-1.542	48.177	1.147	0.433	2.113	0.009	1.807	0	0	0	0	0	0
254 30246089	LARGE	34	11/20/95	6.22	0.3	12000	-12450.304	-0.948	1195.402	3.257	0	0	0.371	0.994	0	0	0	0	0	0
255 30247636	SMALL	35	06/16/95	15.91	0.63	433	-665.152	-2.32	-17.94	-1.913	0.323	5.71	0.012	2.316	0	0	0	0	0	0
256 40000743	LARGE	23	08/21/95	0.04	0	11000	306.828	0.734	-24.9	-0.248	0	0	0.002	0.22	0	0	0	0	0	0
257 40004310	SURVEY	33	10/20/95	2.56	0.08	3000	-2486.025	-0.347	-238.755	-0.483	0	0	0.33431	0.545	0	0	0	0	0	0
258 40004688	LARGE	23	06/28/95	1.96	0.17	6000	290.932	7.346	-219.47	-1.532	0.829	1.646	0	0	0	0	0	0	326.988	2.177
259 40038153	LARGE	30	11/16/95	14.4	0.51	904	129.371	8.05	-47.918	-3.666	0.20763	3.467	0	0	0	0	0	0	0	0
260 40040069	SMALL	37	06/20/95	14.01	0.6	794	4.559	6.103	0.358	0	0.241	5.796	0	0	0	0	0	0	0	0
261 40040247	SURVEY	13	07/10/95	3.31	0.19	177000	-23666.363	-1.101	736.761	0.358	0	0	3.99507	1.948	0	0	0	0	0	0
262 40041936	SMALL	38	02/02/95	4.8	0.34	848	-66.306	-0.247	30.468	1.068	0.253	3.732	0.001	0.238	0	0	0	0	0	0
263 40057037	LARGE	39	12/19/95	4.81	0.25	60000	-7731.768	-1.394	858.747	1.242	0	0	0.721	1.931	0	0	0	0	0	0
264 40069188	LARGE	38	08/24/95	92.99	0.86	2000	-5.283	-0.299	3.08	0.153	1.17428	13.356	0	0	0	0	0	0	0	0
265 40074795	SMALL	28	01/26/95	14.4	0.51	904	129.371	8.05	-47.918	-3.666	0.20763	3.467	0	0	0	0	0	0	0	0
266 40074796	SMALL	28	01/26/95	27.87	0.67	877	15.492	1.357	-28.322	-1.215	0.55644	7.177	0	0	0	0	0	0	0	0
267 40074798	LARGE	28	01/26/95	20.39	0.58	1000	37.283	2.377	-64.244	-1.924	0.63195	5.726	0	0	0	0	0	0	0	0
268 40074799	SMALL	28	01/26/95	4.52	0.24	647	6.678	0.38	-21.442	-0.441	0.37872	2.903	0	0	0	0	0	0	0	0
269 40074800	LARGE	28	01/26/95	51.65	0.84	2000	-1.71	-0.081	-17.842	-0.536	1.36953	9.893	0	0	0	0	0	0	0	0
270 40074802	SMALL	28	01/26/95	37.66	0.8	519	-431.748	-0.975	-52.799	-3.77	0.516	9.204	0.024	1.035	0	0	0	0	0	0
271 40074804	SMALL	30	01/27/95	36.29	0.75	2000	-2.878	-0.515	0.135	0.025	0.20861	8.518	0	0	0	0	0	0	0	0
272 40074805	SMALL	30	01/27/95	55.52	0.82	485	12.526	1.394	-25.069	-2.992	0.38482	10.047	0	0	0	0	0	0	0	0
273 40074806	SMALL	23	01/27/95	16.49	0.54	180	3.841	1.639	-3.476	-0.792	0.08517	5.558	0	0	0	0	0	0	0	0
274 40074808	SMALL	23	01/30/95	5.02	0.4	728	-2437.147	-1.557	-363.265	-1.517	1.117	3.004	0.033	1.548	0	0	0	0	0	0
275 40074989	LARGE	34	08/30/95	0.48	0.05	9000	-678.997	-0.606	42.125	0.443	0.224	0.937	0.053	0.837	0	0	0	0	0	0
276 40082050	SMALL	49	08/25/95	1.4	0.1	238	52.131	2.552	-32.723	-1.411	-0.10683	-1.035	0	0	0	0	0	0	0	0
277 40095679	LARGE	20	08/29/95	0.75	0.05	190000	4965.459	0.202	2658.095	1.213	0	0	0.083	0.103	0	0	0	0	0	0
278 40095690	LARGE	30	07/31/95	8.29	0.36	17000	1328.938	35.323	-210.639	-4.058	-0.1481	-0.432	0	0	0	0	0	0	0	0
279 40095720	SMALL	20	02/16/95	33.08	0.77	819	-421.556	-2.117	7.068	0.483	0.649	9.098	0.012	2.175	0	0	0	0	0	0
280 40095777	SURVEY	35	09/11/95	0	0	7000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
281 40108132	LARGE	28	05/12/95	16.77	0.42	9000	706.262	7.11	-994.047	-4.095	0	0	0	0	0	0	0	0	0	0
282 40112873	LARGE	49	05/01/95	7.14	0.32	201000	7389.966	6.575	3934.653	1.394	0	0	0	0	-11790	-3.251	0	0	0	0
283 40114745	SMALL	39	10/13/95	24.27	0.78	231	-27.005	-0.22	3.442	0.225	0.518	7.918	0.001	0.138	0	0	0	0	0	0
284 40140579	SMALL	30	05/08/95	61.9	0.82	53	0.704	1.161	-0.337	-0.425	0.03726	10.74	0	0	0	0	0	0	0	0
285 40140580	SMALL	30	05/08/95	11.12	0.48	32	1.11	0.76	-0.269	-0.165	0.03368	4.598	0	0	0	0	0	0	0	0
286 40140599	SMALL	35	04/28/95	1.89	0.2	12	-9.164	-0.213	5.997	1.489	0.02	1.996	0	0	0	0	0	0	0	0
287 40140600	SMALL	34	05/08/95	15.16	0.58	124	-0.084	-0.04	0.501	0.142	0.07671	5.484	0	0	0	0	0	0	0	0
288 40140613	SMALL	35	04/28/95	3.02	0.29	67	-326.023	-2.072	3.299	0.728	0.045	2.393	0.005	2.214	0	0	0	0	0	0
289 40140642	LARGE	30	04/28/95	255.2	0.94	1000	0.211	0.028	-4.602	-0.511	0.83871	21.108	0	0	0	0	0	0	0	0
290 40145721	LARGE	34	09/29/95	5.04	0.25	5000	279.061	10.412	43.449	1.046	0.54062	3.103	0	0	0	0	0	0	0	0
291 40150964	LARGE	35	07/27/95	39.84	0.73	2000	29.454	1.303	78.109	3.248	0.95086	8.845	0	0	0	0	0	0	0	0
292 40158536	LARGE	27	04/24/95	65	0.87	3000	-948.315	-0.726	-45.702	-0.82	1.361	12.675	0.019	0.776	0	0	0	0	0	0
293 40164588	LARGE	34	05/19/95	2.84	0.15	14000	772.514	8.427	122.723	0.993	1.22722	2.37	0	0	0	0	0	0	0	0
294 40165515	LARGE	20	08/01/95	5.87	0.16	102000	9300.215	28.813	998.77	2.422	0	0	0	0	0	0	0	0	0	0
295 40173134	SMALL	39	09/20/95	47.04	0.76	500	10.265	2.391	8.495	1.169	0.28511	9.689	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
296 40173145	SMALL	27	09/27/95	31.75	0.77	369	-21.001	-0.109	4.496	0.532	0.185	9.747	0.001	0.269	0	0	0	0	0	0
297 40173146	SMALL	22	09/27/95	17.41	0.57	356	1.62	0.308	-14.639	-1.34	0.23494	5.763	0	0	0	0	0	0	0	0
298 40173149	SMALL	35	09/27/95	11.47	0.61	133	-170.036	-0.936	-2.222	-0.305	0.139	5.885	0.003	0.91	0	0	0	0	0	0
299 40173151	LARGE	37	09/27/95	70.73	0.88	1000	71.229	0.444	3.982	0.298	0.611	14.368	0	0	0	0	0	0	0	0
300 40173157	LARGE	23	09/22/95	30.04	0.67	1000	44.227	3.27	-35.652	-2.183	0.5024	7.116	0	0	0	0	0	0	0	0
301 40198351	SMALL	32	04/14/95	9.35	0.4	629	99.001	9.121	-52.046	-4.323	-0.06099	-1.082	0	0	0	0	0	0	0	0
302 40198357	LARGE	32	01/01/95	30.44	0.69	2000	1065.17	8.253	706.036	2.521	0	0	0	0	0	0	0	0	0	0
303 40216853	LARGE	33	07/27/95	6.35	0.17	27000	1065.17	8.253	706.036	2.521	0	0	0	0	0	0	0	0	0	0
304 40238173	SMALL	33	05/08/95	16.79	0.69	190	-291.584	-2.98	1.929	0.561	0.08	5.103	0.016	2.964	0	0	0	0	0	0
305 40242250	SURVEY	20	08/30/95	1.26	0.17	218000	-8244.109	-0.243	-2298.754	-1.54	-8.50431	-0.796	0.54783	0.602	0	0	0	0	0	0
306 40243739	LARGE	22	10/03/95	63.51	0.89	5000	79.109	0.081	-262.743	-8.105	0	0	0.005	0.747	0	0	0	0	0	0
307 50004342	LARGE	23	06/14/95	5.31	0.25	10000	-48568.712	-2.712	-2070.018	-1.347	0	0	7.961	2.825	0	0	0	0	0	0
308 50005645	LARGE	23	01/11/95	2.04	0.12	6000	662.787	35.777	-19.079	-1.16	-0.20765	-1.843	0	0	0	0	0	0	0	0
309 50005664	SURVEY	23	08/07/95	4.87	0.4	1000	-26.517	-0.177	-78.218	-3.247	-0.00763	-0.075	0.00152	0.62	0	0	0	0	0	0
310 50005670	SMALL	23	01/12/95	39.46	0.78	976	-20.728	-0.879	-10.469	-0.323	1.86957	8.877	0	0	0	0	0	0	0	0
311 50005679	SMALL	23	01/11/95	10.69	0.49	491	143.607	6.33	-176.357	-4.615	-0.03175	-0.133	0	0	0	0	0	0	0	0
312 50005680	SMALL	23	01/11/95	2.23	0.19	249	-12.804	-0.663	-2.733	-1.349	0.013	2.202	0	0	0	0	0	0	0	0
313 50005688	LARGE	23	02/28/95	19.47	0.39	9000	691.646	29.182	-157.996	-4.412	0	0	0	0	0	0	0	0	0	0
314 50005689	SMALL	23	08/14/95	2.92	0.24	0	-46.426	-1.428	2.812	0.616	0.029	1.55	0.001	2.465	0	0	0	0	0	0
315 50005719	LARGE	35	02/01/95	7.8	0.46	26000	-12617.222	-2.355	1486.315	3.381	5.786	3.94	0.523	2.416	0	0	0	0	0	0
316 50005720	SMALL	23	02/28/95	7.39	0.35	871	28.078	2.97	12.57	0.716	0.39387	3.829	0	0	0	0	0	0	0	0
317 50011887	LARGE	35	11/16/95	32.04	0.68	17000	712.236	4.433	116.746	0.672	8.9426	7.996	0	0	0	0	0	0	0	0
318 50011932	LARGE	27	06/20/95	0.21	0.01	164000	-9551.344	-0.158	-153.569	-0.057	0	0	0.434	0.358	0	0	0	0	0	0
319 50011954	SMALL	28	11/20/95	1.84	0.3	197	20.104	5.493	1.399	0.894	0.001	0.003	0.051	0	0	0	0	0	0	0
320 50011955	SMALL	34	11/15/95	0.17	0.01	256	20.104	5.493	1.399	0.894	0.001	0.003	0.051	0	0	0	0	0	0	0
321 50011986	SMALL	23	11/16/95	5.05	0.4	94	3.626	0.822	-2.734	-1.947	0.017	3.697	0	0	0	0	0	0	0	0
322 50012057	LARGE	38	11/20/95	38.34	0.81	3000	-7187.733	-2.115	-43.959	-0.999	0	0	0	0	0	0	0	0	0	0
323 50012073	LARGE	22	11/07/95	1	0.05	2000	83.709	2.959	-113.193	-0.792	0	0	0	0	0	0	0	0	0	0
324 50035115	SURVEY	38	11/28/95	21.49	0.69	22000	933.338	0.464	489.748	3.116	4.07698	7.281	0.00701	0.339	0	0	0	0	0	0
325 50035120	LARGE	23	09/05/95	1	0.06	158000	12993.726	17.602	529.034	0.665	5.10215	1.376	0	0	0	0	0	0	0	0
326 50047363	LARGE	28	01/03/95	12.55	0.29	3000	157.001	6.358	-248.806	-3.543	0	0	0	0	0	0	0	0	0	0
327 50051213	LARGE	34	07/26/95	23.86	0.72	9000	-8.297	-0.002	925.801	8.386	0.213	0.31	0.009	0.071	0	0	0	0	0	0
328 50051269	LARGE	20	07/26/95	0.01	0	5000	218.705	0.373	6.943	0.119	0	0	0	0	0	0	0	0	0	0
329 50054238	SURVEY	22	10/20/95	3.83	0.28	3000	-269.108	-0.823	-17.848	-0.328	0.70259	3.319	0.08761	1.038	0	0	0	0	0	0
330 50068603	SMALL	22	10/23/95	58.79	0.8	748	1.128	0.17	9.2	0.749	0.83041	10.824	0	0	0	0	0	0	0	0
331 50082040	LARGE	38	07/17/95	0.1	0	1000	14.977	0.868	24.371	0.316	0	0	0	0	0	0	0	0	0	0
332 50082244	LARGE	38	07/26/95	10.02	0.4	28000	2056.501	19.61	92.765	0.829	2.30972	4.466	0	0	0	0	0	0	0	0
333 50082347	LARGE	29	07/18/95	87.7	0.87	3000	-4.359	-0.279	-10.428	-0.184	2.06648	13.201	0	0	0	0	0	0	0	0
334 50086326	SMALL	34	08/02/95	104.42	0.92	999	-190.967	-0.355	19.825	2.16	0.671	17.187	0.004	0.335	0	0	0	0	0	0
335 50087462	SMALL	27	10/07/95	1.61	0.11	108	6.291	1.298	1.518	0.047	0.09608	1.787	0	0	0	0	0	0	0	0
336 50097582	LARGE	38	11/01/95	9.16	0.38	11000	173.297	3.61	229.708	1.025	1.336	0	0	0.158	0.628	0	0	0	0	0
337 50097601	LARGE	20	07/11/95	0.9	0.06	105000	-572.173	-0.062	844.161	1.336	0	0	0	0	0	0	0	0	0	0
338 50097608	LARGE	36	11/01/95	4.64	0.24	27000	1124.662	5.607	1164.233	2.373	0	0	0	0	0	0	0	0	0	0
339 50097663	SURVEY	35	07/24/95	6	0.17	72000	4464.395	25.84	-937.841	-2.45	0	0	0	0	0	276.65	0.586	0	0	0
340 50097668	SMALL	36	12/07/95	51.04	0.8	404	3.495	0.556	-23.71	-1.877	0.72075	10.076	0	0	0	0	0	0	0	0
341 50097676	LARGE	34	12/15/95	3.22	0.18	8000	697.62	23.96	70.201	-1.518	0.57298	10.076	0	0	0	0	0	0	0	0
342 50097768	LARGE	37	09/28/95	22.56	0.71	38000	-19520.82	-2.276	692.972	0.88	26.771	7.067	0.214	2.411	0	0	0	0	0	0
343 50097769	LARGE	37	09/28/95	9.93	0.52	2000	-3595.047	-1.249	522.472	2.146	5.567	4.658	0.032	1.201	0	0	0	0	0	0
344 50097785	SMALL	22	09/28/95	8.82	0.42	151	-16.58	-1.079	125.797	3.245	0.45177	2.253	0	0	0	0	0	0	0	0
345 50097846	LARGE	32	07/11/95	4.81	0.33	148000	6527.846	25.592	-685.731	-1.296	2.50167	0.991	0	0	0	1933.87	3.554	0	0	0
346 50097903	LARGE	26	09/20/95	2.76	0.23	45000	-31729.846	-1.059	-756.077	-1.544	8.868	2.516	0	0	0	0	0	0	0	0
347 50098012	LARGE	36	07/19/95	79.34	0.84	3000	-68.661	-1.735	251.104	2.993	5.84658	12.569	0	0	0	0	0	0	0	0
348 50098026	LARGE	39	09/20/95	9.59	0.51	5000	-44.007	-1.671	-113.173	-0.875	2.883	5.165	0.003	0.073	0	0	0	0	0	0
349 50099368	SMALL	36	09/27/95	5.46	0.43	53	-44.007	-1.671	-113.173	-0.875	2.883	5.165	0.003	0.073	0	0	0	0	0	0
350 50099369	SMALL	36	09/27/95	6.33	0.46	55	-30.412	-0.491	0.471	0.117	0.052	4.169	0.001	0.888	0	0	0	0	0	0
351 50099725	SMALL	34	11/17/95	1.9	0.19	268	-173.838	-0.413	2.357	0.322	0.071	2.249	0.004	0.477	0	0	0	0	0	0
352 50099728	LARGE	34	06/01/95	14.39	0.61	1000	-3766.818	-3.234	91.556	5.865	0.415	5.012	0.068	3.291	0	0	0	0	0	0
353 50099732	LARGE	35	11/17/95	0.06	0	21000	536.926	7.636	68.403	0.236	0	0	0	0	0	0	0	0	0	0
354 50099734	LARGE	35	11/17/95	12.07	0.45	2000	119.399	8.777	115.695	4.913	0.03195	0.327	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat
355 50099736	SMALL	35	11/17/95	11.22	0.44	779	10.778	1.22	-35.189	-1.479	0.39878	4.568	0	0	0	0	0	0
356 50109973	LARGE	37	07/13/95	2.64	0.19	2000	28.053	0.419	-76.364	-0.873	0.90755	2.043	0	0	0	0	0	0
357 50112221	LARGE	39	05/01/95	3.56	0.1	8000	139.108	1.877	400.734	1.887	0	0	0	0	0	0	0	0
358 50112223	SMALL	37	05/01/95	11.05	0.58	54	-62.083	-0.823	-0.046	-0.007	0.126	5.328	0.001	1.373	0	0	0	0
359 50112235	LARGE	34	04/19/95	8.07	0.34	48000	6227.748	9.892	-3409.529	-3.984	-9.16438	-1.655	0	0	0	0	0	0
360 50114219	LARGE	35	12/22/95	2.81	0.16	6000	457.81	9.838	156.36	2.368	0.10385	0.256	0	0	0	0	0	0
361 50115285	LARGE	34	05/11/95	6.95	0.32	34000	1203.621	7.826	-1604.499	-3.515	1.23614	0.587	0	0	0	0	0	0
362 50116537	LARGE	34	05/22/95	19.66	0.57	93000	7526.229	18.292	1826.46	5.089	12.91391	5.056	0	0	0	0	0	0
363 50120983	SMALL	35	05/22/95	1.99	0.23	19	48.895	0.526	-5.933	-2.405	-0.002	-0.131	0	0	0	0	0	0
364 50121061	LARGE	32	06/15/95	2.23	0.07	140000	12449.194	14.6	1814.696	1.494	0	0	0	0	0	0	0	0
365 50121160	LARGE	33	07/24/95	4.58	0.4	10000	355.499	0.432	-38.679	-0.623	-0.247	-0.623	0.052	251.381	3.635	0	0	0
366 50121183	SURVEY	34	05/22/95	1.3	0.08	136000	10533.499	15.92	-52.469	-0.06	-1.566	-1.566	0	0	0	0	0	0
367 50126875	SURVEY	20	10/19/95	3.54	0.2	209000	-16097.687	-0.659	-2738.31	-1.779	0	0	0.67868	1.118	0	0	0	0
368 50141624	SURVEY	32	10/18/95	3.02	0.09	46000	1263.47	9.494	-1085.84	-1.738	0	0	0	0	0	0	0	0
369 50145072	SURVEY	32	10/23/95	6.37	0.41	64000	3356.77	11.907	446.616	0.553	0.16006	0.068	0	0	0	0	0	0
370 50147079	SURVEY	35	08/30/95	5.62	0.38	154	-1911.841	-2.738	-9.846	-0.405	0.315	3.374	0.037	2.75	0	0	0	0
371 50148718	LARGE	34	08/30/95	2	0.18	30000	-29615.425	-1.746	249.284	0.889	2.517	1.999	0.665	1.845	0	0	0	0
372 50151884	LARGE	32	08/01/95	14.32	0.48	116000	2655.902	10.83	-232.94	-0.27	13.50635	5.314	0	0	0	0	0	0
373 50151885	LARGE	32	08/01/95	6.89	0.42	86000	-11310.326	-0.864	1790.432	2.673	4.168	1.081	1.126	0	0	0	0	0
374 50165026	LARGE	20	07/31/95	0.94	0.06	43000	1214.92	0.465	-249.576	-1.162	0	0	0.027	0.342	0	0	0	0
375 50190336	LARGE	30	02/07/95	5.25	0.36	132000	-45627.206	-2.02	1665.754	2.572	-2.793	-1.039	1.922	2.326	0	0	0	0
376 50190468	SURVEY	36	05/30/95	3.65	0.28	54000	-3240.682	-0.885	-11.259	-0.011	6.66786	3.133	0.21162	0.534	0	0	0	0
377 50190490	LARGE	28	07/21/95	0.13	0	8000	467.891	19.878	17.943	0.364	0	0	0	0	0	0	0	0
378 50190495	LARGE	34	07/24/95	11	0.54	4000	-630.763	-0.293	-37.612	-1.135	0.765	4.938	0.018	0.417	0	0	0	0
379 50190496	LARGE	30	07/21/95	40.18	0.81	2000	-114.955	-0.168	-30.285	-1.373	0.885	10.364	0.005	0.183	0	0	0	0
380 50190503	SMALL	36	07/21/95	132.04	0.9	964	10.901	1.086	8.418	0.98	0.63792	16.079	0	0	0	0	0	0
381 50190505	SURVEY	27	07/21/95	0.56	0.06	11000	-477.398	-0.268	3.958	0.037	0.24012	0.906	0.02823	0.586	0	0	0	0
382 50190519	LARGE	35	06/29/95	86.4	0.85	3000	-97.18	-2.246	100.287	2.541	2.34637	13.07	0	0	0	0	0	0
383 50199444	SURVEY	36	12/15/95	0.38	0.03	23000	1415.003	24.126	-54.946	-0.488	-0.34502	-0.753	0	0	0	0	0	0
384 50199612	LARGE	34	12/13/95	0.07	0	38000	-422.235	-0.07	-22.158	-0.12	0	0	0.066	0.36	0	0	0	0
385 50207113	LARGE	27	09/05/95	52.21	0.78	2000	15.899	1.142	21.123	0.82	1.11804	10.164	0	0	0	0	0	0
386 50217041	SMALL	37	10/05/95	4.55	0.39	25	-2.552	-0.14	-2.082	-1.039	0.023	3.481	0	0	0	0	0	0
387 50218549	SURVEY	24	07/10/95	1.33	0.08	16000	160.681	0.449	153.086	0.558	0	0	0.00439	1.546	0	0	0	0
388 50218936	SMALL	22	10/04/95	6.07	0.36	38	-0.532	-0.46	-2.225	-1.17	0.02735	3.452	0	0	0	0	0	0
389 50220184	SMALL	34	04/19/95	55.04	0.8	246	9.389	6.23	3.011	1.814	0.1209	10.458	0	0	0	0	0	0
390 50221945	LARGE	20	12/08/95	0.77	0.05	123000	8711.586	24.596	670.973	1.234	-0.14487	-0.063	0	0	0	0	0	0
391 50222513	SMALL	28	10/04/95	2.02	0.22	49	-8.553	-0.056	0.012	0.002	0.046	2.351	0	0	0	0	0	0
392 50230042	SMALL	35	10/04/95	13.53	0.54	123	-3.602	-1.287	1.698	0.251	0.13474	5.136	0	0	0	0	0	0
393 50231056	SMALL	24	10/04/95	1.44	0.13	26	-0.15	-0.231	-1.345	-0.643	0.01182	1.662	0	0	0	0	0	0
394 50235885	SURVEY	30	05/22/95	0.34	0.02	100000	591.793	0.181	-1113.281	-0.685	0	0	0.00469	0.64	0	0	0	0
395 50239850	LARGE	23	02/27/95	8.49	0.44	3000	271.246	6.342	-433.312	-4.082	-0.00997	-0.019	0	0	0	0	0	0
396 50252984	SURVEY	28	08/30/95	0.24	0.01	111000	6836.155	14.874	-542.277	-0.491	0	0	0	0	0	0	0	0
397 6001493	SMALL	20	08/11/95	6	0.3	128	5.199	7.676	-0.146	-0.107	0.02816	3.432	0	0	0	0	0	0
398 60014291	LARGE	23	10/27/95	0.7	0.05	2000	59.351	3.633	48.933	0.598	-1.03	-1.03	0	0	0	0	0	0
399 60043776	SMALL	23	03/15/95	33.64	0.78	575	20.251	0.24	3.104	0.18	0.428	9.85	0	0	0	0	0	0
400 60047728	SMALL	28	08/19/95	6.62	0.32	152	6.324	5.855	-7.214	-2.584	0.0349	2.357	0	0	0	0	0	0
401 60070947	LARGE	34	08/15/95	4.25	0.31	9000	-9160.027	-1.968	-215.538	-2.81	0.325	0.918	0.206	2.126	0	0	0	0
402 60073622	SMALL	38	02/20/95	6.19	0.33	331	2.091	1.069	13.6	0.227	0.18459	3.42	0	0	0	0	0	0
403 60077194	LARGE	39	02/10/95	14.76	0.61	120000	-21919.666	-2.373	884.065	1.426	8.624	4.138	1.137	3.328	0	0	0	0
404 60077360	LARGE	34	11/16/95	2.11	0.18	23000	267.972	0.087	-33.189	-0.166	-1.391	-2.378	0.02	0.13	0	0	0	0
405 60077376	SMALL	28	02/03/95	0.6	0.05	831	21.983	3.379	-19.191	-0.975	0.01751	0.368	0	0	0	0	0	0
406 60077378	LARGE	34	02/02/95	61.21	0.87	1000	-362.196	-0.248	-35.811	-1.928	1.067	11.746	0.007	0.282	0	0	0	0
407 60077382	SMALL	28	02/02/95	12.18	0.6	185	-562.11	-0.472	4.559	0.742	5.929	0.026	2.455	0	0	0	0	0
408 60077384	SMALL	28	02/03/95	15.49	0.67	83	-77.469	-0.474	-11.036	-2.625	0.104	5.818	0.004	0.559	0	0	0	0
409 60077386	SMALL	28	02/07/95	21.74	0.61	871	31.77	2.251	-33.25	-2.052	0.41647	5.921	0	0	0	0	0	0
410 60077388	LARGE	28	02/07/95	11.8	0.44	2000	40.096	2.384	-12.887	-0.329	0.58846	4.717	0	0	0	0	0	0
411 60077396	SMALL	28	08/30/95	1.98	0.17	175	-1161.433	-1.178	-39.461	-1.307	0.217	2.179	0.061	1.196	0	0	0	0
412 60077397	LARGE	28	08/30/95	11.41	0.57	1000	-160.723	-0.091	55.505	0.754	5.694	0.011	0.096	0	0	0	0	0
413 60077494	LARGE	20	08/17/95	2.67	0.22	370000	16361.614	1.709	-1164.507	-2.232	-0.285	-0.137	0.131	0.591	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEEMP	EEEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
414 60078019	LARGE	20	07/12/95	18.43	0.37	56000	4399.445	27.576	-1121.535	-4.293	0	0	0	0	0	0	0	0	0
415 60078587	SMALL	49	07/18/95	21.13	0.59	540	10.474	2.009	10.607	0.851	0.26927	6.499	0	0	0	0	0	0	0
416 60082318	SMALL	49	07/14/95	4.12	0.32	1	37.151	2.11	0.256	0.57	0.002	1.298	0	0	0	0	0	0	0
417 60097309	LARGE	34	05/02/95	0.24	0.01	19000	1239.982	14.88	-21.027	-0.178	0.02108	0.04	0	0	0	0	0	0	0
418 60114844	LARGE	33	05/22/95	0.24	0.01	58000	2842.76	11.704	298.64	0.49	0	0	0	0	0	0	0	0	0
419 60114851	LARGE	34	05/22/95	3.64	0.2	35000	-5154.677	-0.471	420.981	2.619	0	0.144	0.715	0	0	0	0	0	0
420 60115006	LARGE	34	05/17/95	11.64	0.55	255000	-54546.612	-1.228	3342.238	5.615	16.285	3.536	1.639	0	0	0	0	0	0
421 60117975	SURVEY	30	05/22/95	2.32	0.14	185000	-33966.62	-1.77	592.726	0.541	0	2.54207	2.141	0	0	0	0	0	0
422 60118287	LARGE	25	05/26/95	7.7	0.45	136000	-57776.735	-2.213	4473.822	3.036	0	0	3.539	2.392	-1073.2	-0.517	0	0	0
423 60136862	SMALL	49	09/07/95	2.78	0.23	358	-365.739	-1.916	8.348	2.055	0.021	2.112	0.003	2.452	0	0	0	0	0
424 60136864	SMALL	49	09/07/95	12.64	0.62	214	-45.302	-0.399	-7.866	-1.742	0.065	5.505	0.001	0.646	0	0	0	0	0
425 60139170	LARGE	20	09/01/95	1.28	0.08	66000	3163.697	0.769	-427.53	-1.481	0	0	0.009	0.081	0	0	0	0	0
426 60142591	LARGE	34	10/09/95	6.41	0.31	96000	-72509.97	-3.203	-876.602	-1.372	0.46449	10.055	0	0	0	0	0	0	0
427 60142817	LARGE	30	11/27/95	7.3	0.33	91000	5366.069	27.184	1633.369	3.821	-0.4403	-0.279	0	0	0	0	0	0	0
428 60142821	SMALL	39	05/19/95	9.18	0.5	481	-43.069	-0.312	-8.859	-1.086	0.114	4.584	0.003	0.68	0	0	0	0	0
429 60142828	LARGE	34	08/03/95	54.85	0.79	1000	38.155	6.979	-18.499	-1.482	0.46449	10.055	0	0	0	0	0	0	0
430 60142832	LARGE	23	10/12/95	0.44	0.02	2000	159.149	6.217	-45.309	-0.661	0	0	0	0	0	0	0	0	0
431 60142834	SMALL	36	06/30/95	30.99	0.69	437	1.681	0.168	1.15	0.112	0.35556	7.677	0	0	0	0	0	0	0
432 60142835	SMALL	35	09/30/95	7.93	0.36	118	5.849	5.941	-4.399	-2.166	0.02513	3.248	0	0	0	0	0	0	0
433 60142938	SMALL	27	09/12/95	9.53	0.52	117	-9.217	-0.056	2.257	0.41	0.064	5.328	0	0	0	0	0	0	0
434 60142941	SMALL	35	09/12/95	1.87	0.25	1	6.329	1.744	-0.134	-0.001	0.001	2.719	0	0	0	0	0	0	0
435 60150462	LARGE	22	10/12/95	0.01	0	131000	7157.263	39.728	46.386	0.103	0	0	0	0	0	0	0	0	0
436 60156843	LARGE	35	08/10/95	3.9	0.29	5000	-109.315	-0.101	92.104	3.348	0.001	0.008	0.006	0.395	0	0	0	0	0
437 60157173	LARGE	38	07/25/95	24.08	0.73	3000	-1317.855	-1.264	53.451	0.52	2.445	8.298	0.019	1.278	0	0	0	0	0
438 60162489	LARGE	37	07/19/95	122.52	0.91	1000	-0.318	-0.035	7.117	0.463	0.60694	15.651	0	0	0	0	0	0	0
439 60176091	SMALL	27	03/24/95	4.14	0.26	152	8.343	1.963	-6.367	-1.136	0.06041	2.457	0	0	0	0	0	0	0
440 60176092	SMALL	30	03/24/95	22.16	0.61	933	-5.872	-0.242	1.159	0.032	1.00255	6.511	0	0	0	0	0	0	0
441 60176096	SMALL	24	03/24/95	2.5	0.19	102	3.366	0.551	5.854	0.939	0.06318	2.18	0	0	0	0	0	0	0
442 60176099	SMALL	23	09/22/95	6.99	0.36	730	-7.538	-0.275	-47.996	-0.832	0.82026	3.642	0	0	0	0	0	0	0
443 60176100	SMALL	27	03/24/95	31.78	0.69	925	23.76	2.148	-12.436	-0.822	0.49775	7.633	0	0	0	0	0	0	0
444 60197047	LARGE	20	09/13/95	3.84	0.11	4000	209.608	56.636	15.58	1.96	0	0	0	0	0	0	0	0	0
445 60197049	SMALL	34	09/18/95	4.3	0.32	869	-446.552	-0.899	20.523	3.324	0.027	0.853	0.009	1.079	0	0	0	0	0
446 60198005	LARGE	36	08/03/95	0.05	0	5000	213.367	0.387	-2.65	-0.118	0	0	0.002	0.289	0	0	0	0	0
447 60200662	SURVEY	39	08/09/95	24.52	0.72	2000	-193.717	-0.449	1.899	0.051	1.07926	8.328	0.01049	0.479	0	0	0	0	0
448 60226842	SURVEY	35	12/04/95	0	0	200000	7493.779	15.257	73.09	0.044	0	0	0	0	0	0	0	0	0
449 60229852	SMALL	35	09/18/95	62.01	0.87	350	-2.492	-0.549	-7.261	-1.403	0.24872	11	0	0	0	0	0	0	0
450 60242735	SMALL	23	02/07/95	3.09	0.25	77	-15.446	-1.186	-4.693	-1.727	0.009	2.065	0	0	0	0	0	0	0
451 60245635	LARGE	32	09/14/95	0.42	0.03	4000	-909.38	-0.393	119.333	0.891	0	0	0.082	0.463	0	0	0	0	0
452 60246844	LARGE	36	08/10/95	6.08	0.3	865000	-45758.089	-2.863	-4865.825	-2.967	0	0	1.93	3.01	0	0	0	0	0
453 60249015	SMALL	39	09/14/95	7.15	0.43	25	-2.314	-0.941	10.823	2.484	0.06829	2.612	0	0	0	0	0	0	0
454 70043352	LARGE	32	09/06/95	0	0	8000	0	0	0	0	0	0	0	0	0	0	0	0	0
455 70047657	LARGE	30	11/02/95	9.51	0.39	11000	762.733	21.655	-221.957	-4.054	0.3011	1.257	0	0	0	0	0	0	0
456 70047669	LARGE	38	09/12/95	9.48	0.5	22000	-1098.711	-0.56	-337.872	-1.082	4.192	4.718	0.045	0.81	0	0	0	0	0
457 70049053	LARGE	34	09/19/95	0	0	115000	0	0	0	0	0	0	0	0	0	0	0	0	0
458 70071322	SMALL	22	10/03/95	23.49	0.76	204	-38.649	-0.426	0.939	0.145	0.276	8.189	0.005	0.386	0	0	0	0	0
459 70077143	LARGE	39	08/28/95	5.49	0.31	3000	81.898	0.92	-372.37	-1.563	2.47668	3.113	0	0	0	0	0	0	0
460 70081888	SMALL	30	06/01/95	0.08	0.01	334	-10.971	-0.028	-4.05	-0.424	-0.009	-0.205	0.001	0.082	0	0	0	0	0
461 70081695	LARGE	25	06/01/95	16.58	0.64	4000	-25.906	-0.026	-111.955	-1.261	1.81	6.469	0.006	0.072	0	0	0	0	0
462 70085934	LARGE	20	06/21/95	1.44	0.09	14000	1051.436	10.084	-167.624	-1.327	-0.77018	-1.39	0	0	0	0	0	0	0
463 70088065	LARGE	36	08/25/95	52.41	0.85	3000	50.483	0.108	125.588	5.156	0.834	11.205	0	0	0	0	0	0	0
464 70098030	SMALL	35	09/14/95	1.19	0.14	108	-75.527	-0.597	0.005	0.002	0.035	1.795	0.001	0.706	0	0	0	0	0
465 70098054	SMALL	27	09/25/95	4.66	0.4	10	-311.877	-3.01	6.604	1.323	0.036	2.069	0.007	3.161	0	0	0	0	0
466 70098055	SMALL	27	09/25/95	0.15	0.01	65	7.866	4.352	0.222	0.108	-0.00721	-0.539	0	0	0	0	0	0	0
467 70098063	SMALL	27	09/26/95	0.17	0.01	70	8.351	4.605	0.447	0.221	-0.00745	-0.565	0	0	0	0	0	0	0
468 70098111	SMALL	35	09/11/95	19.62	0.62	190	-2.772	-0.572	19.184	1.735	0.43482	5.946	0	0	0	0	0	0	0
469 70098113	SMALL	38	09/11/95	12.56	0.49	846	14.113	0.942	-24.114	-1.181	0.67716	4.743	0	0	0	0	0	0	0
470 70098118	SMALL	38	09/11/95	27.04	0.67	395	-1.896	-0.368	6.455	0.532	0.4938	7.344	0	0	0	0	0	0	0
471 70098130	LARGE	35	09/12/95	52.91	0.85	1000	-206.34	-0.52	-5.828	-0.424	1.007	12.473	0.004	0.529	0	0	0	0	0
472 70098132	SMALL	27	09/12/95	0.65	0.09	1	-3.054	-0.251	0.061	0.094	0.003	1.363	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Group	Premise ID	SIC	Audit Date	F-Statistic	R-Squared	1995 Thems	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
SMALL	473 70098142	36	09/13/95	4.65	0.33	325	-109.169	-1.625	6.998	1.294	0.041	1.937	0.003	1.528	0	0	0	0	0	0
SMALL	474 70098145	35	09/13/95	3.1	0.35	32	18.187	2.015	-0.373	-0.459	0.003	2.405	0	0	0	0	0	0	0	0
SURVEY	475 70100550	37	10/25/95	0.15	0.01	50000	4309.706	10.702	103.35	0.203	1.16289	0.514	0	0	0	0	0	0	0	0
SMALL	476 70102722	28	10/03/95	18.58	0.7	78	-1127.507	-6.738	42.053	2.575	-0.181	-2.139	0.012	6.997	0	0	0	0	0	0
SURVEY	477 70108481	22	11/14/95	5.12	0.35	92000	-1436.165	-0.244	-1421.564	-3.48	2.47448	1.568	0.8173	0.962	0	-0.218	0	0	0	0
SMALL	478 70111873	36	11/28/95	15.09	0.72	706	-168.98	-0.251	24.007	0.811	0.575	7.129	0.004	0.267	-8.75	0	0	0	0	0
LARGE	479 70115750	35	12/06/95	76.56	0.86	25000	-22.84	-0.09	1520.738	2.507	32.28253	10.691	0	0	0	0	0	0	0	0
SURVEY	480 70125585	37	11/28/95	4.95	0.14	5000	401.928	22.668	-72.975	-2.226	0	0	0	0	0	0	0	0	0	0
LARGE	481 70125586	37	11/22/95	41.89	0.74	102000	6137.589	29.736	-3604.085	-9.14	0.80032	0.517	0	0	0	0	0	0	0	0
SURVEY	482 70126064	28	07/27/95	13.01	0.47	2000	27.683	0.766	-126.441	-1.138	1.64056	4.818	0	0	0	0	0	0	0	0
LARGE	483 70132805	37	10/09/95	30.92	0.77	82000	-21787.738	-1.686	771.49	0.51	40.045	9.009	0.323	1.812	0	0	0	0	0	0
SURVEY	484 70134371	49	08/08/95	6.83	0.42	12000	-6474.691	-1.899	399.105	1.863	2.47374	4.21	0.12284	1.969	0	0	0	0	0	0
SMALL	485 70135170	28	08/23/95	18.39	0.62	419	-2.456	-0.436	-19.074	-1.118	0.32979	6.027	0	0	0	0	0	0	0	0
LARGE	486 70137654	33	09/24/95	9.75	0.51	14000	-5594.41	-0.715	176.203	0.358	8.563	5.252	0.45	0.745	0	0	0	0	0	0
LARGE	487 70143008	33	11/30/95	4.26	0.22	19000	1298.874	27.751	-2.26	-0.03	0.91665	2.916	0	0	0	0	0	0	0	0
LARGE	488 70168185	37	09/27/95	23.03	0.7	99000	5902.311	5.152	-968.194	-0.484	39.22097	4.97	0	0	0	0	0	0	0	0
SMALL	489 70168315	35	01/23/95	34.42	0.82	193	-364.599	-1.569	-7.325	-1.163	0.239	9.759	0.005	1.522	0	0	0	0	0	0
LARGE	490 70170256	20	09/15/95	1.52	0.14	2000	38.33	0.44	-1.527	-0.227	0.049	2.026	0.002	0.781	0	0	0	0	0	0
SURVEY	491 70187529	35	07/24/95	115.06	0.91	3000	21.555	1.136	6.831	0.253	1.71228	14.94	0	0	0	0	0	0	0	0
LARGE	492 70187541	35	07/24/95	13.74	0.47	26000	1209.171	9.056	-588.549	-2.653	3.48832	4.101	0	0	0	0	0	0	0	0
SMALL	493 70187542	35	07/24/95	14.14	0.56	812	29.869	3.652	-37.332	-2.467	0.25955	4.909	0	0	0	0	0	0	0	0
LARGE	494 70188003	28	02/07/95	0	0	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LARGE	495 70188029	27	07/14/95	1.74	0.1	2000	58.067	0.822	111.786	1.126	0.73654	1.717	0	0	0	0	0	0	0	0
SMALL	496 70188045	27	01/25/95	16.39	0.62	4	-0.505	-1.559	0.223	0.87	0.00651	5.639	0	0	0	0	0	0	0	0
SMALL	497 70188051	34	01/25/95	7.86	0.4	802	35.646	2.206	-82.894	-2.35	0.33425	2.992	0	0	0	0	0	0	0	0
SMALL	498 70201232	32	09/12/95	5.59	0.37	427	-1198.167	-3.289	-8.094	-0.649	0.085	1.528	0.064	3.425	0	0	0	0	0	0
SURVEY	499 70201407	49	09/18/95	42.25	0.76	2000	-12.189	-0.749	57.677	1.423	1.39752	9.192	0	0	0	0	0	0	0	0
LARGE	500 70201637	20	09/13/95	3.07	0.17	17000	-2166.022	-1.307	90.416	1.741	0	0	0.054	2.385	0	0	0	0	0	0
SMALL	501 70201641	36	09/13/95	14.01	0.6	664	28.903	0.309	5.239	0.388	0.3	6.441	0	0	0	0	0	0	0	0
LARGE	502 70201806	32	09/26/95	0.68	0.04	6000	-2107.021	-0.478	-110.021	-0.734	0	0	0.133	0.615	0	0	0	0	0	0
LARGE	503 70202882	36	08/03/95	30.23	0.69	2000	53.316	3.329	-27.91	-1.134	0.80004	7.368	0	0	0	0	0	0	0	0
LARGE	504 70202930	27	08/03/95	54.38	0.78	2000	18.968	2.328	45.176	1.977	0.86671	10.427	0	0	0	0	0	0	0	0
SMALL	505 70206236	33	08/10/95	0.38	0.03	92	-5.433	-0.918	14.028	0.521	0.05856	0.706	0	0	0	0	0	0	0	0
SMALL	506 70207033	49	07/31/95	0.16	0.01	62	11.465	2.041	1.276	0.258	-0.01024	-0.428	0	0	0	0	0	0	0	0
SMALL	507 70216310	36	08/28/95	19.67	0.64	315	-12.253	-1.536	1.785	0.128	0.34386	6.269	0	0	0	0	0	0	0	0
SURVEY	508 70229090	36	08/28/95	7.5	0.35	111000	4091.339	13.505	141.681	0.176	16.14137	3.871	0	0	0	0	0	0	0	0
LARGE	509 70231434	20	10/10/95	1.31	0.12	85000	164.904	0.049	435.409	1.624	-0.733	-0.519	0.118	1.165	0	0	0	0	0	0
LARGE	510 70235078	33	05/26/95	6.21	0.43	2000	-1320.235	-1.088	26.605	0.244	1.553	3.823	0.144	1.074	0	0	0	0	0	0
SMALL	511 70236057	20	05/18/95	15.57	0.63	127	-0.057	-0.005	-1.408	-2.884	0.006	3.178	0	0	0	0	0	0	0	0
SMALL	512 70239516	25	09/15/95	6.83	0.36	57	0.579	0.199	-3.412	-0.711	0.06757	3.678	0	0	0	0	0	0	0	0
LARGE	513 70241353	38	05/26/95	10.16	0.58	1000	-31.104	-0.084	-36.205	-0.705	0.721	5.15	0.001	0.134	0	0	0	0	0	0
LARGE	514 70243772	25	10/14/95	3.96	0.3	69000	755.945	0.082	992.741	2.875	-1.625	-1.132	0.175	0.511	0	0	0	0	0	0
SMALL	515 70246209	20	08/16/95	30.48	0.69	948	52.833	18.82	29.674	7.786	0.0168	0.953	0	0	0	0	0	0	0	0
LARGE	516 70254445	20	05/25/95	0.62	0.04	14000	624.202	0.941	-2.738	-0.114	0	0	0.009	0.841	0	0	0	0	0	0
SURVEY	517 70256155	38	09/12/95	2.47	0.15	123000	7976.148	25.896	1004.647	2.179	1.46457	0.707	0	0.038	0	0	0	0	0	0
LARGE	518 80001296	20	08/24/95	0.2	0.02	143000	8917.641	0.46	194.135	0.151	0	0	0.015	0.038	0	0	0	0	0	0
SMALL	519 80001397	34	10/26/95	20.29	0.59	486	38.37	21.882	-6.157	-2.609	0.09369	5.845	0	0	0	0	0	0	0	0
LARGE	520 80001402	34	06/13/95	1.2	0.04	5000	336.394	26.704	-25.792	-1.097	0	0	0	0	0	0	0	0	0	0
LARGE	521 80001426	34	10/26/95	8.82	0.37	77000	5472.541	48.051	-234.347	-1.318	4.4071	3.897	0	0	0	0	0	0	0	0
SMALL	522 80001440	20	11/20/95	11.4	0.55	181	-87.729	-2.297	-3.878	-1.894	0.053	4.677	0.002	2.451	0	0	0	0	0	0
LARGE	523 80003014	20	01/30/95	8.8	0.38	22000	1113.275	0.622	-543.39	-3.608	0	0	0.003	0.056	0	0	0	0	0	0
LARGE	524 80003016	28	02/01/95	29.3	0.66	7000	1169.999	9.111	-1317.698	-7.179	0.88208	0.818	0	0	0	0	0	0	0	0
LARGE	525 80003075	34	01/12/95	19.66	0.57	2000	142.545	14.578	-8.098	-0.703	0.4354	6.007	0	0	0	0	0	0	0	0
LARGE	526 80003080	23	01/18/95	50.41	0.77	5000	36.368	0.409	-107.707	-0.808	7.30109	9.615	0	0	0	0	0	0	0	0
LARGE	527 80003113	20	01/17/95	1.48	0.14	54000	-5473.948	-1.058	540.569	1.61	-0.153	-0.108	0.208	1.613	0	0	0	0	0	0
LARGE	528 80003129	27	10/18/95	17.98	0.66	13000	-4069.105	-1.7	259.602	1.235	5.173	7.268	0.175	1.808	0	0	0	0	0	0
LARGE	529 80003235	23	01/15/95	1.81	0.11	3000	-486.496	-1.215	-63.857	-1.674	0	0	0.006	2.008	0	0	0	0	0	0
SURVEY	530 80007862	34	07/13/95	1.79	0.06	52000	2884.38	24.268	-335.221	-1.34	0	0	0	0	0	0	0	0	0	0
LARGE	531 80032845	34	09/05/95	78.12	0.86	41000	4333.222	17.821	-3739.446	-12.497	-1.29184	-0.965	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat
532 80032876	LARGE	27	09/20/95	1.58	0.1	63000	-48520.616	-1.634	2081.068	1.414	0	0	1.149	1.774	0	0	0	0
533 80048448	SURVEY	20	10/30/95	25.47	0.65	116000	11950.73	67.743	687.567	3.354	0	0	0	0	685.682	3.474	0	0
534 80051740	SURVEY	38	11/09/95	14.28	0.5	22000	1397.439	25.407	532.977	5.083	-1.10255	0	0	0	0	0	0	0
535 80051791	LARGE	30	09/05/95	1.59	0.1	295000	-108971.125	-1.559	1017.078	0.426	0	0	5.219	1.783	0	0	0	0
536 80051794	SMALL	33	08/03/95	0.18	0.03	545	889.403	1.304	-1710.39	-0.517	0.71893	0.133	0	0	0	0	0	0
537 80051872	LARGE	22	12/06/95	8.86	0.6	210000	-197885.732	-1.695	5279.177	1.554	0	0	23.654	1.832	0	0	0	0
538 80063156	SURVEY	20	12/19/95	4.75	0.34	127000	-988.445	-1.909	1466.617	3.725	-0.25454	-0.108	0.1949	1.202	0	0	0	0
539 80065872	LARGE	35	05/02/95	98.14	0.91	145000	-41175.58	-1.909	-2275.03	-4.978	28.471	13.17	0.572	2.454	0	0	0	0
540 8007880	LARGE	20	11/03/95	2.95	0.09	94000	5302.968	91.666	239.298	1.717	0	0	0	0	0	0	0	0
541 8007881	LARGE	20	10/09/95	1.88	0.06	21000	621.299	3.658	857.778	1.373	0	0	0	0	0	0	0	0
542 80124863	SURVEY	49	07/26/95	10.58	0.27	65000	3046.821	11.05	2155.186	3.252	0	0	0	0	0	0	0	0
543 80151224	LARGE	20	06/26/95	1.33	0.04	18000	969.825	26.524	90.67	1.153	0	0	0	0	0	0	0	0
544 80160176	LARGE	27	08/07/95	28.9	0.76	1000	19.155	0.021	-22.767	-0.512	1.02	8.938	0	0	0	0	0	0
545 80160186	LARGE	27	08/03/95	8.13	0.48	16000	-13663.454	-2.139	-266.876	-0.79	1.27	1.482	0.351	2.296	0	0	0	0
546 80160238	LARGE	37	08/07/95	24.93	0.82	6000	51.473	0.895	463.645	4.001	4.40572	6.362	0	0	0	0	0	0
547 80185609	LARGE	36	08/29/95	9.76	0.52	15000	-4280.869	-1.778	-290.793	-1.6	2.369	5.02	0.12	1.951	0	0	0	0
548 80189985	LARGE	23	12/20/95	20.37	0.69	42000	-7527.728	-4.685	-1725.414	-7.055	2.684	3.669	0.115	6.096	0	0	0	0
549 80196655	SURVEY	38	07/12/95	54.02	0.8	2000	-11.807	-0.723	26.148	1.039	1.18225	10.295	0	0	0	0	0	0
550 80196688	SMALL	47	09/12/95	37.3	0.73	538	0.781	0.177	12.193	1.253	0.34854	8.631	0	0	0	0	0	0
551 80201307	SMALL	49	05/03/95	6.02	0.34	80	-1.07	-0.636	1.451	0.462	0.04654	3.469	0	0	0	0	0	0
552 80213595	SMALL	34	05/16/95	0.01	0	261	14.994	4.298	0.411	0.059	-0.00343	-0.129	0	0	0	0	0	0
553 80217214	LARGE	33	05/02/95	1.61	0.1	54000	-5813.271	-0.79	146.431	0.502	0	0	0.546	1.436	0	0	0	0
554 80232599	SURVEY	35	12/20/95	27.77	0.66	2000	-9.73	-0.386	50.392	0.738	1.82677	7.434	0	0	0	0	0	0
555 80248087	LARGE	38	01/01/95	21.12	0.63	2000	73.195	5.519	-61.467	-2.834	0.54313	5.816	0	0	0	0	0	0
556 90007449	LARGE	23	12/12/95	8.27	0.47	53000	-1421.48	-0.443	385.999	1.112	-3.536	-2.197	0.053	2.058	0	0	0	0
557 90007477	LARGE	37	12/11/95	13.64	0.59	6000	-884.459	-1.461	-36.334	-0.592	1.537	5.065	0.013	1.973	0	0	0	0
558 90007480	LARGE	37	12/11/95	33.24	0.7	28000	-30151.536	-6.73	584.104	1.248	0	0	0.367	7.386	0	0	0	0
559 90007482	LARGE	22	06/14/95	2.19	0.07	208000	8472.751	11.784	-2890.405	-1.479	0	0	1.287	2.053	0	0	0	0
560 90007489	LARGE	34	07/31/95	2.48	0.15	101000	-27862.274	-1.783	-642.224	-0.874	0	0	0	0	0	0	0	0
561 90007685	LARGE	37	07/05/95	0.04	0	3000	202.27	0.502	7.492	0.244	-0.007	-0.052	0	0	0	0	0	0
562 90007689	LARGE	34	08/28/95	4.62	0.33	94000	-2392.446	-0.185	-1886.667	-1.607	-13.955	-3.037	0.329	0.418	0	0	0	0
563 90007691	LARGE	34	09/28/95	11.65	0.29	53000	3154.592	9.635	3024.622	3.414	0	0	0	0	0	0	0	0
564 90030152	LARGE	36	10/26/95	2.77	0.24	145000	-34720.106	-1.377	-173.705	-0.161	-6.874	-1.86	0.638	1.807	0	0	0	0
565 90038322	LARGE	36	06/30/95	3.12	0.24	146000	7474.787	18.083	-752.067	-0.854	2.93145	0.987	0	0	0	0	2440.46	2.73
566 90043520	SURVEY	20	10/02/95	4.39	0.13	148000	4674.277	14.748	-2474.983	-2.094	0	0	0	0	0	0	0	0
567 90045234	LARGE	34	09/07/95	0.21	0.01	49000	-3027.801	-0.32	26.513	0.122	0	0	0.151	0.623	0	0	0	0
568 90056539	LARGE	33	08/28/95	11.63	0.55	150000	-15255.008	-0.747	-2926.099	-3.084	0	0	1.702	1.43	-6651.5	-4.738	0	0
569 90057527	SURVEY	36	10/12/95	4.05	0.22	23000	1361.373	20.975	26.513	0.275	1.22369	2.844	0	0	0	0	0	0
570 90064092	SURVEY	33	12/19/95	0.22	0.01	76000	1300.725	0.225	297.676	0.403	0	0	0.15016	0.189	0	0	0	0
571 90064111	LARGE	30	12/19/95	4.65	0.24	81000	-30514.446	-2.155	321.945	1.272	0	0	0.814	2.807	0	0	0	0
572 90064333	LARGE	33	09/11/95	16.8	0.71	203000	11004.058	0.69	2138.406	1.411	-4.917	-1.142	0.066	0.059	0	3376.05	2.059	0
573 90064367	LARGE	33	10/24/95	1.14	0.04	36000	1401.363	7.402	-817.297	-1.066	0	0	0	0	0	0	0	0
574 90071139	LARGE	33	08/25/95	4.56	0.33	50000	-1874.339	-0.316	1142.968	2.449	-1.874	-1.244	0.38	0.698	0	0	0	0
575 90111776	SURVEY	20	05/22/95	0.57	0.02	196000	15048.162	53.005	-333.934	-0.754	9.026	1.084	1.952	1.284	-1830.5	-0.999	9204.67	4.8
576 90112017	LARGE	34	04/27/95	16.18	0.76	106000	-90275.866	-1.22	1392.488	0.528	2.513	1.028	0.956	3.027	0	0	0	0
577 90126935	LARGE	35	11/22/95	3.85	0.29	54000	-58524.664	-2.84	-927.372	-1.514	6.71774	15.514	0	0	0	0	0	0
578 90127467	LARGE	24	07/14/95	128.49	0.9	11000	51.773	0.548	-89.686	-0.688	2.69921	13.101	0	0	0	0	0	0
579 90127468	LARGE	24	07/14/95	87.34	0.87	5000	94.124	-12.941	-32.033	-1.006	0.462	6.718	0.006	0.451	0	0	0	0
580 90127471	SMALL	27	08/25/95	15.2	0.65	364	-353.424	-0.271	32.033	0.467	1.55193	6.672	0	0	0	0	0	0
581 90127472	LARGE	24	07/14/95	22.26	0.63	3000	20.424	0.608	81.027	1.4	1.55193	6.672	0	0	0	0	0	0
582 90127473	LARGE	32	11/27/95	17.13	0.53	4000	61.897	4.768	-104.683	-1.866	0.91088	5.824	0	0	0	0	0	0
583 90135334	LARGE	30	10/16/95	4.3	0.32	182000	-27786.305	-1.465	-1093.65	-1.254	-0.92379	-0.282	0.8194	2.244	0	0	0	0
584 90146597	SURVEY	28	07/19/95	1.41	0.09	5000	211.509	7.621	95.182	1.435	0.25666	1.102	0	0	0	0	0	0
585 90155907	LARGE	34	07/19/95	75.51	0.89	4000	-811.914	-0.253	25.134	0.401	3.782	13.739	0.02	0.26	0	0	0	0
586 90155959	LARGE	39	07/17/95	2.66	0.15	102000	-477.964	-0.062	1040.036	1.181	0	0	0.375	0.697	0	0	0	0
587 90156048	LARGE	29	07/17/95	1.17	0.07	53000	4332.146	19.185	-241.442	-0.922	-1.70662	-1.425	0	0	0	0	0	0
588 90156081	LARGE	29	07/27/95	18.53	0.57	66	2.253	7.889	1.559	2.541	0.01365	5.925	0	0	0	0	0	0
589 90156083	SMALL	29	07/27/95	1.78	0.11	4000	-149.699	-0.513	39.312	0.369	0	0	0.079	1.271	0	0	0	0
590 90156086	LARGE	29	07/27/95	1.78	0.11	4000	-149.699	-0.513	39.312	0.369	0	0	0.079	1.271	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Thems	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat
591 90163445	SMALL	36	01/24/95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
592 90163446	LARGE	36	01/23/95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
593 90163494	LARGE	32	07/11/95	28.73	0.66	3000	30.436	0.841	-103.684	-0.999	2.56076	7.288	0	0	0	0	0	0
594 90163500	LARGE	34	07/18/95	2.64	0.22	48000	-8149.564	-0.863	-247.689	-0.356	5.549	2.719	0.508	1.017	0	0	0	0
595 90163941	LARGE	32	07/18/95	0.5	0.02	12000	512.997	5.183	-252.383	-0.705	0	0	0	0	0	0	0	0
596 90163942	LARGE	32	07/18/95	1.46	0.09	136000	5582.476	0.274	-1765.858	-1.574	0	0	0.12	0.079	0	0	0	0
597 90163966	LARGE	32	10/30/95	0.04	0	175000	2418.055	0.159	1631.517	0.285	0	0	0.333	0.078	0	0	0	0
598 90179403	LARGE	37	07/11/95	8.09	0.46	20000	941.849	0.289	-407.897	-1.715	2.099	3.067	0.006	0.227	0	0	0	0
599 90180459	SMALL	35	04/28/95	0.13	0.01	90	8.952	0.36	0.056	0.132	0.001	0.505	0	0	0	0	0	0
600 90207289	SMALL	35	12/27/95	19.1	0.72	251	-135.546	-0.341	-16.601	-0.738	0.258	7.146	0.002	0.295	0	0	0	0
601 90207290	SURVEY	35	12/27/95	14.93	0.62	2000	-1305.978	-1.077	-77.569	-1.457	0.76709	6.493	0.03146	1.121	0	0	0	0
602 90210014	SMALL	27	07/19/95	11.61	0.64	568	-671.679	-0.562	52.851	1.026	0.815	5.807	0.014	0.538	0	0	0	0
603 90212024	LARGE	35	11/22/95	0	0	9000	0	0	0	0	0	0	0	0	0	0	0	0
604 100004861	LARGE	20	08/03/95	62.51	0.87	197000	13166.868	28.03	-1291.51	-2.008	0.29176	0.071	0	0	-13376	-13.002	0	0
605 100006609	LARGE	28	10/27/95	0.92	0.05	73000	3361.262	5.541	2066.364	0.959	0	0	0	0	0	0	0	0
606 100006661	LARGE	34	10/10/95	0.57	0.06	57000	-4427.528	-0.816	201.951	0.54	0.287	0.183	0.313	1.153	0	0	0	0
607 10006703	LARGE	33	06/26/95	0.95	0.06	177000	1027.295	0.095	488.156	0.721	0	0	0.732	0.88	0	0	0	0
608 10006718	LARGE	26	10/17/95	0.03	0	12000	415.945	10.341	-21.842	-0.161	0	0	0	0	0	0	0	0
609 100027852	SMALL	25	10/11/95	1.64	0.15	263	-10.088	-0.341	11.746	2.104	-0.007	-0.345	0.002	0.504	0	0	0	0
610 100054930	SURVEY	35	09/14/95	8.08	0.35	74000	6676.159	17.557	1570.759	3.801	-2.15028	-0.778	0	0	0	0	0	0
611 100054939	SURVEY	33	07/20/95	4.01	0.22	187000	13610.261	28.626	3737.271	2.526	0	0	0	0	0	0	-2327.2	-1.556
612 100054955	SURVEY	30	08/15/95	1.01	0.06	127000	7809.74	14.444	1143.049	1.394	-0.13115	-0.025	0	0	0	0	0	0
613 100054961	SURVEY	32	07/18/95	25.08	0.45	4000	315.784	11.037	218.811	5.008	0	0	1.444	1.142	0	0	0	0
614 100067305	LARGE	33	10/24/95	5.19	0.36	185000	707.5	0.078	-2154.182	0.758	0	0	0.131	0.403	0	0	0	0
615 100067654	LARGE	20	12/19/95	2.78	0.16	122000	122000	0.519	787.129	2.189	0	0	0	0	0	0	0	0
616 100074004	LARGE	33	08/29/95	8.86	0.49	45000	674.986	0.249	1723.865	4.393	-1.6	-1.521	0.06	0.149	0	0	0	0
617 100074058	LARGE	33	08/29/95	0.79	0.08	99000	3659.33	0.221	62.571	0.085	-3.943	-1.44	0.251	0.27	0	0	0	0
618 100076698	SURVEY	34	08/24/95	1.55	0.1	6000	-3731.39	-1.052	106.742	1.267	0	0	0.10654	1.145	0	0	0	0
619 100079308	LARGE	25	07/28/95	20.13	0.57	1000	-37.452	-1	39.681	0.708	1.584	6.312	0	0	0	0	0	0
620 100079454	SMALL	25	05/23/95	11.63	0.45	148	3.506	2.764	-1.172	-0.472	0.0485	4.577	0	0	0	0	0	0
621 100079455	LARGE	25	05/23/95	26.57	0.74	6000	-2404.703	-1.392	-154.234	-1.264	3.477	8.069	0.171	1.406	0	0	0	0
622 100099244	LARGE	25	10/09/95	1.83	0.11	64000	-7029.691	-1.016	344.442	0.898	0	0	0.544	1.471	0	0	0	0
623 100112494	LARGE	36	05/22/95	1.11	0.03	60000	1603.517	5.373	-1341.988	-1.053	0	0	0	0	0	0	0	0
624 100121130	LARGE	32	09/12/95	177.58	0.92	3000	131.35	9.664	1.823	0.105	1.42713	18.645	0	0	0	0	0	0
625 100135184	SMALL	30	07/12/95	0.64	0.04	356	37.247	21.004	-1.039	-0.624	-0.00851	-1.063	0	0	0	0	0	0
626 100135356	LARGE	35	08/07/95	10.97	0.43	56000	-7180.439	-0.855	-914.954	-4.349	0	0	0.163	1.398	0	0	0	0
627 100135388	LARGE	25	09/01/95	12.08	0.45	11000	362.107	4.249	-193.417	-0.847	3.76432	4.783	0	0	0	0	0	0
628 100141883	SMALL	34	11/01/95	33.93	0.74	684	-6.84	-0.744	-36.656	-1.301	0.74342	8.233	0	0	0	0	0	0
629 100149812	LARGE	39	07/21/95	24.74	0.62	3000	106.617	2.373	-125.22	-2.007	0.74342	8.233	0	0	0	0	0	0
630 100149813	LARGE	30	07/21/95	9.65	0.39	25000	1261.038	6.539	-46.869	-0.136	5.52038	4.264	0	0	0	0	0	0
631 100149998	LARGE	25	10/17/95	29.17	0.66	30000	-160.269	-0.337	987.812	1.01	28.35684	7.631	0	0	0	0	0	0
632 100162161	LARGE	26	07/12/95	0.1	0.01	11000	588.266	9.278	-56.233	-0.434	-0.08496	-0.17	0	0	0	0	0	0
633 100162162	LARGE	28	12/05/95	3.16	0.17	187000	10039.698	24.037	2328.881	2.503	-1.25102	-0.349	0	0	0	0	0	0
634 100188982	LARGE	38	06/28/95	4.34	0.32	21000	-2845.467	-0.841	151.828	0.593	2.31	2.959	0.047	1.346	0	0	0	0
635 100194850	SMALL	25	09/25/95	12.33	0.54	99	-0.839	-0.37	0.07431	-1.037	0.07431	4.955	0	0	0	0	0	0
636 100196818	SURVEY	27	09/06/95	18.99	0.58	1000	-15.675	-0.876	11.127	0.313	0.92063	6.146	0	0	0	0	0	0
637 100209506	LARGE	22	07/13/95	4.59	0.32	123000	-161.094	-0.007	-190.614	-0.096	0	0	0.831	0.208	-8361.3	-3.474	0	0
638 100209598	SURVEY	36	08/03/95	8.57	0.48	24000	-2770.005	-0.529	-484.216	-0.769	6.83999	4.912	0.14916	0.581	0	0	0	0
639 100210530	LARGE	39	11/01/95	63.25	0.88	4000	-587.712	-0.997	111.615	2.242	2.271	13.119	0.029	1.085	0	0	0	0
640 100212210	LARGE	34	10/12/95	1.3	0.08	95000	547.986	0.046	897.266	1.563	0	0	0.108	0.217	0	0	0	0
641 100225104	SMALL	35	11/01/95	23.25	0.74	548	-788.942	-1.21	0.823	0.045	0.567	8.165	0.009	1.162	0	0	0	0
642 100228302	LARGE	33	11/01/95	1.35	0.09	47000	286.41	0.041	-710.107	-1.423	0	0	0.215	0.373	0	0	0	0
643 100228531	LARGE	30	10/19/95	23.78	0.43	53000	4245.935	51.725	-754.476	-4.877	-0.82147	-1.803	0	0	0	0	0	0
644 100234098	SURVEY	35	12/12/95	12.52	0.47	31000	2753.536	35.948	-490.268	-4.768	0	0	0	0	0	0	0	0
645 100235514	SURVEY	20	06/09/95	0.44	0.03	323000	12984.488	5.043	1065.274	0.781	0	0	0.00083	0.622	0	0	0	0
646 100237325	LARGE	22	07/14/95	5.7	0.38	120000	-57697.364	-1.182	-8927.432	-3.856	0	0	6.006	1.342	7548.37	3.145	0	0
647 100238730	LARGE	20	10/19/95	1.22	0.04	71000	4874.171	28.881	348.458	1.103	0	0	0	0	0	0	0	0
648 100239520	LARGE	33	11/01/95	136.88	0.94	2000	-264.923	-1.109	7.51	0.181	2.196	19.852	7.51592	0.98	0	0	0	0
649 110002111	LARGE	20	10/11/95	9.64	0.4	35000	-3040.051	-1.434	763.373	4.317	0	0	0.14	2.204	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Thems	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	
650 110002748	LARGE	35	01/20/95	14.82	0.61	2000	-834.456	-0.335	47.714	0.763	2.477	6.551	0.01	0.302	0	0	0	0	0	0
651 110003609	LARGE	22	01/11/95	0	0	1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
652 110004754	LARGE	33	11/16/95	0.19	0.01	69000	1224.115	3.479	748.573	0.43	0	0	0	0	0	0	0	0	0	0
653 110004768	LARGE	33	08/03/95	0.37	0.02	149000	2991.67	0.179	-963.139	-0.858	0	0	0.447	0.33	0	0	0	0	0	0
654 110004792	SURVEY	36	06/27/95	0	0	155000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
655 110004793	LARGE	36	03/02/95	12.43	0.73	61000	-6063.403	-0.233	-4709.459	-3.84	4.776	1.111	0.222	0.63	0	0	0	0	0	0
656 110004802	LARGE	26	11/16/95	10.93	0.42	4000	78.809	1.97	-196.901	-1.718	2.58634	4.407	0	0	0	0	0	0	0	0
657 110004822	SURVEY	35	08/15/95	14.16	0.5	127000	7768.335	40.812	-884.702	-2.753	8.98326	4.252	0	0	0	0	0	0	0	0
658 110004823	LARGE	28	10/11/95	8.91	0.49	138000	-15193.898	-0.477	2351.451	1.53	0	0	1.418	0.655	0	0	0	0	4605.06	2.832
659 110004903	SURVEY	32	10/17/95	3.85	0.21	42000	-6306.98	-0.746	-1690.2	-2.296	0	0	0.85451	0.989	0	0	0	0	0	0
660 110004912	LARGE	33	11/16/95	0.88	0.09	7000	-424.77	-0.815	-70.421	-1.126	-0.171	-0.719	0.089	1.359	0	0	0	0	0	0
661 110004966	SURVEY	20	10/18/95	0	0	69000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
662 110006366	LARGE	20	08/07/95	0.01	0	1000	86.793	5.774	3.014	0.097	0	0	0	0	0	0	0	0	0	0
663 110006371	LARGE	20	06/20/95	1.72	0.05	32000	2533.892	8.211	-650.221	-1.311	0	0	0	0	0	0	0	0	0	0
664 110006403	LARGE	22	12/08/95	4.88	0.25	22000	-268.432	-0.143	274.143	2.985	0	0	0.177	0.876	0	0	0	0	0	0
665 110043420	LARGE	36	08/21/95	27.73	0.65	1000	10.78	0.538	-6.334	-0.193	1.0159	7.215	0	0	0	0	0	0	0	0
666 110043422	LARGE	35	02/02/95	48.27	0.78	2000	-16.245	-0.8	49.292	1.216	1.47422	9.802	0	0	0	0	0	0	0	0
667 110043480	LARGE	35	09/28/95	2.84	0.3	109000	-17311.675	-0.256	-888.147	-0.26	0	0	0.515	0.338	-4265.9	-1.321	8095.33	2.276	0	0
668 110043496	LARGE	37	10/12/95	16.94	0.69	17000	-6020.955	-1.737	-1505.685	-3.696	5.761	4.205	0.081	1.932	0	0	0	0	0	0
669 110043550	LARGE	37	10/13/95	37.73	0.72	4000	-113.903	-1.784	100.461	0.788	4.57856	8.687	0	0	0	0	0	0	0	0
670 110043551	LARGE	35	10/20/95	24.5	0.62	4000	65.794	2.18	-186.419	-1.972	2.16152	6.688	0	0	0	0	0	0	0	0
671 110048190	SURVEY	29	09/20/95	0.4	0.03	201000	9115.076	1.233	-922.733	-0.805	1.69609	0.334	0	0.05138	0.806	0	0	0	0	0
672 110054081	LARGE	35	06/20/95	3.8	0.2	146000	11691.906	18.64	-1872.648	-2.524	0	0	0	0.385	1.112	0	0	0	0	0
673 110054416	LARGE	20	12/21/95	6.09	0.16	27000	2002.289	16.658	522.986	2.468	0	0	0	0	0	0	0	0	0	0
674 110058446	LARGE	49	01/24/95	7.75	0.39	7000	-13467.522	-0.972	-4284.845	-3.121	0	0	0	0.47	1.631	0	0	0	0	0
675 110058495	LARGE	20	10/11/95	11.39	0.52	27000	-21285.874	-1.433	-2838.324	-3.121	0	0	0.713	0.088	0.386	0	0	0	0	0
676 110060609	LARGE	33	08/09/95	19.25	0.67	26000	-32.853	-0.01	1199.475	6.441	0.719	0.713	0	0	0	0	0	0	0	0
677 110065608	LARGE	34	12/19/95	1.25	0.08	30000	1215.084	6.609	-863.421	-1.55	-0.70456	-0.262	0	0	0	0	0	0	0	0
678 110080437	LARGE	36	08/17/95	0.34	0.02	37000	4289.241	31.879	-69.28	-0.567	-0.40972	-0.709	0	0	0	0	0	0	0	0
679 110098233	LARGE	34	05/01/95	1.85	0.11	24000	-1795.205	-0.771	189.979	1.712	0	0	0.103	1.11	0	0	0	0	0	0
680 110098245	SMALL	26	07/13/95	5.37	0.43	23	-92.604	-0.354	20.835	2.072	0.156	3.032	0.011	0.347	0	0	0	0	0	0
681 110108485	SURVEY	37	07/12/95	49.18	0.84	99000	536.06	0.075	409.163	0.858	25.15508	11.525	0.05352	1.001	0	0	0	0	0	0
682 110130045	LARGE	27	04/06/95	148.85	0.83	43000	6314.426	24.864	-4506.703	-12.2	0	0	0	0	0	0	0	0	0	0
683 110131881	SMALL	27	08/31/95	28.05	0.67	326	6.666	1.642	2.485	0.374	0.20992	7.479	0	0	0	0	0	0	0	0
684 110135247	SURVEY	20	12/08/95	1.97	0.17	204000	-7573.257	-0.617	507.94	1.088	-6.62288	-1.626	0.5846	1.269	0	0	0	0	0	0
685 110140234	LARGE	34	11/28/95	15.35	0.64	1000	-883.047	-0.483	-61.311	-1.081	1.309	6.551	0.025	0.465	0	0	0	0	0	0
686 110153582	LARGE	49	10/23/95	0.01	0	86000	2760.866	4.013	300.59	0.112	0	0	0	0	0	0	0	0	0	0
687 110171821	LARGE	34	05/24/95	0.54	0.04	16000	-1855.619	-0.733	67.374	0.563	0	0	0.095	0.934	0	0	0	0	0	0
688 110183564	LARGE	27	03/17/95	4.53	0.33	51000	-18390.554	-2.404	645.732	2.261	2.513	2.545	0.376	2.922	0	0	0	0	0	0
689 110183572	SMALL	35	04/25/95	13.61	0.54	430	23.038	3.001	-19.226	-1.973	0.17469	4.189	0	0	0	0	0	0	0	0
690 110198557	LARGE	49	08/24/95	23.31	0.71	1000	25.106	0.036	-8.034	-0.199	0.969	8.184	0	0	0	0	0	0	0	0
691 110199360	SMALL	27	07/12/95	31.68	0.71	536	-3.429	-0.57	3.112	0.231	0.42271	7.875	0	0	0	0	0	0	0	0
692 110201149	LARGE	33	08/10/95	21.6	0.71	2000	-348.78	-0.753	-46.894	-1.385	0.944	7.557	0.032	0.803	0	0	0	0	0	0
693 110203237	SMALL	28	10/12/95	81.81	0.89	604	4.104	0.739	-9.497	-0.995	0.25363	12.464	0	0	0	0	0	0	0	0
694 110203255	LARGE	28	03/27/95	4.13	0.22	146000	10081.029	32.673	-283.355	-0.7	2.784	2.526	0	0	0	0	0	0	0	0
695 110203264	LARGE	20	12/06/95	0.01	0	19000	749.637	2.278	138.798	0.108	0	0	0	0	0	0	0	0	0	0
696 110209521	LARGE	28	12/29/95	72.29	0.89	1000	-579.895	-0.542	-11.334	-0.427	0.806	13.5	0.023	0.527	0	0	0	0	0	0
697 110215205	LARGE	26	08/16/95	0.56	0.02	3000	176.723	6.352	-56.313	-0.751	0	0	0	0	0	0	0	0	0	0
698 110215485	SMALL	35	10/07/95	20.18	0.66	448	1.322	0.181	-60.815	-3.057	0.38679	6.069	0	0	0	0	0	0	0	0
699 110224777	LARGE	33	09/28/95	1.08	0.07	41000	-1020.341	-0.166	303.205	0.73	0	0	0.273	0.563	0	0	0	0	0	0
700 110231671	LARGE	20	07/11/95	4.11	0.31	4000	124.331	0.103	292.908	3.011	0.234	0.643	0	0	0	0	0	0	0	0
701 110233953	LARGE	34	09/05/95	0.53	0.05	4000	-4161.594	-0.353	178.39	1.146	0.324	0.443	0.077	0.376	0	0	0	0	0	0
702 110234904	SURVEY	22	11/22/95	0.88	0.06	90000	-8250.69	-1.025	68.604	0.06	0	0	2.48792	1.329	0	0	0	0	0	0
703 110243097	LARGE	34	10/24/95	14.82	0.61	106000	-56294.003	-1.813	-114.013	-0.142	0	0	1.312	2.008	0	0	0	0	0	0
704 120001021	LARGE	37	08/07/95	8.04	0.21	11000	443.517	25.136	134.799	2.836	0	0	0	0.273	0.563	0	0	0	0	0
705 120001855	LARGE	23	01/10/95	10.34	0.41	21000	1624.485	13.787	-699.765	-3.995	1.4701	1.422	0	0	0	0	0	0	0	0
706 120004948	LARGE	33	11/16/95	21.78	0.59	13000	277.952	2.741	819.682	3.412	7.52334	5.615	0	0	0	0	0	0	0	0
707 120004975	LARGE	26	11/16/95	0.16	0.01	17000	1860.256	23.34	40.195	0.467	0.20404	0.359	0	0	0	0	0	0	0	0
708 120004976	LARGE	27	10/27/95	2.51	0.07	157000	10389.099	12.25	-3024.054	-1.583	0	0	0	0	0	0	0	0	0	0



APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
709 120005003	LARGE	22	09/19/95	2.87	0.24	114000	-469.327	-0.053	2511.503	2.669	0	0	0.832	0.497	-259.04	-0.266	0	0	0	0
710 120005035	SMALL	25	11/19/95	9.64	0.51	376	-110.93	-1.279	-16.718	-3.598	0.107	4.143	0.007	1.566	0	0	0	0	0	0
711 120005494	LARGE	20	09/20/95	0.82	0.05	39000	-2596.34	-0.621	207.576	0.926	0	0	0.109	1.185	0	0	0	0	0	0
712 120005559	LARGE	20	07/20/95	0.27	0.02	152000	3082.222	0.224	-693.538	-0.53	0	0	0.11	0.243	0	0	0	0	0	0
713 120005640	LARGE	20	06/16/95	0	0	115000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
714 120005646	LARGE	26	10/04/95	3.19	0.18	250000	-103776.91	-1.48	1369.281	0.969	0	0	7.906	1.765	0	0	0	0	0	0
715 120005704	SMALL	23	08/07/95	1.92	0.14	476	-4.718	-0.164	-25.718	-0.314	0.69153	1.942	0	0	0	0	0	0	0	0
716 120005721	LARGE	28	07/31/95	3.79	0.11	99000	9461.5	45.024	-552.769	-1.947	0	0	0	0	0	0	0	0	0	0
717 120005724	SURVEY	30	08/07/95	10.88	0.43	3000	130.073	7.405	131.504	4.244	0.48435	2.582	0	0	0	0	0	0	0	0
718 120005375	LARGE	27	08/08/95	1.13	0.04	190000	10700.039	13.358	-1802.643	-1.061	0	0	0	0	0	0	0	0	0	0
719 1200058611	LARGE	20	12/19/95	6.4	0.31	20000	-18476.785	-2.474	-1468.669	-1.749	6.428	1.1	0.738	2.702	0	0	0	0	0	0
720 1200058619	LARGE	22	12/19/95	3.55	0.3	81000	2079.345	0.21	-4685.34	-3.232	0	0	0.052	0.022	0	0	0	0	0	0
721 1200059044	LARGE	22	08/08/95	0.41	0.01	76000	3103.266	10.738	-609.157	-0.642	0	0	0	0	0	0	0	0	0	0
722 120064516	SURVEY	20	12/19/95	41.95	0.59	121000	6342.581	32.461	-3551.946	-6.476	0	0	0	0	0	0	0	0	0	0
723 120064738	LARGE	33	12/19/95	2.04	0.18	13000	-4859.034	-2.137	-382.23	-1.278	0.59902	0.557	0.75605	2.282	0	0	0	0	0	0
724 120064751	SURVEY	28	12/19/95	6.94	0.44	89000	6625.762	8.464	599.667	0.101	1.53961	0.162	0	0	0	0	0	0	0	0
725 120064752	LARGE	28	12/19/95	80.01	0.86	6000	287.96	7.211	-112.953	-2.336	3.71469	12.056	0	0	0	0	0	0	0	0
726 120064756	LARGE	34	12/19/95	16.63	0.64	15000	-2923.022	-0.969	5.104	0.044	4.066	6.877	0.118	1.123	0	0	0	0	0	0
727 120064769	LARGE	28	10/24/95	5.68	0.15	202000	9829.239	36.852	-1775.736	-2.382	0	0	0	0	0	0	0	0	0	0
728 120068414	SURVEY	20	01/04/95	10.12	0.41	5000	-116.189	-0.301	-55.122	-2.54	0	0	0.01021	1.17	0	0	0	0	0	0
729 120068415	SURVEY	20	07/14/95	0.16	0.01	51000	3719.234	20.123	118.028	0.405	0	0	0	0	0	0	0	0	0	0
730 120068416	SURVEY	20	07/14/95	0.71	0.02	147000	8252.597	25.224	563.674	0.844	0.18427	3.224	0	0	0	0	0	0	0	0
731 120068625	SMALL	26	01/04/95	5.54	0.28	385	9.237	1.931	11.986	0.943	0	0	0	0	0	0	0	0	0	0
732 120068994	LARGE	20	11/07/95	0.01	0	8000	555.386	13.309	7.18	0.086	0	0	0	0	0	0	0	0	0	0
733 120069171	LARGE	30	01/04/95	25.94	0.65	744	23.48	2.059	6.896	0.56	0.58931	7.2	0	0	0	0	0	0	0	0
734 120076536	SMALL	34	08/23/95	74.59	0.84	323	-0.659	-0.207	14.822	3.532	0.226	12.035	0	0	0	0	0	0	0	0
735 120076538	SMALL	34	08/23/95	13.96	0.6	126	16.082	0.295	1.924	2.357	0.022	5.9	0	0	0	0	0	0	0	0
736 120076548	LARGE	34	08/23/95	4.65	0.33	2000	-1354.826	-1.191	6.654	0.354	0.312	3.729	0.031	1.307	0	0	0	0	0	0
737 120096113	SURVEY	32	11/17/95	3.31	0.1	40000	4037.734	48.835	-238.039	-1.82	0	0	0	0	0	0	0	0	0	0
738 120106892	LARGE	35	08/16/95	2.46	0.08	55000	2238.9	8.082	-1335.19	-1.57	1.29622	4.152	0	0	0	0	0	0	0	0
739 120107032	LARGE	35	10/19/95	8.66	0.4	1000	-27.328	-0.671	-14.747	-0.186	4.505	5.267	0	0	0	0	0	0	0	0
740 120107033	LARGE	30	10/19/95	21.06	0.58	26000	1526.323	10.151	-581.036	-3.061	2.79476	5.757	0	0	0	0	0	0	0	0
741 120107034	LARGE	35	10/19/95	17.2	0.53	4000	0.295	0.005	-74.624	-0.628	2.09834	5.021	0	0	0	0	0	0	0	0
742 120107035	LARGE	37	10/19/95	12.79	0.46	2000	-26.926	-0.529	-19.28	-0.188	2.88474	3.583	0	0	0	0	0	0	0	0
743 120107037	LARGE	37	10/19/95	6.71	0.31	5000	-27.475	-0.283	-94.357	-0.474	0	0	0.132	0.089	0	0	0	0	0	0
744 120107056	LARGE	34	10/19/95	0.03	0	62000	-627.97	-0.037	355.436	0.219	-3.361	-2.169	0.27	0.657	0	0	0	0	0	0
745 120107059	LARGE	34	10/19/95	2.68	0.22	16000	-8070.092	-0.564	-594.584	-1.556	0	0	1.389	2.758	-948.31	-1.333	0	0	0	0
746 120135444	LARGE	34	04/13/95	2.91	0.24	112000	-62324.807	-2.398	544.879	0.781	0	0	0	0	0	0	0	0	0	0
747 120159933	SURVEY	34	06/15/95	73.22	0.84	3000	12.3	0.709	50.705	1.457	2.51962	12.073	0	0	0	0	0	0	0	0
748 120141274	SMALL	37	11/02/95	10.69	0.58	57	-66.941	-1.606	3.945	0.88	0.063	4.691	0.001	2.525	0	0	0	0	0	0
749 120141280	SMALL	35	11/02/95	63.49	0.9	162	-701.259	-5.516	-13.213	-3.75	0.167	13.14	0.007	5.333	0	0	0	0	0	0
750 120141386	LARGE	33	12/19/95	5.24	0.36	76000	-882.398	-1.029	-757.951	-1.927	3.178	3.303	0.82	1.744	0	0	0	0	0	0
751 120141419	LARGE	34	10/02/95	3.27	0.26	71000	-16509.003	-1.323	330.251	1.925	-0.49	-0.652	0.419	1.788	0	0	0	0	0	0
752 120141502	SURVEY	30	12/19/95	136.39	0.9	50000	2471.315	15.305	307.917	1.153	17.27927	16.488	0	0	0	0	0	0	0	0
753 120141514	LARGE	30	12/19/95	0.59	0.06	130000	10263.015	0.566	-232.951	-0.583	1.895	1.886	0.023	0.046	0	0	0	0	0	0
754 120150885	SMALL	36	09/26/95	31.41	0.72	396	-15.403	-1.957	47.255	2.595	0.48182	7.36	0	0	0	0	0	0	0	0
755 120181564	LARGE	23	09/26/95	35.77	0.79	3000	-1260.089	-1.959	-13.934	-0.173	2.432	10.313	0.013	1.925	0	0	0	0	0	0
756 120181617	SURVEY	25	10/16/95	2.04	0.18	145000	-22094.273	-1.416	1038.278	1.054	2.38992	0.67	1.9496	1.836	0	0	0	0	0	0
757 120193185	LARGE	23	07/20/95	36.91	0.71	3000	71.127	1.875	-103.482	-1.391	2.28839	8.06	0	0	0	0	0	0	0	0
758 120202511	LARGE	23	08/18/95	231.38	0.94	2000	9.264	0.944	-3.014	-0.207	0.84538	21.311	0	0	0	0	0	0	0	0
759 120210553	LARGE	28	08/18/95	0.04	0	13000	211.544	5.094	37.078	0.206	0	0	0	0	0	0	0	0	0	0
760 120220905	LARGE	34	11/27/95	0.4	0.03	74000	1205.975	0.086	302.933	0.854	0	0	0.077	0.204	0	0	0	0	0	0
761 120223433	LARGE	28	11/22/95	1.38	0.09	45000	-18730.613	-1.429	-373.284	-0.901	0	0	1.096	1.662	0	0	0	0	0	0
762 120225913	LARGE	23	01/12/95	2.79	0.23	8000	610.817	2.458	-21.817	-0.831	-0.183	-2.373	0.001	0.467	0	0	0	0	0	0
763 120227911	LARGE	32	07/07/95	3.12	0.17	91000	3214.846	9.764	-37.71	-0.04	7.31732	2.46	0	0	0	0	0	0	0	0
764 120233654	LARGE	23	01/12/95	6.22	0.17	3000	222.198	20.919	-39.961	-2.494	0	0	0	0	0	0	0	0	0	0
765 120234355	LARGE	26	08/31/95	1.93	0.11	177000	-16468.572	-0.386	1807.073	1.452	0	0	2.521	0.635	0	0	0	0	0	0
766 120234396	LARGE	23	01/17/95	1.98	0.12	52000	-18459.055	-1.183	-4418.812	-1.909	0	0	0.291	1.471	0	0	0	0	0	0
767 120234970	SURVEY	20	12/19/95	1.69	0.06	154000	6673.547	40.234	721.331	1.3	0	0	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Group	Premise ID	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
SMALL	768 120237217	34	11/02/95	1.52	0.14	289	-108.41	-1.271	10.345	1.086	0.033	1.423	0.008	1.394	0	0	0	0	0	0
SMALL	769 120237247	30	11/02/95	5.32	0.41	104	7.144	0.073	-2.108	-0.718	0.041	3.971	0	0	0	0	0	0	0	0
SURVEY	770 120237834	30	01/25/95	1.47	0.1	341000	23029.103	8.305	5590.999	1.713	3.19274	0.22	0	0	0	0	0	0	0	0
LARGE	771 120239374	25	10/17/95	2.05	0.06	102000	4508.321	23.041	-821.052	-1.43	0	0	0	0	0	0	0	0	0	0
LARGE	772 120240524	28	06/20/95	0	0	143000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LARGE	773 120244260	22	10/05/95	0	0	185000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LARGE	774 120246407	34	05/01/95	3.85	0.3	12000	-28691.971	-2.64	105.881	0.488	0	0	0.635	2.73	0	0	0	0	0	0
SMALL	775 130000718	26	01/06/95	10.37	0.43	411	45.661	3.422	-29.147	-1.473	0.53032	4.291	0	0	0	0	0	0	0	0
SURVEY	776 130000781	34	06/21/95	8.18	0.47	15000	-327.06	-0.1	-216.892	-4.007	0.59899	1.574	0.02876	0.407	0	0	0	0	0	0
LARGE	777 130044383	35	09/19/95	12.07	0.45	1000	-5.756	-0.354	21.012	0.629	0.65707	4.913	0	0	0	0	0	0	0	0
LARGE	778 130054992	32	10/12/95	51.21	0.77	16000	547.995	6.434	-161.878	-1.049	9.43823	9.984	0	0	0	0	0	0	0	0
LARGE	779 130054994	23	10/13/95	3.54	0.27	32000	-1871.812	-0.93	-958.634	-1.914	4.964	2.683	0.066	1.431	0	0	0	0	0	0
LARGE	780 130055007	25	04/04/95	2.75	0.29	309000	-1008.154	-0.027	3558.642	0.923	-4.401	-2.276	0.934	0.282	0	0	9579.24	2.538	0	0
LARGE	781 130055681	39	11/03/95	27.75	0.65	15000	376.636	4.438	192.654	0.974	8.15062	7.392	0	0	0	0	0	0	0	0
LARGE	782 130055683	37	08/12/95	4.48	0.24	3000	105.562	2.622	6.299	0.082	1.346	2.983	0	0	0	0	0	0	0	0
LARGE	783 130056574	24	12/20/95	20.29	0.47	31000	2941.982	21.871	-2768.026	-4.505	0	0	0	0	0	0	0	0	0	0
SMALL	784 130056580	28	08/15/95	9.72	0.44	231	1.77	0.228	10.599	1.179	0.10071	4.202	0	0	0.15	0.094	5483.47	3.577	0	0
LARGE	785 130059632	32	10/09/95	4.45	0.32	122000	1269.034	0.097	-1514.17	-0.918	0	0	0	0	0	0	0	0	0	0
LARGE	786 130066452	25	08/15/95	10.71	0.45	3000	1.178	0.015	157.586	1.338	3.3897	4.519	0	0	0	0	0	0	0	0
LARGE	787 130066459	34	08/17/95	18.78	0.38	73000	3547.984	26.906	-1477.281	-4.334	0	0	0	0	0	0	0	0	0	0
LARGE	788 130066464	35	08/16/95	19.91	0.57	1000	49.299	3.358	-4.49	-0.274	0.70376	6.133	0	0	0	0	0	0	0	0
LARGE	789 130067068	25	12/19/95	5.6	0.37	69000	-6625.282	-0.965	1021.767	2.448	5.969	2.781	0.55	1.459	0	0	0	0	0	0
LARGE	790 130067121	34	09/15/95	15.32	0.33	57000	6451.369	57.778	561.863	3.914	1.85566	0.48	0	0	0	0	0	0	0	0
LARGE	791 130067121	34	10/24/95	0.17	0.01	50000	882.931	3.838	332.676	0.314	1.85566	0.48	0	0	0	0	0	0	0	0
LARGE	792 130067172	34	10/23/95	1.14	0.07	76000	4226.521	11.718	-908.024	-1.089	4.50827	0.988	0	0	0	0	0	0	0	0
LARGE	793 130127157	49	07/26/95	2.17	0.41	36000	3071.919	11.184	-3008.022	-4.658	0	0	0	0	0	0	0	0	0	0
LARGE	794 130162357	37	07/17/95	40.24	0.81	2000	-1595.838	-2.098	172.057	2.004	2.427	10.57	0.022	2.066	0	0	0	0	0	0
LARGE	795 130167720	49	07/26/95	320.05	0.96	13000	184.565	2.054	-100.37	-1.226	5.88211	24.654	0	0	0	0	0	0	0	0
LARGE	796 130170530	37	07/17/95	87.7	0.85	4000	-8.043	-0.292	27.132	0.387	3.11927	13.122	0	0	0	0	0	0	0	0
LARGE	797 130170531	37	07/17/95	7.01	0.51	54000	-2235.809	-0.305	1683.565	2.161	4.847	2.351	0.063	0.669	-2275.6	-3.287	0	0	0	0
LARGE	798 130184983	38	02/07/95	3.45	0.58	0	-2226.644	-2.138	0	0	0.477	1.951	0.031	2.119	0	0	0	0	0	0
SMALL	799 130186980	35	03/31/95	4.62	0.37	206	-35.903	-0.112	36.568	0	0.094	2.162	0.001	0.178	0	0	0	0	0	0
LARGE	800 130233171	22	04/13/95	2.65	0.15	64000	-17017.788	-1.619	-347.501	-0.5	0	0	0	0	0	0	0	0	0	0
LARGE	801 130242331	20	10/13/95	1.36	0.04	10000	949.206	94.634	17.498	1.167	0	0	0	0	0	0	0	0	0	0
SURVEY	802 140001204	28	08/24/95	38.01	0.72	58000	4010.64	28.627	-675.41	-3.56	9.21747	7.372	0	0	0	0	0	0	0	0
SMALL	803 140001312	22	01/03/95	54.76	0.8	647	33.372	4.203	-4.152	-0.622	0.48559	10.432	0	0	0	0	0	0	0	0
SMALL	804 140002805	23	09/14/95	2.51	0.26	128	20.367	1.814	-2.034	-1.261	-0.004	-0.606	0	0	0	0	0	0	0	0
LARGE	805 140004626	23	02/01/95	0.85	0.11	2000	-19.36	-0.154	-78.38	-1.104	0.107	0.638	0.003	0.435	0	0	0	0	0	0
LARGE	806 140004641	20	02/01/95	0.48	0.05	81000	-6839.168	-0.505	883.982	1.151	1.171	0.341	0.261	0.853	0	0	0	0	0	0
SURVEY	807 140004690	23	01/11/95	25.73	0.64	7000	375.202	21.162	-4.916	-0.183	1.0598	7.093	0	0	0	0	0	0	0	0
LARGE	808 140004694	23	01/11/95	0	0	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LARGE	809 140004710	23	02/27/95	0.01	0	3000	277.816	16.876	3.844	0.077	0	0	0	0	0	0	0	0	0	0
LARGE	810 140004731	23	01/15/95	0.41	0.04	11000	-15.338	-0.018	-54.923	-0.434	0.052	0.156	0.009	0.845	0	0	0	0	0	0
LARGE	811 140004735	23	01/11/95	4.95	0.35	11000	-2581.559	-1.866	-186.863	-1.063	0.219	0.441	0.036	2.471	0	0	0	0	0	0
LARGE	812 140004799	23	01/12/95	17.67	0.54	5000	663.951	8.993	-900.091	-5.83	0.271	0.395	0	0	0	0	0	0	0	0
LARGE	813 140004853	23	01/03/95	2.93	0.24	4000	64.623	0.159	31.552	0.46	0.516	2.526	0.002	0.336	0	0	0	0	0	0
SURVEY	814 140005433	22	05/12/95	2.2	0.07	48000	3325.252	24.078	-355.725	-1.485	0	0	0	0	0	0	0	0	0	0
SURVEY	815 140005435	20	11/21/95	4.78	0.34	51000	1093.751	0.759	-714.236	-3.441	1.58425	1.787	0.02243	0.351	0	0	824.374	1.539	0	0
LARGE	816 140005437	20	11/21/95	1.48	0.13	42000	1020.594	5.471	358.679	0.668	0.13107	0.057	0	0	0	0	0	0	0	0
SURVEY	817 140005438	20	10/05/95	0.44	0.01	95000	2867.688	16.625	439.165	0.66	0	0	0	0	0	0	0	0	0	0
LARGE	818 140005454	20	09/07/95	2.85	0.08	2000	89.19	0.868	-43.603	-1.689	0	0	0	0	0	0	0	0	0	0
LARGE	819 140005490	20	06/16/95	0.39	0.04	226000	-1092.176	-0.037	-910.301	-0.479	0	0	0.366	0.513	125.973	0.06	0	0	0	0
LARGE	820 140005491	24	12/12/95	14.28	0.49	32000	3919.215	28.313	-23.774	-0.121	0	0	0	0	0	0	-1710.2	-5.233	0	0
LARGE	821 140005492	23	10/11/95	38.59	0.55	25000	1651.05	27.301	-885.409	-6.212	0	0	0	0	0	0	0	0	0	0
LARGE	822 140005494	20	01/30/95	0.35	0.02	80000	490.634	1.829	-742.709	-0.443	2.27194	0.524	0	0	0	0	0	0	0	0
LARGE	823 140005496	20	01/30/95	2.07	0.18	21000	-7619.46	-0.89	1475.162	2.323	4.009	1.361	0.224	0.956	0	0	0	0	0	0
LARGE	824 140005511	34	07/14/95	3.79	0.21	165000	-70234.561	-2.372	-504.701	-0.664	0	0	2.207	2.674	0	0	0	0	0	0
SURVEY	825 140005512	35	12/21/95	3.61	0.28	13000	-6467.822	-1.429	-159.061	-1.576	-1.40405	-2.176	0.08729	1.761	0	0	0	0	0	0
SURVEY	826 140005550	34	05/05/95	7.73	0.45	181000	10045.487	0.441	-1299.364	-4.633	-3.2938	-1.489	0.1219	0.325	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
827	LARGE	36	12/12/95	13.29	0.47	33000	696.858	11.342	-21.499	-0.078	5.43146	5.1	0	0	0	0	0	0	0	0
828	SMALL	38	08/28/95	15.42	0.58	612	-6.315	-0.928	8.912	0.513	0.38028	5.513	0	0	0	0	0	0	0	0
829	SURVEY	36	06/29/95	8.48	0.22	57000	3489.242	28.685	632.772	2.911	0	0	0	0	0	0	0	0	0	0
830	LARGE	24	03/15/95	2.03	0.18	1000	-42.529	-0.21	4.821	0.296	0.175	2.459	0.007	0.529	0	0	0	0	0	0
831	LARGE	35	07/19/95	5.59	0.45	130000	2108.099	0.049	-32.16678	-2.516	3.486	0.619	0.138	0.204	-5233.6	-3.286	0	0	0	0
832	LARGE	25	07/25/95	22.66	0.71	3000	-104.104	-0.06	96.814	1.025	2.977	8.197	0.002	0.021	0	0	0	0	0	0
833	SURVEY	36	10/31/95	11.99	0.46	20000	656.121	11.102	-112.92	-0.569	4.53798	4.893	0	0	0	0	0	0	0	0
834	SURVEY	35	07/24/95	32.85	0.78	5000	-4412.675	-0.838	53.099	0.363	6.28307	9.628	0.06287	0.808	0	0	0	0	0	0
835	LARGE	27	11/01/95	23.12	0.61	5000	-62.772	-0.469	42.851	0.208	5.95638	6.783	0	0	0	0	0	0	0	0
836	LARGE	39	10/23/95	0.84	0.03	31000	847.61	27.115	115.888	0.917	0	0	0	0	0	0	0	0	0	0
837	SURVEY	30	06/22/95	1.51	0.1	62000	3939.436	12.099	-1029.441	-1.607	-3.71612	-0.929	0	0	0	0	0	0	0	0
838	LARGE	34	08/31/95	6.28	0.3	77000	1866.31	4.869	-686.319	-0.436	0	0	0	0	-5775.7	-3.498	0	0	0	0
839	LARGE	20	07/20/95	1.46	0.05	2000	49.835	7.071	29.399	1.21	0	0	0	0	0	0	0	0	0	0
840	LARGE	34	09/01/95	1.33	0.12	76000	-9603.551	-0.431	-39.916	-0.098	2.207	1.986	0.324	0.653	0	0	0	0	0	0
841	LARGE	34	08/18/95	16.49	0.53	54000	-5713.171	-2.459	-1432.084	-4.779	0	0	0.547	2.984	0	0	0	0	0	0
842	LARGE	34	09/01/95	3.59	0.25	67000	-9192.776	-1.148	-305.822	-2.146	0	0	0.309	1.707	0	0	0	0	0	0
843	LARGE	35	09/18/95	0.67	0.04	2000	-208.465	-0.242	-20.898	-1.022	0	0	0.005	0.45	0	0	0	0	0	0
844	LARGE	34	12/19/95	5.26	0.15	90000	6551.878	40.061	-856.734	-2.294	0	0	0	0	0	0	0	0	0	0
845	LARGE	32	08/23/95	0.22	0.01	12000	738.82	7.893	110.469	0.471	0	0	0	0	0	0	0	0	0	0
846	SMALL	20	07/12/95	1.02	0.08	209	814.507	1.877	-1860.837	-1.337	-1.85655	-0.431	0	0	0	0	0	0	0	0
847	SMALL	20	08/24/95	1.7	0.11	435	56.397	8.969	-3.443	-0.583	-0.04898	-1.813	0	0	0	0	0	0	0	0
848	LARGE	36	08/24/95	37.52	0.73	3000	-30.388	-0.936	83.314	1.343	2.14976	8.65	0	0	0	0	0	0	0	0
849	LARGE	49	08/25/95	0	0	36000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
850	SMALL	35	09/15/95	32.62	0.74	252	-5.835	-1.494	10.528	1.215	0.24699	7.737	0	0	0	0	0	0	0	0
851	SMALL	35	09/15/95	13.97	0.68	112	-225.267	-1.003	-5.373	-0.708	0.175	6.457	0.003	0.911	0	0	0	0	0	0
852	SMALL	35	09/15/95	14.82	0.61	470	-86.713	-0.581	4.683	0.998	0.121	6.583	0.002	0.77	0	0	0	0	0	0
853	LARGE	36	12/06/95	131.87	0.9	3000	85.407	3.359	39.54	1.179	3.49527	16.24	0	0	0	0	0	0	0	0
854	LARGE	36	04/19/95	0	0	157000	0	0	0	0	0	0	0	0	0	0	0	0	0	0
855	SMALL	28	12/06/95	13.3	0.61	841	-554.539	-1.196	18.811	0.545	0.717	5.874	0.012	1.222	0	0	0	0	0	0
856	LARGE	36	08/15/95	3.36	0.18	63000	3176.898	5.575	-2835.06	-1.481	0	0	0	0	-2255.1	-1.231	0	0	0	0
857	LARGE	32	07/26/95	2.18	0.24	95000	-20158.89	-0.921	-1284.493	-1.305	-8.942	-1.835	1.452	1.233	839.92	0.874	0	0	0	0
858	SMALL	22	10/11/95	12.67	0.63	120	-410.296	-1.433	23.106	1.795	0.378	5.342	0.043	1.419	0	0	0	0	0	0
859	LARGE	22	04/05/95	3.21	0.18	115000	6379.849	14.445	-2395.683	-2.508	-4.28795	-0.866	0	0	0	0	0	0	0	0
860	LARGE	34	06/07/95	0.54	0.02	51000	3388.782	24.205	-184.123	-0.732	0	0	0	0	0	0	0	0	0	0
861	SMALL	34	06/07/95	0.64	0.05	213	26.462	2.704	-24.277	-1.13	-0.02147	-0.178	0	0	0	0	0	0	0	0
862	SMALL	34	06/07/95	1.06	0.12	37	-21.19	-0.16	0.007	0.005	0.017	1.716	0	0	0	0	0	0	0	0
863	SMALL	25	11/15/95	9.12	0.6	794	-444.801	-0.34	18.089	0.491	1.03	4.719	0.018	0.336	0	0	0	0	0	0
864	SURVEY	34	05/22/95	1.33	0.04	27000	766.541	8.985	307.416	1.151	0	0	0	0	0	0	0	0	0	0
865	LARGE	34	07/05/95	3.21	0.32	225000	-48246.963	-1.684	1821.271	1.015	2.051	0.323	2.576	1.926	0	0	0	0	3231.64	1.869
866	SURVEY	35	07/05/95	24.83	0.63	1000	31.963	1.225	15.502	0.407	1.6161	6.975	0	0	0	0	0	0	0	0
867	SMALL	36	07/05/95	3	0.2	325	2.24	0.216	-19.779	-0.701	0.29616	2.334	0	0	0	0	0	0	0	0
868	SMALL	23	07/05/95	12.39	0.54	269	2.074	0.488	-17.372	-1.395	0.25751	4.87	0	0	0	0	0	0	0	0
869	SMALL	35	07/05/95	3.46	0.29	199	-641.045	-1.259	19.731	1.51	0.236	2.928	0.009	1.343	0	0	0	0	0	0
870	LARGE	27	12/31/95	26.26	0.74	10000	-318.441	-0.145	-13.756	0.1	2.832	8.852	0.017	0.299	0	0	0	0	0	0
871	LARGE	27	12/31/95	3.1	0.17	2000	33.196	3.336	-26.609	-0.634	0.26658	2.421	0	0	0	0	0	0	0	0
872	SURVEY	20	12/19/95	1.22	0.04	69000	2775.481	24.796	398.06	1.107	0	0	0	0	0	0	0	0	0	0
873	SMALL	32	03/31/95	4.22	0.29	66	2	1.361	-6.117	-1.792	0.02592	2.258	0	0	0	0	0	0	0	0
874	SMALL	27	02/21/95	20.93	0.74	124	-155.458	-1.516	-8.9	-0.295	0.14	7.27	0.01	1.502	0	0	0	0	0	0
875	SMALL	27	02/21/95	22.93	0.68	182	6	2.002	-0.956	-2.077	0.10094	6.738	0	0	0	0	0	0	0	0
876	LARGE	23	01/09/95	2.16	0.13	3000	-111.55	-0.649	-87.039	-2.077	0	0	0.005	1.472	0	0	0	0	0	0
877	LARGE	39	12/08/95	0.33	0.01	52000	3877.679	13.43	359.458	0.575	0	0	0	0	0	0	0	0	0	0
878	LARGE	39	01/17/95	0.6	0.02	18000	323.753	3.725	216.76	0.777	0	0	0	0	0	0	0	0	0	0
879	LARGE	39	12/11/95	7.84	0.36	36000	-10692.424	-2.042	597.67	1.352	0	0	0.599	2.531	0	0	0	0	0	0
880	LARGE	32	09/05/95	2.63	0.15	5000	-4326.359	-1.153	-553.307	-1.524	0	0	0.162	1.3	0	0	0	0	0	0
881	LARGE	30	12/01/95	0.07	0	126000	7425.648	13.359	-312.646	-0.273	0	0	0	0	0	0	0	0	0	0
882	LARGE	23	06/06/95	1.45	0.13	12000	229.164	0.294	-199.4	-1.61	0.282	0.6	0.007	0.652	0	0	0	0	0	0
883	SMALL	32	06/06/95	1.35	0.1	80	13.027	2.637	-7.469	-1.396	0.02542	0.64	0	0	0	0	0	0	0	0
884	LARGE	23	06/28/95	0.49	0.03	4000	412.705	33.189	11.809	0.969	0.03992	0.463	0	0	0	0	0	0	0	0
885	LARGE	39	10/26/95	4.75	0.14	48000	2392.941	12.683	-1156.194	-2.18	0	0	0	0	0	0	0	0	0	0

APPENDIX B - REGRESSION RESULTS

Premise ID	Group	SIC	Audit Date	F-Statistic	R-Squared	1995 Therms	EINT	EINT T-Stat	EPOST	EPOST T-Stat	EHDD	EHDD T-Stat	EEMP	EEMP T-Stat	EN95	EN95 T-Stat	EN96	EN96 T-Stat	EN96	EN96 T-Stat
886 150001498	LARGE	22	10/02/95	0.02	0	129000	1828.481	0.236	162.667	0.112	0	0	0.39	0.182	0	0	0	0	0	0
887 150004568	SMALL	39	06/21/95	30.5	0.69	240	4.087	1.174	-1.964	-0.412	0.2501	7.543	0	0	0	0	0	0	0	0
888 150006094	LARGE	20	06/16/95	3.16	0.18	62000	-14070.582	-2.026	427.941	0.674	0	0	0.561	2.478	0	0	0	0	0	0
889 150006094	LARGE	20	06/16/95	3.62	0.28	157000	-5249.618	-0.357	583.679	0.32	0	0	0.421	0.774	0	0	4681.11	2.736	0	0
890 150006129	LARGE	23	07/10/95	96.71	0.88	3000	-52.507	-1.305	49.043	1.108	4.16011	13.857	0	0	0	0	0	0	0	0
891 150006251	SURVEY	33	05/18/95	13.68	0.49	62000	5723.868	28.856	-1091.924	-4.378	-6.89328	-3.838	0	0	0	0	0	0	0	0
892 150035864	LARGE	37	11/28/95	24.53	0.62	29000	3034.478	6.373	550.539	1.987	8.49852	6.922	0	0	0	0	0	0	0	0
893 150036554	SURVEY	20	09/08/95	14.77	0.69	152000	3819.532	0.415	-1873.175	-1.842	-2.59203	-0.849	0.01314	0.041	0	0	6778.22	6.633	0	0
894 150042118	LARGE	30	08/09/95	0.69	0.07	233000	-16421.183	-0.744	121.445	0.05	9.172	1.141	0.899	1.098	0	0	0	0	0	0
895 150054970	LARGE	30	10/12/95	1.33	0.08	18000	-3738.02	-0.893	-69.401	-0.74	0	0	0	0.142	0	0	0	0	0	0
896 150055066	LARGE	34	07/24/95	1.48	0.05	1000	48.202	5.735	-35.187	-1.216	0	0	0	0	0	0	0	0	0	0
897 150064245	LARGE	30	11/14/95	3.93	0.21	24000	-1350.265	-0.928	418.41	2.677	0	0	0.086	1.61	0	0	0	0	0	0
898 150065331	LARGE	22	12/19/95	1.51	0.1	43000	-6901.779	-1.434	-100.163	-0.15	0	0	1.828	1.738	0	0	0	0	0	0
899 150065489	LARGE	34	12/19/95	19.81	0.57	65000	4026.621	15.251	-879.625	-1.822	16.81672	5.984	0	0	0	0	0	0	0	0
900 150065495	LARGE	34	12/19/95	81.46	0.84	4000	-17.013	-0.403	-65.367	-0.836	5.76934	12.718	0	0	0	0	0	0	0	0
901 150075501	SMALL	34	04/20/95	52.54	0.79	304	3.561	1.061	-0.187	-0.047	0.18022	9.94	0	0	0	0	0	0	0	0
902 150075640	LARGE	20	08/25/95	44.76	0.6	2000	45.724	4.547	192.397	6.69	0	0	0	0.587	0	0	0	0	0	0
903 150075698	LARGE	20	08/24/95	1.82	0.16	12000	-310.526	-0.139	-66.202	-0.701	-0.625	-1.759	0.024	0.587	0	0	0	0	0	0
904 150076440	LARGE	33	07/12/95	4.62	0.13	50000	2846.951	27.082	445.566	2.15	0	0	0	0	0	0	0	0	0	0
905 150087967	SMALL	35	09/30/95	24.49	0.72	843	-73.104	-0.269	-15.668	-2.547	0.21	7.816	0.002	0.59	0	0	0	0	0	0
906 150087983	SMALL	39	09/30/95	5.1	0.35	492	-7.311	-0.139	-9.63	-1.76	0.055	3.333	0.002	0.616	0	0	0	0	0	0
907 150092636	LARGE	35	09/19/95	264.42	0.95	4000	46.705	2.01	71.377	2.969	3.888	22.991	0	0	0	0	0	0	0	0
908 150092651	LARGE	35	09/19/95	27.15	0.77	2000	-1031.094	-0.527	162.281	3.653	2.489	8.466	0.011	0.493	0	0	0	0	0	0
909 150092680	LARGE	37	09/19/95	3.34	0.19	9000	-457.77	-0.816	124.427	2.572	0	0	0.011	0.201	0	0	0	0	0	0
910 150092685	LARGE	34	10/03/95	55.01	0.85	11000	-31589.53	-2.439	-294.298	-1.541	16.246	12.222	0.616	2.454	0	0	0	0	0	0
911 150092699	SMALL	36	09/20/95	44.05	0.8	194	-2.452	-0.762	3.087	0.653	0.29604	9.295	0	0	0	0	0	0	0	0
912 150092700	SMALL	36	09/20/95	3.24	0.35	18	-13.608	-0.385	-1.513	-1.035	0.021	2.987	0	0	0	0	0	0	0	0
913 150092719	LARGE	25	04/11/95	1.07	0.07	95000	5655.639	15.394	228.074	0.413	4.81968	1.462	0	0	0	0	0	0	0	0
914 150093126	LARGE	23	04/05/95	2.05	0.24	2000	-1613.566	-1.307	139.584	0.764	0.163	0.262	0.028	1.328	-125.46	0	0	4401.03	3.426	0
915 150094122	LARGE	35	05/02/95	12.1	0.56	235000	11308.463	18.458	3066.802	2.483	5.31696	0.891	0	0	0	0	0	0	0	0
916 150094133	LARGE	36	11/16/95	37.22	0.71	14000	542.269	3.697	-702.337	-3.347	10.66243	9.363	0	0	0	0	0	0	0	0
917 150116621	SMALL	25	07/24/95	43.97	0.76	479	13.87	4.004	3.262	0.626	0.33458	9.363	0	0	0	0	0	0	0	0
918 150116665	LARGE	27	10/11/95	7.33	0.44	37000	-36741.609	-2.59	367.328	0.706	2.871	1.604	0.649	2.838	0	0	0	0	0	0
919 150116666	SMALL	27	10/09/95	5.91	0.38	782	50.04	0.854	566.368	3.357	-0.72192	-0.84	0	0	0	0	0	0	0	0
920 150127492	LARGE	32	12/18/95	2.4	0.14	10000	521.992	4.33	683.39	2.067	0.77561	0	0	0	0	0	0	0	0	0
921 150140986	LARGE	36	03/22/95	38.79	0.71	2000	42.592	0.952	-160.999	-1.983	2.31011	7.911	0	0	0	0	0	0	0	0
922 150169880	SMALL	36	07/27/95	58.8	0.82	805	-24.883	-1.338	36.242	1.893	0.92746	10.839	0	0	0	0	0	0	0	0
923 150178921	LARGE	38	08/09/95	14.01	0.6	13000	-5037.451	-3.422	-8.465	-0.062	0.318	0.864	0.081	4.176	0	0	0	0	0	0
924 150188791	SMALL	35	09/22/95	4.62	0.32	202	7.555	1.213	-37.562	-1.865	0.15973	2.7	0	0	0	0	0	0	0	0
925 150188805	SMALL	27	09/22/95	3.15	0.28	131	-101.388	-0.315	0.012	0.001	0.132	3.02	0.003	0.363	0	0	0	0	0	0
926 150200039	LARGE	49	08/09/95	11.51	0.43	2000	145.534	43.02	12.604	3.089	0.08228	4.398	0	0	0	0	0	0	0	0
927 150209133	LARGE	25	12/28/95	11.07	0.54	44000	-3526.874	-0.581	-1101.035	-1.441	7.341	5.478	0.509	0.739	0	0	0	0	0	0
928 150213002	LARGE	23	06/01/95	5.93	0.44	1000	-315.474	-1.422	-92.945	-2.057	0.393	3.065	0.006	1.546	0	0	0	0	0	0
929 150219956	SURVEY	22	12/29/95	0.7	0.05	10000	-28.605	-0.069	39.455	0.784	0	0	0.0159	1.018	0	0	0	0	0	0
930 150220672	LARGE	20	06/14/95	3.85	0.29	139000	-32734.941	-1.466	-3506.645	-2.045	-5.53	-0.674	6.428	1.795	0	0	0	0	0	0
931 150221629	SURVEY	20	08/10/95	1.21	0.08	247000	12297.456	15.745	1783.626	1.082	-10.09845	-1.015	0	0	0	0	0	0	0	0
932 150230681	SMALL	27	11/06/95	9.54	0.51	129	-53.351	-1.689	1.505	0.679	0.027	4.95	0.002	2.083	0	0	0	0	0	0
933 150242344	SURVEY	22	11/08/95	21.97	0.61	20000	1435.497	14.411	-189.091	-0.54	0	0	0	0	0	0	0	0	1484.86	4.017
934 150249575	LARGE	30	08/23/95	6.89	0.32	88000	-20580.92	-2.539	126.934	0.876	0	0	0.673	3.707	0	0	0	0	0	0
935 150249653	LARGE	37	12/04/95	3.63	0.19	63000	2625.287	14.894	-1246.857	-1.414	0	0	0	0	0	0	0	0	0	0
936 150250897	LARGE	34	11/28/95	11.19	0.45	36000	-20924.063	-1.598	-743.112	-4.55	0	0	0.427	1.859	0	0	0	0	0	0
937 160001237	SURVEY	22	01/12/95	5.75	0.38	10000	656.943	5.525	168.266	3.652	-0.24908	-0.674	1.2091	0.563	0	0	0	0	0	0
938 160001284	SURVEY	22	01/11/95	70.18	0.83	1000	36.011	2.74	-20.857	-1.312	1.26441	11.665	0	0	0	0	0	0	0	0
939 160001285	LARGE	35	06/20/95	15.01	0.5	1000	-4.353	-0.098	49.307	0.722	2.3018	5.435	0	0	0	0	0	0	0	0
940 160001373	SMALL	23	08/07/95	79.23	0.88	412	-15.099	-2.397	35.902	3.029	0.89555	12.178	0	0	0	0	0	0	0	0
941 160003972	LARGE	23	06/16/95	1.31	0.08	9000	-835.55	-0.643	-433.188	-1.615	0	0	0.023	0.901	0	0	0	0	0	0
942 160004730	SURVEY	34	01/11/95	1.82	0.11	23000	-655.537	-0.259	538.272	1.74	0	0	0.08065	0.418	0	0	0	0	0	0
943 160036084	LARGE	36	11/16/95	1.96	0.12	5000	-1097.214	-1.145	31.303	0.465	0	0	0.031	1.322	0	0	0	0	0	0
944 160036088	LARGE	36	08/09/95	9.48	0.4	188000	-36351.508	-2.761	762.735	0.651	0	0	1.347	3.156	0	0	0	0	0	0

**TABLE 6 PROTOCOLS FOR REPORTING OF RESULTS OF IMPACT MEASUREMENT STUDIES USED TO SUPPORT AN EARNINGS CLAIM**

**1. Average Participant Group and Average Comparison Group Usage (therms)**

	<b>Unit type</b>	<b>Annual Therms</b>
<b>A. Pre installation usage</b>	average audited	39,915
	industrial account	
<b>B. Post installation usage</b>	average audited	44,774
	industrial account	

Notes: There is no comparison group

**2. Average net and gross end use load impacts (therms) for the 1994 program year.**

	<b>Unit type</b>	<b>Total</b>
<b>A.&amp;B. Avg. load impacts</b>	average audited	254
	industrial account	
<b>C. Percent change in usage</b>	average audited	0.6%
	industrial account	
<b>D. Realization rates</b>	average audited	25.4%
	industrial account	

Notes: There is no comparison group.

**3. Net to Gross Ratio: uncertain**

Impacts in Section 2 above are net impacts. The savings from the survey group who both recalled the audit and implemented actions was divided by the total consumption of all respondents who recalled the audit. Savings for the sub-group who recalled the audit, but took no action based upon the audit, were not included in the ex post savings estimate.

**4. Designated Unit Intermediate Data**

Billing data, employment data, production data (where available), and audit data are all included in the machine-readable file, USAGE.CSV, which is included with this report.

**5. Precision of Load Impact Estimates**

The precision of the audit impact estimates at the 90% and 80% confidence levels are shown (on a per customer basis) in Table S2.

**6. Measure Count Data**

Measure count data for program participants was not available from the SoCalGas audit records nor from the participant survey. Table S1 provides audit counts by major group. The market segment data shown below in section 7 provides audit counts by two-digit SIC.

7. Market Segment Data –1995 Audit Participants by Industry Group

SIC Code	SCG Core Customers	Total Audit Group	Survey Respondents	Non Respondents	Small Customers
<b>20 – Food Products</b>	1,328	155	36	104	15
	5.9%	11.6%	16.8%	12.4%	5.2%
<b>22 – Textiles</b>	508	60	18	34	8
	2.2%	4.5%	8.4%	4.1%	2.8%
<b>23 – Apparel</b>	1,843	95	3	61	31
	8.2%	7.1%	1.4%	7.3%	10.7%
<b>24 – Lumber</b>	463	17	1	10	6
	2.0%	1.3%	0.5%	1.2%	2.1%
<b>25 – Furniture</b>	781	39	5	25	9
	3.5%	2.9%	2.3%	3.0%	3.1%
<b>26 – Paper</b>	319	17	0	13	4
	1.4%	1.3%	0.0%	1.6%	1.4%
<b>27 – Printing</b>	2,473	68	8	29	31
	10.9%	5.1%	3.7%	3.5%	10.7%
<b>28 – Chemicals</b>	973	76	10	46	20
	4.3%	5.7%	4.7%	5.5%	6.9%
<b>29 – Petroleum</b>	146	6	3	2	1
	0.6%	0.4%	1.4%	0.2%	0.3%
<b>30 – Rubber &amp; Plastics</b>	990	64	15	37	12
	4.4%	4.8%	7.0%	4.4%	4.2%
<b>31 – Leather</b>	98	2	1	1	0
	0.4%	0.1%	0.5%	0.1%	0.0%
<b>32 – Stone, Clay &amp; Glass</b>	757	55	13	36	6
	3.4%	4.1%	6.1%	4.3%	2.1%
<b>33 – Primary Metals</b>	615	77	16	53	8
	2.7%	5.8%	7.5%	6.3%	2.8%
<b>34 – Fabricated Metals</b>	2,386	202	27	151	24
	10.6%	15.1%	12.6%	18.1%	8.3%
<b>35 – Machinery</b>	4,069	125	16	66	43
	18.0%	9.3%	7.5%	7.9%	14.9%
<b>36 – Electronics</b>	1,769	98	16	55	27
	7.8%	7.3%	7.5%	6.6%	9.3%
<b>37 – Transportation Eqp.</b>	1,088	64	9	47	8
	4.8%	4.8%	4.2%	5.6%	2.8%
<b>38 – Instruments</b>	972	42	7	23	12
	4.3%	3.1%	3.3%	2.8%	4.2%
<b>39 – Misc.</b>	1,017	40	5	24	11
	4.5%	3.0%	2.3%	2.9%	3.8%
<b>Other (Pumping)</b>	NA	37	5	19	13
	NA	2.8%	2.3%	2.3%	4.5%
<b>Total</b>	<b>22,595</b>	<b>1,339</b>	<b>214</b>	<b>836</b>	<b>289</b>

**Table S1  
Participant Therm Savings -  
Customer Impacts, Customer Counts and Program Impacts**

Group	Ex-Post Audit Impact (therms)	Ex-Post Audit Impact (% of usage)	Ex-Post Customer Count	Ex-Post Program Impact
Survey Respondents, Total	1,832	2.6%	209	382,898
Recalled Audit	1,415	2.4%	98	183,326
Recalled Audit & Implementation	456	0.6%	98	44,645
Non-Respondents (>1000 Therms)	45	0.1%	818	36,406
Small Customers (<1000 Therms)	23	6.7%	266	6,080
<b>All Participants<sup>a</sup></b>	<b>254</b>	<b>0.6%</b>	<b>1293</b>	<b>328,613</b>

**Notes:**

a) Audit impact per customer determined using the percentage savings from the respondents who recalled the audit and implemented actions

**Table S2  
1995 IEMS Per Customer Annualized Therm Savings<sup>a</sup>**

	Total Audit Group	Non-Response Group	Small Customer Group	Surveyed Group	Surveyed Group, Recall	Surveyed Group, Recall & Implement
<b>Customers</b>	<b>1,293</b>	<b>818</b>	<b>266</b>	<b>209</b>	<b>98</b>	<b>98</b>
<b>90% Upper Confidence Bound</b>	<b>1,014</b>	<b>1,060</b>	<b>48</b>	<b>3,306</b>	<b>3,710</b>	<b>1,942</b>
<b>80% Upper Confidence Bound</b>	<b>863</b>	<b>836</b>	<b>43</b>	<b>2,980</b>	<b>3,304</b>	<b>1,614</b>
<b>Mean Savings</b>	<b>329</b>	<b>45</b>	<b>23</b>	<b>1,832</b>	<b>1,871</b>	<b>456</b>
<b>80% Lower Confidence Bound</b>	<b>(205)</b>	<b>(747)</b>	<b>3</b>	<b>684</b>	<b>437</b>	<b>(703)</b>
<b>90% Lower Confidence Bound</b>	<b>(356)</b>	<b>(971)</b>	<b>(3)</b>	<b>359</b>	<b>31</b>	<b>(1,031)</b>

**Notes:**

a) After correcting for serial correlation; negative values imply dissavings

## **TABLE 7 DOCUMENTATION PROTOCOLS FOR DATA QUALITY AND PROCESSING**

### **A. OVERVIEW INFORMATION**

#### **1. Study title**

First Year Load Impact Study of Southern California Gas Company's 1995 Industrial Energy Management Services Program

**Study ID 710.0**

#### **2. Program/program year**

Industrial Energy Management Services (IEMS), Program Year 1995

#### **Program description**

SoCalGas' 1995 IEMS program provided energy efficiency information (via direct contact with SoCalGas account executives and interns) to the Company's core industrial customers (SIC 20-39 and pumping).

#### **3. End uses covered**

End uses – other

#### **4. Methods and models used**

Customer-specific, time series regression analysis models; specification discussed on pages 19-20 of the report.

#### **5. Participant and comparison group definition**

Participants included SoCalGas nonresidential core customers whose two digit SIC code was 20-39. There was no comparison group since only sub groups of very small industrial customers had not been audited by SoCalGas within the last 2-3 years.

#### **6. Analysis sample size**

The analysis group included 1293 program participants. This was virtually a census. Survey respondents represented 214 customers. An average of 33 months of consumption data was available for each participant.



## **B. DATABASE MANAGEMENT**

### **1. Flow chart illustrating the relationships between data elements**

Included on page 11 of the report.

### **2. Identify the specific data sources ...**

See pages 9-16 of the report. Primary sources were monthly billing data, a participant survey, weather data (HDD), and Bureau of Labor Statistics monthly employment data.

### **3. Diagram and describe the data attrition process...**

Discussion of the attrition process is included on pages 17-18 of the report. Few customers were deleted from the analysis, primarily because they were non-core customers or had very anomalous consumption patterns.

### **4. Describe the internal/organizational data quality checks...**

See pages 17-18 of the report. Dummy variables were added to account for anomalous consumption in individual monthly records for a subset of customers. The DATAPREP.JOB text file included on the data diskette submitted with this report provides the SAS program code identifying each use of dummy variables.

### **5. Provide a summary of the data collected specifically ...**

Survey data not used in the analysis included measures adopted and equipment holdings of customers. The main reason for not including measures adopted was the poor response rate to the question (due to failed memory of the audit). Equipment holdings were not included because there was insufficient data to conduct a conditional demand analysis. Employed survey data are included in the analytic dataset, USAGE.CSV. A copy of the raw survey responses can be obtained from L. Villarreal of SoCalGas.

## **C. SAMPLING**

### **1. Sampling procedures and protocols**

A census was attempted of all participants whose annual consumption exceeded 1,000 therms.

### **2. Survey information**

Appendix A is the survey instrument. The survey is discussed on pages 13-16.

### **3. Statistical descriptions**

Only a limited amount of production data was employed from the survey. The BLS employment data was used a proxy when customer-specific production data was not available. Other than response rates, summary statistics were not useful.

## **D. DATA SCREENING AND ANALYSIS**

### **1. Describe procedures used for the treatment of outliers...**

See pages 17-18 of the report and the DATAPREP.JOB text file for how anomalous consumption data was treated. Only 3 customers were deleted from the analytic data set because of their consumption pattern. These were deleted because the usage dramatic reduction demonstrated in their consumption history could not have been due to an audit response

### **2. Describe what was done to control for the effects of ...**

Changes in weather effects were incorporated, as were changes in production/employment levels.

### **3. Describe procedures, including those identified in Table C-12, ...**

See pages 10-18 of the report (and the DATAPREP.JOB text file for SAS code that eliminated observations).

### **4. Regression statistics**

See pages 24 and 25 of the report, as well as the regression output in appendix B for each customer.

### **5. Specification**

See Energy Use Model Development (pages 19-25) of the report.

During the initial stage of the assessment pooled cross-sectional time series models were considered. In particular the use of a CDA model was considered. It quickly became clear that the use of a CDA model be impossible given the lack of equipment data. Pooling was dropped because of the size and equipment heterogeneity in this sector, and because pooling would have involved a loss of information from a dataset that was already smaller than we had hoped for.

### **6. Error in measuring variables**

It was not believed that measurement error presented a significant problem for this analysis with the exception of customer specific production data. The lack of monthly production data for the majority of participants severely impacted the error bounds on the savings estimates.

### **7. Autocorrelation**

See page 21-23 of the report.

## **8. Heteroscedasticity**

The use of customer-specific models prevented traditional heteroscedasticity problems typical of cross-sectional models.

## **9. Collinearity**

Collinearity was not believed to be a significant problem with the chosen model specification.

## **10. Influential data points**

Outliers were not believed to be a problem given that customer-specific models were employed

## **11. Missing data**

See pages 18 of the report.

## **12. Precision**

See pages 26-27.

# **E. DATA INTERPRETATION AND APPLICATION**

## **1. For all program participants and at the end use level, ...**

Net impacts were calculated by:

1. Calculating average percentage saved as savings from the "survey respondents who recalled the audit and took actions" divided by the total annual therm consumption of respondents who remember the audit (irrespective of whether they took any action)
2. Applying the percentage saved (0.6%) times total IEMS participant consumption
3. Dividing the calculated savings for the IEMS participant group by the number of participants.

## **2. Describe the process, choices made, and rationale for ...**

There was no comparison group, since it was impossible to find a suitable control group among SoCalGas core customers. Of the limited customer information available, the most complete, accurate data was had for survey respondents. The impact of the audit can be most clearly defined for this subset of program participants who recalled having the audit. Those that recalled the audit and recalled taking actions from the audit were clearly influenced by the audit. Those that recalled the audit, but took no action based upon the audit may still have taken other actions, but their savings should not be considered due to the audit.

Savings estimates derived from the respondent group who recalled the audit would have been greater than the final estimate provided, but including savings from survey respondents who claimed they took no action would be inappropriate.