APPENDIX A – DATA SOURCES AND METHODOLOGICAL APPROACH

This appendix provides the methodology and data sources used to estimate refined product demand and supply for the study area.

SUPPLY ESTIMATION

The major supply points for the study area are located in New Jersey. The Linden-Newark-Bayonne area, along with Perth Amboy houses some of the largest petroleum port and storage facilities in the United States. These terminals not only supply regions in the study area, but the northern half of New Jersey, western Pennsylvania, southern New York State, and even New England states via tanker and barge. This region is viewed as a central supply point for the entire northeast for three reasons. There are two large refineries, two large port facilities, and the terminus of the largest petroleum product pipeline in the United States: The Colonial Pipeline. ICF's assumption is that any demand not supplied by New York ports in the study area is made up by the distribution of products from New Jersey.

The primary source of supply data is the U.S. Energy Information Administration (EIA). There are two publications that are useful in estimating the supply picture in the study area. The first is EIA *Company Level Import Data*. This data series is reported on a monthly basis using form EIA-814 "Monthly Imports Report". The smallest geographic location for which data is available is port of entry city. There are four ports in this data series that lie within the study area: Albany, NY, New York, NY, Newark, NJ, and Perth Amboy, NJ. The three products of interest that EIA reported data for were distillate fuel oils, residual fuel oils, and kerosene. Data for volumes of shipments by product were extracted from the EIA database for these four ports and three products. From 1996 to 2003, data for distillate fuel oil imports was broken into two categories based on sulfur content, <.05% sulfur content, which is generally diesel fuel, and >.05% sulfur content, which is mostly home heating oil. Beginning in 2004, distillate fuel oil imports were further broken out into four different categories based on sulfur content. These four categories are: <15 PPM, 15<PPM<=500, 500<PPM<=2000, and >2000 PPM. From 1996-2002, data for residual fuel oil was reported on a total residual fuel oil imports basis. In 2003, EIA began to report residual fuel oil imports on a sulfur content basis. Import volumes for residual fuel oil are now reported by <.31% sulfur content, .31-1.00% sulfur content, and >1.00% sulfur content. The New York City area requires 0.3 % sulfur content residual fuel oil

Imports into Port Cities

Energy Information Administration *Company Level Imports* 1996-2004 available on web at: http://www.eia.doe.gov/oil_gas/petroleum/data_publications/company_level_imports/cli.html.

The second EIA publication used to estimate supply in the study area is EIA *Petroleum Supply Annual.* Table 34 of *Petroleum Supply Annual Volume 2* reports movements of crude oil and petroleum products by tanker and barge between PAD Districts. These data are reported on a monthly basis using form EIA-817 "Monthly Tanker and Barge Movement Report". Data for movements between PADD 3 and Central Atlantic were extracted because the Central Atlantic region encompasses the study area. Once again the products of interest were distillate fuel oils, residual fuel oils, and kerosene. The breakout of residual fuel oils by sulfur is reported in a similar fashion to how the imports are now reported. Data for volumes of shipments of distillate fuel oils are still broken out by only two sulfur categories.

Movements of Petroleum Products between PAD Districts

Energy Information Administration *Petroleum Supply Annual*, Volume 2 1995-2003 and *Petroleum Supply Monthly* Jan. 2004 to Dec. 2004 available on web at:
http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume2/psa_volume2.html
http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_monthly/psm.html

Deriving estimates of movements of distillates and residual fuels from New Jersey to the New York portion of the NYSERDA study area

Movements from NYC Metro-NJ to the NYC Metro-NY Area and Long Island were based on filling the demand requirements for those regions. The figures generated represent the difference between the demands in those two study regions minus imports into those two study regions. The demand data from EIA is the total of all the commercial, industrial, residential, transportation, and electricity generation sales. The import data is from the EIA *Company Level Imports* database.

Movements from NYC Metro-NJ to the Albany/Hudson study region are based on movement data from the United States Army Corp of Engineer *Waterborne Commerce Data Series*. Data for volumes of movements of residual fuel oil and distillate fuel oil between the NYC Metro-NJ and the Albany/Hudson study region were extracted from the *Waterborne Commerce* database. ICF also made an assumption regarding the amount of residual fuel oil supplied from NYC Metro-NJ to the Albany/Hudson region. This was based on the assumption that Albany was the distribution point for the surrounding region. As a result, the Albany/Hudson region requires more supply than would be used solely within the area to meet the surrounding demand. Therefore, ICF concludes the Albany/Hudson region most likely supplies the surrounding region with residual fuel oil via rail and truck transport.

Movements between NYC Metro-NJ study region and Albany/Hudson study region

U.S. Army Corp of Engineers *Waterborne Commerce Data Series* 1995-2003 available on the web at:

http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm.

DEMAND ESTIMATION

The primary source of demand data is the Energy Information Administration (EIA). The EIA publishes two data series related to demand, *Consumption* and *Prime Supplier Sales.* The smallest geographic location for which this data is available is the state level. Consumption is a direct estimate of refined products consumed. *Prime Supplier Sales* is based on the survey form EIA-782-C, that measures primary petroleum product deliveries into the states where they are locally marketed and consumed. To avoid double counting volumes, survey respondents are instructed to exclude sales to other prime suppliers and traders. The design of the EIA-782C makes possible accurate measurement of sales volumes for consumption at the United States and regional levels, as well as for most states[1]. Since actual consumption data at the state level is only available for years prior to 2002, the sales data was used as a substitute for years 2002 and 2003. Neither sales nor consumption data were available at the state level for 2004.

The major sectors for which state-level data is available and their definitions as per EIA are given below.

Residential. An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. Sales to farmhouses are reported under "Farm" and sales to apartment buildings are reported under "Commercial."

Commercial. An energy-consuming sector that consists of service-providing facilities and equipment of non-manufacturing businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking and running a wide variety of other equipment.

Industrial. An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing and mining. Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products.

[1] Energy Information Administration, Prime Supplier Report, January 2005

Electric Power: An energy-consuming sector that consists of electricity only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat to the public. volumes directly imported and used by the electric power companies are included.

Transportation: The transportation sector consists of the following sub-sectors defined by EIA.
Railroad. An energy-consuming sector that consists of all railroads for any use, including that used for heating buildings operated by railroads.
Vessel Bunkering. An energy-consuming sector that consists of commercial or private boats such as pleasure craft, fishing boats, tugboats, an ocean-going vessels, including vessels operated by oil companies. Excluded are volumes sold to the U.S. Armed Forces.
On-Highway Diesel. An energy-consuming sector that consists of motor vehicles: automobiles, trucks, and buses. Vehicles used in the marketing and distribution of petroleum products are also included.
Off-Highway. An energy-consuming sector that consist of farm equipment:
Construction. An energy-consuming sub sector that consist of all facilities and equipment including earthmoving equipment, cranes, generators, air compressors, etc.
Other. An energy-consuming sub-sector that consists of all off-highway uses other than construction. Includes logging, scrape and junk yards, and refrigeration units on trucks.

Deriving County Level Estimates from State level EIA data.

The study region poses a special challenge to determine values for energy consumption, supply and movements, in that the EIA data is only available at the state level, but the study region is at sub-state level. One of the steps taken to make data estimation easier for the study region was to define the region as consisting of distinct counties. This helps estimating numbers for the study region by using demographic and business pattern data that are available in the *County Business Patterns* Report from the U.S. Census. Appropriate characteristics were chosen from Census data that would help ICF estimate the distribution of fuel demand across the various counties. The assumptions used for each of the sectors are given below.

Residential

EIA data provides annual state-wide data for residential consumption of distillate fuel and kerosene for 1960 – 2001 and sales data after that. The U.S. Census Bureau provides the number of housing units using fuel oil for heating on a county-wide level. Housing units within apartment buildings were removed from this total by using the percentage of housing units in multi-unit structures so that only single unit homes were included in the residential data. This information from the Census Bureau was used to calculate the distribution of state energy consumption data among various counties based on the proportion of fuel oil customers within that county. In

cases where counties of interest did not have data on the number of fuel oil customers (only the larger counties have data), the population was used to estimate the proportion of the consumption in that county.

Data Sources for Residential Sector

State Wide Residential Consumption

Energy Information Administration. Table 8. *Residential Sector Energy Consumption Estimates*, *1960-2001, New Jersey* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_nj.html
Energy Information Administration. Table 8. *Residential Sector Energy Consumption Estimates*, *1960-2001, New York* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/res/use_res_ny.html

State Wide Sales for Residential Use
Energy Information Administration. Table 7. *Fuel Oil and Kerosene Sales 2001 - 2003* available on the web at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2001/foks_2001.html
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2002/foks_2002.html
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/distillate.html

Number of Residential Customers
United States Census Bureau. *American Fact Finder – American Community Survey 1998 – 2003* available on the web at:
http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=ACS_2003_EST_G00_&_lang=en&_ts=121188717372

Housing Units in Multi-unit Structures
United States Census Bureau. *State and County Quick Facts 2000* available on the web at:
http://quickfacts.census.gov/qfd/

Heating Degree Days
National Oceanic and Atmospheric Administration. National Climatic Data Center.
http://www.ncdc.noaa.gov/oa/ncdc.html

Industrial and Commercial

The *County Business Patterns* data series provides the number of commercial and industrial establishments present in a county. These establishments are composed of different sectors of business such as wholesale trade, manufacturing etc. Appropriate businesses were grouped under commercial and industrial sectors to provide a means to disaggregate state data into county data. Exhibit A-1 provides a list of various categories under *County Business Patterns*' commercial and industrial establishments and the consumption sector that they were allocated to.

Exhibit A-1: Allocation of County Business Patterns' Commercial and Industrial Establishments categories into energy consumption sectors (Commercial and Industrial only) for the Study area

County Business Pattern Categories	Industrial Sector	Commercial Sector
Forestry, fishing, hunting, and agriculture support		X
Wholesale trade		X
Retail trade		X
Transportation & warehousing		X
Information		X
Finance & insurance		X
Real estate & rental & leasing		X
Professional, scientific & technical services		X
Management of companies & enterprises		X
Admin, support, waste mgt, remediation services		X
Educational services		X
Health care and social assistance		X
Arts, entertainment & recreation		X
Accommodation & food services		X
Other services (except public administration)		X
Auxiliaries (excl. corporate, subsidiary & regional mgt)		X
Unclassified establishments		X
Mining	X	
Utilities	X	
Construction	X	
Manufacturing	X	

Source: US Census Bureau, *County Business Patterns*, and ICF Consulting assumptions

Data Sources for Commercial and Industrial Sectors

State Wide Commercial Consumption
Energy Information Administration. Table 9. *Commercial Sector Energy Consumption Estimates, 1960-2001, New Jersey* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/com/use_com_nj.html
Energy Information Administration. Table 9. *Commercial Sector Energy Consumption Estimates, 1960-2001, New York* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/com/use_com_ny.html

State Wide Sales for Commercial Use
Energy Information Administration. Table 8. *Fuel Oil and Kerosene Sales 2001 - 2003* available on the web at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2001/foks_2001.html
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2002/foks_2002.html
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/distillate.html

Number of Commercial Establishments

United States Census Bureau. *Censtat Database – County Business Patterns 1998 - 2002* (NAICS Codes 11, 42, 44, 48, 51 – 56, 61, 62, 71, 72, 81, 95, 99) available on the web at:
http://censtats.census.gov/cbpnaic/cbpnaic.shtml

Heating Degree Days
National Oceanic and Atmospheric Administration. National Climatic Data Center.
http://www.ncdc.noaa.gov/oa/ncdc.html

State Wide Industrial Consumption
Energy Information Administration. Table 10. *Industrial Sector Energy Consumption Estimates, 1960-2001, New Jersey* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/ind/use_ind_nj.html
Energy Information Administration. Table 10. *Industrial Sector Energy Consumption Estimates, 1960-2001, New York* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/ind/use_ind_ny.html

State Wide Sales for Industrial Use
Energy Information Administration. Table 9. *Fuel Oil and Kerosene Sales 2001 - 2003* available on the web at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2001/foks_2001.html
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2002/foks_2002.html
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/distillate.html

Number of Industrial Establishments
United States Census Bureau. *Censtat Database – County Business Patterns 1998 - 2002* (NAICS Code 21, 22, 23, 31) available on the web at:
http://censtats.census.gov/cbpnaic/cbpnaic.shtml

EIA MECS Survey
Energy Information Administration. *Manufacturing Energy Consumption Survey 1998* available on the web at:
http://www.eia.doe.gov/emeu/mecs/contents.html

Heating Degree Days
National Oceanic and Atmospheric Administration. National Climatic Data Center.
http://www.ncdc.noaa.gov/oa/ncdc.html

Transportation

EIA has state-wide data on transportation consumption of aviation gasoline, distillate fuel, jet fuel, LPG, lubricants, motor gasoline, and residual fuel for years 1960 to 2001. EIA also provides annual state-wide data on sales of distillate fuel and residual fuel oil for transportation use that is used as a surrogate for demand for the years 2002 and 2003. Since diesel is primarily used for on-road consumption in the transportation sector, its consumption was disaggregated to the county level by using the number of gasoline stations in each county given in the Census Bureau's *County Business Patterns*. The primary use of residual fuel in transportation is for vessel bunkering at the ports. A list of ports in the states of New York and New Jersey is available from the U.S. Army Corps of Engineers. A count of the number of ports in the county is the closest indicator of demand for oil at the county-level that could be found. Other alternatives, like residual storage capacity by county, were explored, but were deemed poor indicators since the storage could be for electricity generation or temporary

storage for oil enroute to another location. Yet another alternative, estimating demand by distribution of vessel tonnage by port, was not considered to be any better an indicator than the number of ports.

Data Sources for Transportation Sector

State wide Transportation Consumption

Energy Information Administration. Table 11. *Transportation Sector Energy Consumption Estimates, 1960-2001, New Jersey* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/tra/use_tra_nj.html
Energy Information Administration. Table 11. *Transportation Sector Energy Consumption Estimates, 1960-2001, New York* available on the web at:
http://www.eia.doe.gov/emeu/states/sep_use/tra/use_tra_ny.html

State Wide Sales for Transportation Use
Energy Information Administration. Table 11. *Fuel Oil and Kerosene Sales 2001 - 2003* available on the web at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2001/foks_2001.html
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2002/foks_2002.html
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/distillate.html

Number of Gasoline Stations
United States Census Bureau. *Censtat Database – County Business Patterns 1998 - 2002* (NAICS Code 447) available on the web at:
http://censtats.census.gov/cbpnaic/cbpnaic.shtml

Number of Ports
US Army Corps of Engineers. *NDC Publications and US Waterway Data CD*. Volume 9. 2003

Prime Supplier Sales
Energy Information Administration. *Prime Supplier Report 1998 - 2003*
http://www.eia.doe.gov/oil_gas/petroleum/data_publications/prime_supplier_report/psr_historical.html

Electricity Generation

The EIA-906 *"Power Plant Report"* contains fuel consumption data at the power plant level for both utility and non-utility electricity generation. This data was used for the years 1997 to 2001. Individual plants were mapped to the county and region that they are located in. The consumption from plants that could not be mapped was divided using the same proportions as industrial demand. Although the EIA-906 data is available for the years 2002 and 2003, EIA sales data was used instead in order to be consistent with estimation methodology used for the other sectors. The state-level sales data was distributed among the various counties and regions in the study area using the 2002 demand data from EIA-906.

State Consumption Data

- EIA has state-wide data on electric plant consumption of distillate fuel, jet fuel, LPG, and residual fuel for 1960 – 2001.

State Sales Data

- EIA data provides annual state-wide data on sales of distillate fuel and residual fuel oil for electric plant use.

Plant-Level Data

- The EIA form 906 contains fuel consumption data at the power plant level for both utility and non-utility electricity generation. Individual plants were mapped to the county that they are located in.
- The consumption from plants that could not be mapped was divided using the same proportions as industrial demand.

Daily Approximation

- Consumption from electric power generation was assumed to follow the same pattern as cooling degree days for Brooklyn, NY.

Data Sources for Electric Power Sector

State Wide Sales for Electric Plant Use
Energy Information Administration. Table 10. *Fuel Oil and Kerosene Sales 2001 - 2003* available on the web at:
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2001/foks_2001.html
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/fuel_oil_and_kerosene_sales/historical/2002/foks_2002.html
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/distillate.html

Electric Plant Consumption
Energy Information Administration. *EIA 906 Database – Monthly Utility Power Plant Database 1998 – 2003available on web at:*
http://www.eia.doe.gov/cneaf/electricity/page/eia906u.html

METHODOLOGY FOR DATA EXTRAPOLATION OF GAS DEMAND OF INTERRUPTIBLE CUSTOMERS FOR 2004-2005 HEATING SEASON

ICF extrapolated the monthly gas consumption of interruptible customers from October 2004 to the remaining months of the 2004-2005 winter season in order to assess the number of days coverage that the fuel oil storage capacity would provide to these customers in an event of a gas supply interruption. The extrapolation was done using scaling factors derived from an analysis of sectoral gas consumption in New York State.

The demand 'scaling factor' for each month of the 2004-2005 winter season was calculated as the daily average demand in each sector for that month divided by the daily average demand for October 2004. The scaling factor was then applied to the October 2004 gas consumption for only the gas interruptible customers (customers successfully cross-referenced between databases) to estimate their likely gas demand[2] from December 2004 until March 2005. This estimated gas demand was then used to calculate the number of days coverage that the fuel oil storage capacity will provide. The state level natural gas consumption data from EIA that was used to estimate the scaling factor categorizes apartment buildings in the commercial sector. Exhibits IV-10 and IV-11

[2] The data for interruptible customers was allocated to either Commercial, Industrial or Electric Sector based on their 'Site Type' in Exhibit IV-10. Customers with unclear site type like "Other" or "Unknown" were assigned to the commercial sector and the respective scaling factor was used.

extrapolate the gas consumption for apartment buildings using the same classification as EIA. However, apartment buildings may also exhibit gas usage in a pattern that mirrors the residential sector that shows a greater peak in the winter than the commercial sector. Therefore, Exhibits IV-12 to IV-13 estimate the number of days of fuel backup storage assuming apartment buildings to be in the residential sector in order to evaluate the case of extreme winter demand peak. It should also be noted that sectoral New York state consumption data from the EIA for January 2005 were affected somewhat by interruptible customers being instructed to switch off gas, as the last half of that month was very cold. The specifics of those interruptions were as follows: KeySpan Long Island - customers were interrupted for 3 days, Con Edison - customers were interrupted for approximately 9 days, and Central Hudson - customers were interrupted for 15 days. These gas interruptions result in actual gas consumption being lower than true gas demand since some customers would have switched to alternative fuels during the interruption period.

APPENDIX B – MODELING RESULTS

Appendix on the Fuel-Switching Simulation

The objective of this simulation is to estimate the distribution of fuel switching per heating season caused by natural gas supply interruptions in the study area. Because the frequency with which levels of switching occur is of interest, especially for extreme events, the output of the simulation shows not just the mean, but the full expected range of the quantity of such fuel switching.

Basic Design

The model simulates the markets in the study area for natural gas, No. 2 distillate fuel oil, and No. 6 residual fuel oil. The unit of time in the simulation is one day. While it is difficult to obtain all the data inputs with that frequency, it is necessary to model natural gas interruptions on the daily level as the decision to ask for interruptions is made on a daily basis. Some interruptions may be as short as one day.

The model runs in two modes, calibration and forecasting. During its development, the simulation was run in calibration mode which models the markets for all the days of an historical heating season and then compares the simulated results with actual history. The key comparison is predicted natural gas interruptions to dual-fired customers versus actual interruptions.

Once a good match is found, the model can be run in forecasting mode. To do this it uses models of the behavior of heating degree days (HDD) over the heating season in the study area and the behavior of wholesale prices of the three fuels. These equations generate a large number of simulated heating seasons, and the results by season are collected to estimate the full range of outcomes of interest.

Demand: Sectors, Fuels, and Entities

The simulation models four demand sectors – residential, commercial, industrial, and electric utility. Three fuels are included – natural gas, distillate, and residual. The residential sector demands only distillate and natural gas; the other three sectors utilize all three fuels.

The basic simplifying concept in the model is entities, which are the source of demand for fuels. An entity is defined by its sector and the set of fuels it can burn. Exhibit B-1 lists the 17 entities that were used in the model. As the exhibit shows, the commercial, industrial, and electric utility sectors have five sectors each that burn distillate only, natural gas only, residual fuel only, gas and distillate, and gas and residual fuel.

The exhibit also shows the typical daily demand of each entity and its demand function. The demand functions for the single-fired entities were estimated by regression analysis. Those for the dual-fired entities were made by combining the functions of the corresponding single-fired entities within the same sector. The typical demand levels of the dual-fired entities were calibrated to match the fuel switching observed during some historical gas interruptions.

Exhibit B-1: Model Inputs for Entities

		Typical				
		Consumption	Demand Function Coefficients			Elasticity
Sector	Fuels Burned	(Dth/day)	Intercept	HDD	Price	at Means
Residential	Distillate Oil	1,415,313	241,560	38,175	-65,246	-0.52
Residential	Natural Gas	1,812,341	37,160	48,614	-8,338	-0.23
Commercial	Distillate Oil	599,568	342,892	16,185	-614	-0.57
Commercial	Natural Gas	1,064,285	150,318	33,804	-32,084	-0.31
Commercial	Residual Oil	419,047	144,079	11,312	-307	-0.35
Commercial	Gas & Dist.	176,430	51,068	5,314	-3,550	-0.40
Commercial	Gas & Resid.	106,119	20,622	3,238	-2,381	-0.32
Industrial	Distillate Oil	68,265	51,760	1,843	-97.7	-0.76
Industrial	Natural Gas	227,639	109,180	4,163	-2,274	-0.08
Industrial	Residual Oil	114,429	100,928	3,089	-215	-0.89
Industrial	Gas & Dist.	19,112	10,294	385	-144	-0.23
Industrial	Gas & Resid.	38,898	23,671	820	-75.2	-0.34
Elec. Utility	Distillate Oil	18,038	87,392	487	-196	-4.88
Elec. Utility	Natural Gas	545,982	756,133	27,147	-266,422	-1.71
Elec. Utility	Residual Oil	643,038	308,404	17,358	-656	-0.48
Elec. Utility	Gas & Dist.	3,442	8,227	148	-1,108	-2.63
Elec. Utility	Gas & Resid.	210,932	189,060	7,901	-22,484	-1.05

All the demand curves are linear functions of HDD and the retail price of their fuel. The units of measure are decatherms for quantity and (2000) dollars per decatherm for prices. This uniformity facilitates the fuel switching that goes on as the model seeks a market equilibrium across the three submarkets. As the demand functions are linear, the coefficients show the rate of change in demand with respect to HDD and price. Unlike such functions that use the logs of the dependent and independent variables, the estimated coefficients are not interpretable as elasticities. However, a typical elasticity can be computed at the means of the data, and these elasticities are shown in the far-right column of the exhibit. The elasticities seem reasonable. Residential gas demand is inelastic, as expected, with an elasticity of –0.23. All the demands are inelastic except for four of the functions in the electric utility sector, but this makes sense, too, as that sector has more substitutes for fuel inputs, including buying outside power.

Inventories

The simulation tracks the levels of tertiary inventories of distillate and residual fuel held by entities. Primary inventories at terminals and bulks storage and secondary inventories held by distributors are not tracked in the model. Entities consume from inventory when the market price is relatively high and can bid for refills when the price is low or equal to the outside price[3].

The inventory capacity of all nonresidential entities is equal to the averages obtained by the provided data: 47.5, 33.2, and 41.8 days of consumption for commercial, industrial, and electric utility distillate customers, respectively, and 52.3 and 49.9 days of supply for commercial and industrial residual users. No data were available for electric utility residual customers, so their capacity was assumed to equal that of electric utility distillate users. These tanks are assumed to be 75 percent full at the beginning of the heating season.

For the distillate-burning residential entity, inventory capacity is set equal to one-fifth of the average heating-season consumption. On average, tanks are assumed to be 62.5 percent full at the beginning of the season on November 1.

Inventories have a refill fraction. When stocks fall below the refill level, the entity tries to refill when the price is low. For the residential sector the refill fraction is 0.625.[4] The other entities are assumed to receive refills that bring their stocks up to 75 percent original capacity. Refills are not assumed to bring stocks up to aggregate capacity in either case because of diversity – all customers do not obtain refills at once. It takes time for sellers to cycle through the entire list of customers, and the first on the list can consumer a considerable fraction of the last refill before the last on the list is refilled.

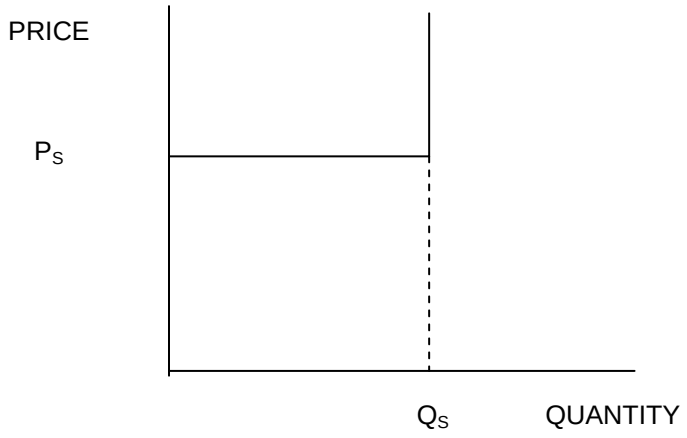
The model's inventories also have a runout fraction, a level at which some members of the entity run out of inventory. Our model of residential inventories indicates this would begin to happen at 37.5 percent of capacity. For other entities, which probably have less fill diversity, runout starts at one-quarter fill.

Supply

The simulation has a model of the supply of each of the three fuels at the retail level for a single day. These models are simple but realistic. Exhibit B-2 provides a generic example, which illustrates the shape of the supply schedule for all three fuels. The supply curves are completely elastic at price P_s from Q=0 out to Q_s at which it becomes completely inelastic.

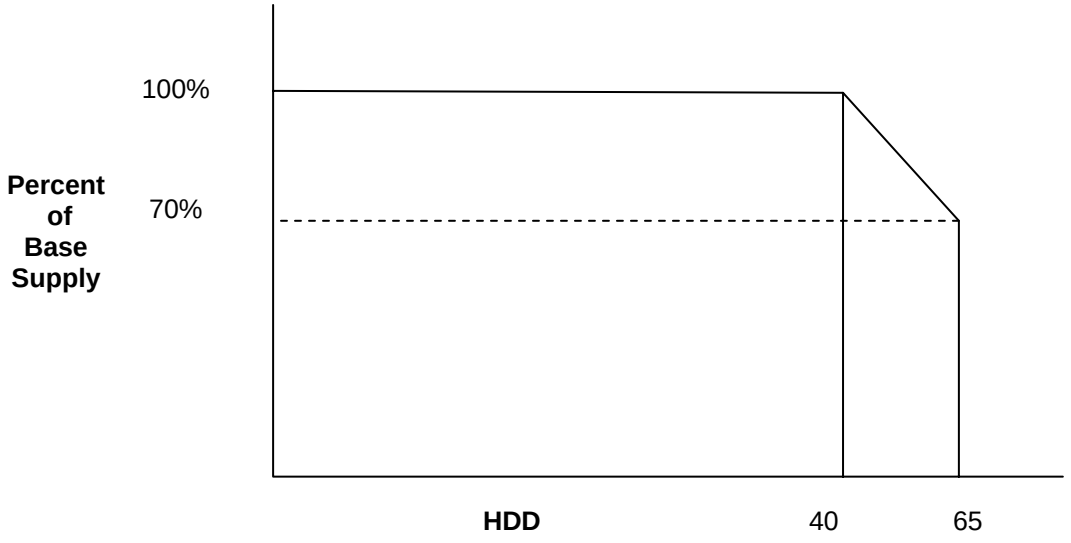
[3] See the next section for a definition of the outside price.
[4] The residential refill fraction value is derived from this model: The typical behavior of heating oil distributors is to refill residential tanks when the fill drops to one-quarter. Once the system is in equilibrium with a diversity of fill levels, the average fill will be the average of one-quarter and full or 5/8 (0.625).

Exhibit B-2:



Q_s is the maximum quantity that can be supplied in a day. For the liquid fuels, ICF estimated these supplies at 24,451,600 gallons of distillate per day and 16,800,000 gallons of residual fuel per day. However, these limits are not constant. For the liquid fuels it clearly varies with ice and snow conditions that affect delivery by truck or barge. We approximate this relationship by reducing the Q_s for distillate and resid at low temperatures, as illustrated in Exhibit B-3. As the exhibit shows Q_s is constant between 0 and 40 HHD, and then falls linearly to 65 HDD where it reaches 70 percent of the maximum. This estimate of 70 percent is taken from responses we received from heating oil distributors. While HDD is not a perfect proxy for ice and snow conditions, there is not sufficient data on actual snow and ice conditions to use them as variables in the model.

B-3: Distillate and Resid Supply Reductions in Very Cold Weather



The natural gas supply is not constant, either. The gas supply comes from an essentially constant component: from pipelines and peaking components from gas storage, cogeneration sources, and winter peak shaving. In a cold heating season, the peaking components can be exhausted before the season ends, so the maximum gas supply can decline. ICF estimated the maximum that could be attained from all gas suppliers into the study area at 6,031 kilodecatherms of which 2,378 kilodecatherms are from flowing pipelines.

The ideal measure for P_s would be a lower-bound price set in the outside market that reflects the general level of prices rather than local conditions. For example, for the liquid fuels, it would reflect the world price of crude oil, and the levels of primary stocks, but not the effect of current, local temperature; that is handled in the model. We chose to use the New York Harbor prices of distillate and residual fuel. They are close to ideal as they are correlated with world prices and with deviations of primary stock levels from normal. However, they are also somewhat correlated with deviations of HDD in the Northeast, but on balance, they are the best available.

However, to use these wholesale prices in the model, we had to connect them to the retail prices needed for the market supply models. We found that regression analysis could estimate the relationship between monthly retail and wholesale prices. The formulas we used are shown in Exhibit B-4. In calibration mode, the model reads in daily wholesale prices and uses those formulas to convert them to the three base prices (P_s).

Exhibit B-4: Equations to Convert Wholesale to Retail Prices

Sector	Fuels Burned	Intercept	Beta
Residential	Distillate Oil	0.77	0.73
Residential	Natural Gas	8.07	0.23
Commercial	Distillate Oil	0.17	1.03
Commercial	Natural Gas	5.09	0.67
Commercial	Residual Oil	0.24	0.84
Industrial	Distillate Oil	0.10	1.08
Industrial	Natural Gas	3.46	0.73
Industrial	Residual Oil	0.24	0.84
Elec. Utility	Distillate Oil	0.02	1.28
Elec. Utility	Natural Gas	0.82	1.12
Elec. Utility	Residual Oil	0.24	0.84

Equilibration

To find an equilibrium set of fuel prices, the model polls each entity in turn and lets it switch an increment of fuel demand from a higher price fuel alternative to one with a lower price. This polling and switching procedure continues until no customer can obtain a lower price from any further switching.

Entities that use only natural gas cannot switch; they simply buy what is indicated by their demand curves at the equilibrium gas price. Entities that do not use gas have two supply alternatives, buy on the market or use some inventory. The price of inventory is conventionally set at one cent above P_s so that inventory will be used only when the market price is being bid up the inelastic part of the supply curve.

When the market price is at the base, no one takes from inventory because they can get all they want at the lowest possible price. Also, when prices are at the base, entities with inventories below the refill level will bid for fuel to refill their tanks to the refill fraction. If the total demand for refilling is greater than the amount that would drive the total demand to Q_s, then the available refill is prorated among the applicants. Thus, the demand for refilling is not allowed to bid up the market price above P_s.

Even though this algorithm does not involve looking ahead or optimizing complex dynamics, it makes the entities mimic optimizing behavior. They buy inventory at a low price and use it when the market price is high.

Running Out

Entities that burn a liquid fuel can run out. Running out occurs when inventory at the beginning of the day is below the runout fraction and the part of an entity's consumption that comes from a liquid fuel is less than its demand for that fuel at P_s. For example, if an entity starts the day with inventory ten percent below the runout level and does not make up that decatherm shortfall by buying a fuel on the market, then ten percent of that entity has run out. Dual-fired entities can make up the shortfall with either fuel if their gas supply has not been interrupted.

Statistics and Accounting

After the simulation solves for the market equilibrium, it updates the balance sheet for each entity finding its demand, inventory use, inventory refill, and consumption. Statistics on running out, days that demand at P_s exceeded supply, and switching from gas are collected and aggregated for the heating season.

Calibration

The simulation was calibrated against the data we had on the actual interruption experience of the 2002-2003 heating season. We also intended to calibrate against the 2003-2004, but the data for that season were inconsistent. During midwinter, the data we collected showed that HDDs as low as 39 were causing interruptions, but in February and March HDDs as high as 50 were not.

The 2002-2003 heating season was quite cold – the third coldest of the 21 seasons from 1984 to 2004. According to the data we collected for the 2001 through 2004 heating seasons, this one had the most gas supply interruptions at 76 days, and is the logical choice for calibration.

The simulation's summary page of statistics for the calibration is shown in Exhibit B-5. The five lines of documentation record the key input assumptions and parameter values that were adopted for this model run. As the exhibit shows, these include:

- **Gas supply interruptions for nonresidential customers.** The model can let dual-fired entities choose their more economic fuel, or it can use the option adopted in this run to interrupt such entities whenever the demand for gas exceeds the supply.
- **Using 40 tranches of gas surge capacity.** From the load-curve data provided by National Grid, we constructed tranches of gas supplies from storage, cogeneration, and winter peaking. Each tranche has a volume in decatherms and a limiting number of days it can be drawn.
- **Variable supplies of distillate & residual fuels.** As discussed above, the available supplies of distillate and residual fall when the HDD exceeds 40 to reflect the slowing of truck deliveries during extreme weather.
- **Residential distillate inventories started at equilibrium.** The simulation gives the user the option to start residential heating oil full or in equilibrium on November 1. Equilibrium means that the tanks have a steady-state range of fills; some are calling for refill, some have just been filled, etc. The model assumes that the average fill for residential tanks is 62.5 percent in equilibrium.
- **Nonresidential refill factors at 75 percent.** Nonresidential tanks can be started full on November 1 or at 75 percent of capacity, and the model user can choose whether they refill after use to 100 percent or to 75 percent. The former would represent diligent efforts by companies to refill their tanks after use.

The first table on the summary page shows the number of days that each fuel supply was insufficient to meet demand at the base price. For natural gas, this condition means an interruption for dual-fired customers in this run, as explained in the first bullet above. The summary in the exhibit shows that the model predicted that there should have been 71 gas supply interruptions; in fact 76 occurred, which is close agreement. However, these

statistics do not account for whether the predicted and actual interruptions occurred on the same days. The "hits" statistic handles that and shows that 63 of the 73 interruptions predicted by the model match actual interruptions. The summary also shows that distillate fuel supplies fell short of demand on seven days and residual fuel supplies were short on 17 days.

The table of runout days in Exhibit B-5 shows the number of days that each entity ran out of distillate or residual fuel. Only residual-only entities ran out. The commercial entity ran out for just less than one day. This can be interpreted as 96 percent of the companies in the entity ran out for a day. Runout days for the residual-only industrial entity was 0.61; it was 0.91 for the electric utilities burning resid only.

The last table in the summary shows the number of days that the dual-fired entities either chose to switch to a liquid fuel or were forced by an interruption to do so. We expect the minimum here to be about 73, the number of gas interruption days, and the maximum can be more because of voluntary switching, especially in late March when the base price of residual fuel was lower than the price of gas.

Exhibit B-5: 2002-2003 Heating Season

Gas supply interruptions for nonresidential customers
Using 40 tranches of gas surge capacity
Variable supplies of dist. & resid
Residential distillate inventories started at equilibrium
Nonresidential refill factors at 75 percent

Days that Demand at Base Price Exceeded Supply

	Gas	Dist	Resid
Model	71	7	16
Hits	61		
History	76		

Runout Days by Entity

Num	Sector	Fuel 1	Fuel 2	Days Out
1	Residential	Dist	None	0.00
3	Commercial	Dist	None	0.00
5	Commercial	Resid	None	0.00
6	Commercial	Gas	Dist	0.00
7	Commercial	Gas	Resid	0.00
8	Industrial	Dist	None	0.00
10	Industrial	Resid	None	0.00
11	Industrial	Gas	Dist	0.00
12	Industrial	Gas	Resid	0.00
13	Electric	Dist	None	0.00
15	Electric	Resid	None	0.00
16	Electric	Gas	Dist	0.00
17	Electric	Gas	Resid	0.00
Weighted Average				0.00

Days Switched

Num	Sector	Fuel 1	Fuel 2	From Gas
6	Commercial	Gas	Dist	72.8
7	Commercial	Gas	Resid	80.4
11	Industrial	Gas	Dist	72.9
12	Industrial	Gas	Resid	81.1
16	Electric	Gas	Dist	73.1
17	Electric	Gas	Resid	81.4

B-6: 2002-2003 Heating Season

HS		Demand in KDth			Supply in KDth			Prices in $/Dth		
Day	HDD	Gas	Dist	Resid	Gas	Dist	Resid	Gas	Dist	Resid
1	26.0	3319.	1203.	1076.|	3583.	3391.	2515.|	4.12	5.10	4.42
2	36.0	4723.	1562.	1324.|	4820.	3391.	2515.|	3.82	5.10	4.42
3	32.0	4202.	1419.	1225.|	4375.	3391.	2515.|	3.82	5.10	4.42
4	26.0	3421.	1205.	1076.|	3583.	3391.	2515.|	3.82	5.05	4.42
5	27.0	3592.	1246.	1100.|	3709.	3391.	2515.|	3.70	4.93	4.34
6	28.0	3734.	1284.	1125.|	4093.	3391.	2515.|	3.66	4.88	4.30
7	32.0	4246.	1430.	1225.|	4375.	3391.	2515.|	3.69	4.82	4.13
8	21.0	2819.	1037.	952.|	3012.	3391.	2515.|	3.67	4.77	4.13
9	11.0	1563.	677.	703.|	2378.	3391.	2515.|	3.54	4.77	4.13
10	6.0	935.	498.	579.|	2378.	3391.	2515.|	3.54	4.77	4.13
11	7.0	1042.	534.	604.|	2378.	3391.	2515.|	3.54	4.77	4.17
12	20.0	2716.	999.	927.|	3012.	3391.	2515.|	3.59	4.82	4.30
13	21.0	2844.	1042.	952.|	3012.	3391.	2515.|	3.60	4.65	4.19
14	25.0	3365.	1184.	1051.|	3583.	3391.	2515.|	3.60	4.69	4.19
15	17.0	2301.	894.	852.|	2378.	3391.	2515.|	3.66	4.75	4.15
16	34.0	4510.	1505.	1274.|	4524.	3391.	2515.|	3.68	4.75	4.15
17	32.0	4249.	1433.	1225.|	4375.	3391.	2515.|	3.68	4.75	4.15
18	29.0	3859.	1316.	1150.|	4093.	3391.	2515.|	3.68	4.99	4.23
19	28.0	3644.	1281.	1125.|	3709.	3391.	2515.|	3.93	4.97	4.30
20	25.0	3233.	1165.	1051.|	3583.	3391.	2515.|	3.99	5.16	4.33
21	28.0	3616.	1273.	1125.|	3709.	3391.	2515.|	4.01	5.16	4.30
22	24.0	3104.	1123.	1026.|	3583.	3391.	2515.|	3.98	5.31	4.34
23	28.0	3600.	1267.	1125.|	3709.	3391.	2515.|	4.06	5.31	4.34
24	25.0	3209.	1159.	1051.|	3583.	3391.	2515.|	4.06	5.31	4.34
25	27.0	3470.	1236.	1100.|	3583.	3391.	2515.|	4.06	5.17	4.34
26	28.0	3593.	1269.	1125.|	3709.	3391.	2515.|	4.08	5.26	4.36
27	39.0	5061.	1666.	1398.|	5096.	3391.	2515.|	3.97	5.21	4.44
28	43.0	5581.	1810.	1498.|	5606.	3269.	2424.|	3.97	5.21	4.44
29	35.0	4540.	1522.	1299.|	4575.	3391.	2515.|	3.97	5.21	4.44
30	26.0	3368.	1199.	1076.|	3583.	3391.	2515.|	3.97	5.21	4.44
31	37.0	4817.	1594.	1349.|	4820.	3391.	2515.|	3.92	5.21	4.42
32	35.0	4557. +	1516.	1299.|	4575.	3391.	2515.|	3.92	5.36	4.42
33	50.0	6009. +	2218.	1989.|	6031.	2984.	2213.|	3.96	5.29	4.42
34	45.0	5808. +	1883.	1547.|	5814.	3188.	2364.|	4.07	5.17	4.56
35	44.0	5713. +	1845.	1522.|	5751.	3228.	2394.|	3.97	5.22	4.68
36	43.0	5546. +	1812.	1498.|	5558.	3269.	2424.|	4.08	5.16	4.60
37	40.0	5143. +	1704.	1423.|	5224.	3391.	2515.|	4.11	5.16	4.60
38	36.0	4622. +	1560.	1324.|	4630.	3391.	2515.|	4.11	5.16	4.60
39	53.0	6008. +	2430.	2122.|	6031.	2862.	2122.|	4.11	5.21	8.02
40	48.0	6031.*	2031.	1728.|	6031.	3066.	2273.|	4.11	5.26	4.60
41	41.0	5272.	1735.	1448.|	5315.	3351.	2485.|	4.12	5.27	4.60
42	34.0	4284.	1478.	1274.|	4375.	3391.	2515.|	4.34	5.41	4.72
43	36.0	4487. +	1543.	1323.|	4524.	3391.	2515.|	4.51	5.57	4.92
44	28.0	3372. +	1256.	1125.|	3583.	3391.	2515.|	4.73	5.57	4.92
45	28.0	3372.	1256.	1125.|	3583.	3391.	2515.|	4.73	5.57	4.92
46	36.0	4414.	1533.	1323.|	4451.	3391.	2515.|	4.73	5.83	5.24

47	48.0	5888.	1969.	1621.|	5897.	3066.	2273.|	4.99	5.72	5.24
48	49.0	5960.	2007.	1754.|	5980.	3025.	2243.|	4.82	5.83	5.17
49	41.0	5085.	1709.	1447.|	5096.	3351.	2485.|	4.67	5.91	5.17
50	23.0	2690. +	1062.	1000.|	3012.	3391.	2515.|	4.82	5.91	5.17
51	31.0	3761. +	1350.	1199.|	4093.	3391.	2515.|	4.73	5.91	5.17
52	26.0	3110.	1170.	1075.|	3583.	3391.	2515.|	4.73	5.91	5.17
53	30.0	3631.	1304.	1174.|	3709.	3391.	2515.|	4.73	6.15	5.21
54	35.0	4289.	1482.	1298.|	4375.	3391.	2515.|	4.71	6.18	5.32
55	38.0	4679.	1590.	1373.|	4820.	3391.	2515.|	4.71	6.18	5.32
56	37.0	4549.	1553.	1348.|	4575.	3391.	2515.|	4.71	6.22	5.36
57	44.0	5473.	1804.	1522.|	5519.	3228.	2394.|	4.68	6.22	5.36
58	35.0	4361.	1481.	1298.|	4375.	3391.	2515.|	4.50	6.22	5.36
59	32.0	3971.	1373.	1224.|	4093.	3391.	2515.|	4.50	6.22	5.36
60	41.0	5143.	1708.	1447.|	5224.	3351.	2485.|	4.50	5.95	5.36
61	27.0	3339.	1202.	1100.|	3545.	3391.	2515.|	4.44	6.01	5.36
62	31.0	3919.	1348.	1199.|	3975.	3391.	2515.|	4.27	5.96	5.31
63	43.0	5313.*	1791.	1621.|	5313.	3269.	2424.|	4.33	6.04	5.54
64	42.0	5248.	1730.	1472.|	5276.	3310.	2454.|	4.57	6.27	5.61
65	37.0	4532.	1551.	1348.|	4548.	3391.	2515.|	4.76	6.27	5.61
66	40.0	4923.	1658.	1422.|	4973.	3391.	2515.|	4.76	6.27	5.61
67	43.0	4723.	1936.	1905.|	4742.	3269.	2424.|	4.76	6.09	5.57
68	48.0	4742.*	2245.	2245.|	4742.	3066.	2273.|	5.73	5.80	5.42
69	37.0	4609.	1574.	1348.|	4614.	3391.	2515.|	4.54	5.70	5.27
70	36.0	4423.	1527.	1323.|	4462.	3391.	2515.|	4.70	5.96	5.42
71	47.0	4742.*+	2200.	2209.|	4742.	3106.	2304.|	5.36	5.88	5.42
72	45.0	4697.*+	2118.	2123.|	4697.	3188.	2364.|	4.81	5.88	5.42
73	44.0	4678. +	2036.	2034.|	4697.	3228.	2394.|	4.81	5.88	5.42
74	45.0	4659.*+	2113.	2136.|	4659.	3188.	2364.|	4.89	5.99	5.42
75	54.0	4650.*+	2479.	2092.|	4650.	2821.	2092.|	8.23	6.09	7.85
76	54.0	4614.*+	2476.	2092.|	4614.	2821.	2092.|	8.39	6.17	7.85
77	48.0	4230.*+	2232.	2238.|	4230.	3066.	2273.|	7.38	6.09	5.69
78	53.0	4230.*+	2438.	2122.|	4230.	2862.	2122.|	15.36	6.09	7.88
79	64.0	4103.*+	2415.	1791.|	4103.	2415.	1791.|	40.63	8.25	8.42
80	58.0	4103.*+	2644.	1898.|	4103.	2659.	1972.|	28.46	6.09	5.69
81	49.0	4103.*+	2273.	2191.|	4103.	3025.	2243.|	10.21	6.09	5.69
82	61.0	4027.*+	2537.	1800.|	4027.	2537.	1881.|	36.33	7.33	5.77
83	61.0	4027.*+	2537.	1881.|	4027.	2537.	1881.|	36.33	7.33	9.48
84	64.0	3978.*+	2415.	1791.|	3978.	2415.	1791.|	43.55	8.25	8.42
85	57.0	3927.*+	2586.	1931.|	3927.	2699.	2002.|	30.55	6.47	5.95
86	52.0	3854.*+	2380.	2153.|	3854.	2903.	2153.|	22.12	6.47	8.85
87	45.0	3664.*+	2091.	2123.|	3664.	3188.	2364.|	12.38	6.47	5.95
88	58.0	3664.*+	2630.	1892.|	3664.	2659.	1972.|	38.75	6.40	5.95
89	65.0	3605.*+	2374.	1689.|	3605.	2374.	1760.|	54.33	9.02	5.95
90	46.0	3324.*+	2126.	2158.|	3324.	3147.	2334.|	22.38	6.60	5.99
91	51.0	3324.*+	2328.	2183.|	3324.	2944.	2183.|	32.52	6.70	8.73
92	47.0	3272.*+	2170.	2189.|	3272.	3106.	2304.|	25.61	6.55	6.18
93	33.0	3272.*+	1572.	1631.|	3272.	3391.	2515.|	5.22	6.53	6.16
94	29.0	3167.*+	1322.	1244.|	3167.	3391.	2515.|	5.21	6.53	6.16
95	31.0	3074. +	1477.	1563.|	3088.	3391.	2515.|	5.17	6.46	6.01
96	30.0	3071.*+	1388.	1408.|	3071.	3391.	2515.|	5.33	6.75	6.01
97	39.0	3071.*+	1816.	1903.|	3071.	3391.	2515.|	14.11	7.07	6.09
98	46.0	3071.*+	2078.	2144.|	3071.	3147.	2334.|	28.31	7.66	6.54
99	42.0	2986.*+	1888.	1992.|	2986.	3310.	2454.|	22.19	8.21	6.84
100	49.0	2986.*+	2176.	2214.|	2986.	3025.	2243.|	36.38	8.21	6.84

101	41.0	2986.*+	1847.	1956.|	2986.	3351.	2485.|	20.16	8.21	6.84
102	40.0	2803.*+	1824.	1914.|	2803.	3391.	2515.|	22.41	7.80	7.06
103	52.0	2803.*+	2324.	2153.|	2803.	2903.	2153.|	46.75	7.68	10.08
104	48.0	2803.*+	2172.	2198.|	2803.	3066.	2273.|	38.64	7.40	7.21
105	55.0	2631.*+	2455.	1996.|	2631.	2781.	2062.|	56.85	7.51	7.21
106	59.0	2612.*+	2613.	1941.|	2612.	2618.	1941.|	65.42	7.68	10.55
107	61.0	2612.*+	2537.	1881.|	2612.	2537.	1881.|	71.06	8.34	9.92
108	65.0	2612.*+	2374.	1708.|	2612.	2374.	1760.|	90.96	10.18	7.36
109	55.0	2552.*+	2448.	1992.|	2552.	2781.	2062.|	58.71	7.68	7.36
110	42.0	2552.*+	1911.	1978.|	2552.	3310.	2454.|	32.35	7.72	7.36
111	34.0	2463.*+	1570.	1690.|	2463.	3391.	2515.|	18.20	7.95	7.36
112	33.0	2438.*+	1543.	1659.|	2438.	3391.	2515.|	16.77	7.66	7.14
113	34.0	2438.*+	1569.	1695.|	2438.	3391.	2515.|	18.79	7.97	7.17
114	28.0	2438.*+	1322.	1478.|	2438.	3391.	2515.|	6.63	7.97	7.17
115	35.0	2438.*+	1610.	1731.|	2438.	3391.	2515.|	20.82	7.97	7.17
116	43.0	2438.*+	1928.	2007.|	2438.	3269.	2424.|	37.04	8.23	7.66
117	51.0	2432.*+	2274.	2183.|	2432.	2944.	2183.|	53.40	7.87	9.65
118	56.0	2432.*+	2470.	2032.|	2432.	2740.	2032.|	63.54	8.10	10.76
119	48.0	2432.*+	2143.	2179.|	2432.	3066.	2273.|	47.31	8.03	7.98
120	42.0	2432.*+	1883.	1962.|	2432.	3310.	2454.|	35.15	8.33	7.98
121	30.0	2432.*+	1389.	1530.|	2432.	3391.	2515.|	10.81	8.32	7.98
122	33.0	2420.*+	1512.	1638.|	2420.	3391.	2515.|	17.19	8.32	7.98
123	54.0	2420.*+	2363.	2092.|	2420.	2821.	2092.|	59.77	8.64	10.34
124	47.0	2420.*+	2101.	2147.|	2420.	3106.	2304.|	45.58	8.05	7.81
125	31.0	2420.*+	1446.	1574.|	2420.	3391.	2515.|	13.13	7.97	7.66
126	46.0	2420.*+	2073.	2119.|	2420.	3147.	2334.|	43.55	7.76	7.51
127	51.0	2396.*+	2258.	2134.|	2396.	2944.	2183.|	54.26	8.23	7.47
128	31.0	2396.*+	1434.	1579.|	2396.	3391.	2515.|	13.70	8.23	7.47
129	38.0	2396.*+	1722.	1831.|	2396.	3391.	2515.|	27.90	8.23	7.47
130	50.0	2396.*+	2217.	2213.|	2396.	2984.	2213.|	52.23	8.22	9.44
131	41.0	2396.*+	1859.	1942.|	2396.	3351.	2485.|	33.98	7.94	7.36
132	26.0	2384. +	1216.	1357.|	2396.	3391.	2515.|	5.78	7.86	7.21
133	40.0	2396.*+	1848.	1924.|	2396.	3391.	2515.|	31.96	7.28	6.68
134	47.0	2396.*+	2151.	2192.|	2396.	3106.	2304.|	46.15	6.97	6.08
135	28.0	2396.*	1368.	1507.|	2396.	3391.	2515.|	7.62	6.97	6.08
136	23.0	2396.*	1113.	1177.|	2396.	3391.	2515.|	4.82	6.97	6.08
137	16.0	1875.	786.	826.|	2378.	3391.	2515.|	4.79	6.51	5.89
138	24.0	2367.	1217.	1306.|	2378.	3391.	2515.|	4.93	6.16	5.03
139	29.0	2378.*	1452.	1576.|	2378.	3391.	2515.|	10.05	6.03	4.80
140	31.0	2378.*	1536.	1654.|	2378.	3391.	2515.|	14.10	5.99	4.54
141	18.0	1777.	905.	1186.|	2378.	3391.	2515.|	4.81	5.36	4.54
142	19.0	1901.	941.	1222.|	2378.	3391.	2515.|	4.68	5.36	4.54
143	24.0	2378.*	1231.	1402.|	2378.	3391.	2515.|	4.69	5.36	4.54
144	22.0	2258.	1044.	1332.|	2378.	3391.	2515.|	4.68	5.47	4.47
145	10.0	1048.	626.	903.|	2378.	3391.	2515.|	4.70	5.16	4.32
146	21.0	2137.	1022.	1301.|	2378.	3391.	2515.|	4.68	5.14	4.28
147	22.0	2302.	1042.	1335.|	2378.	3391.	2515.|	4.54	5.52	4.36
148	17.0	1713.	860.	1154.|	2378.	3391.	2515.|	4.52	5.59	4.36
149	10.0	1048.	608.	902.|	2378.	3391.	2515.|	4.68	5.59	4.36
150	28.0	2378.*	1431.	1551.|	2378.	3391.	2515.|	8.02	5.59	4.36
151	35.0	2378.*	1727.	1803.|	2378.	3391.	2515.|	22.22	5.42	4.36

Key: * = Simulation called a gas interruption
+ = Historical day of gas interruption

Exhibit B-6, above, provides a day-by-day picture of the simulated markets for the three fuels. The first two columns show the day and the historical HDD. The next three labeled columns show the demand for the three fuels in kilodecatherms. Just to the right of the gas demand column, the model indicates with a "+" days of historical gas interruptions and uses an asterisk to mark days that the model predicted were interruptions. Note the close correspondence between the two during the coldest part of the heating season.

The next three columns show supplies. The gas supply generally goes up on colder days as storage is used (until it runs out) while the distillate and residual fuel supplies go down when the HDD is colder than 40.

The last three columns on the right are the shadow prices of the three fuels. When demand is less than supply, this is equal to the outside (or base) price. When demand exceeds supply, its price is bid up.

Exhibits B-7 through B-10 (shown at the end of the Appendix) show how the model keeps track of each entity's demand and use of inventory. Each exhibit shows a single sector starting with residential. For the dual-fired entities, the exhibits show how they switch from fuel to fuel. Inventory refilling is shown for entities that use a liquid fuel. Runouts occur for entities that use a liquid fuel when their inventories are empty, and they cannot get the decatherms they want from gas. Examination of these exhibits indicates that the entities engage in logical, economic behavior.

Prediction

Having calibrated to a cold heating season, we switched the simulation to prediction mode and ran it for a large number of simulated winters to make a variety of long-run predictions and to examine the effect of a change in policy on holding nonresidential inventories.

To run the predictions we estimated time series models of the daily behavior of HDD and the prices of the three fuels. A model of daily HDD is a key equation required for a simulation of fuel switching. We estimated an equation that simulates the daily HDD in Albany using data from a twenty-year period. The specification is:

$$(1)\quad HDD_t = \alpha + \beta_1 HDD_{t-1} + \beta_2 HDD_{t-2} + \beta_3 HDD_{t-3} + \Sigma\delta_i Year_i + \varepsilon_t$$

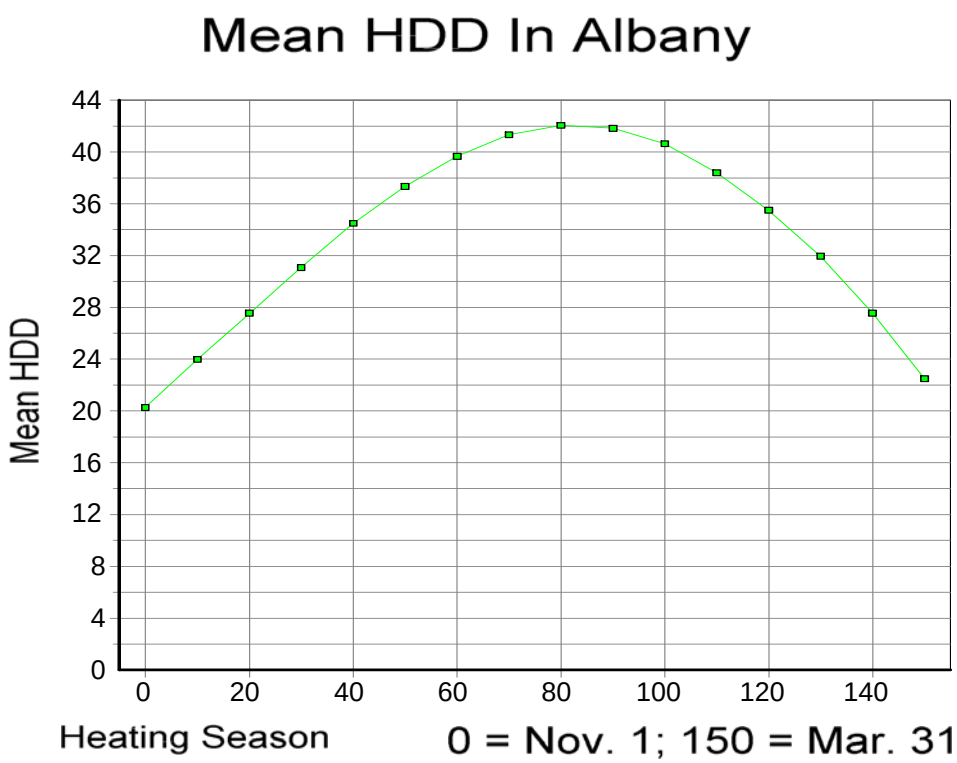
where the HDDs are daily deviations from normal;
α, the βs, and the δs are parameters to be estimated; and
ε_t is the error term.

This specification has worked well in other similar applications.[5] The daily HDD observations are converted to deviations by subtracting the expected HDD for each day given the number of days into the heating season, with day zero being November 1. We estimated a model with Shiller[6] smoothness priors to establish the normal HDD level for each day of the heating season in Albany. Exhibit B-11 shows the resulting curve.

The results of fitting the daily model shown in equation 1 to the HDD deviations are shown in Exhibit B-12. The coefficients on the three lagged HDD deviations decline in magnitude with greater lag, as one would expect. They alternate in sign, which is typical, too, for a series in which all the neighboring members are positively correlated.

By using the estimated parameters from the regression and the standard error of the regression for random shocks, we can simulate heating-season HDD deviations. Then, adding the expected HDD to that which yields an HDD series that behaves just like the original. This is quite useful in a simulation analysis of the fuels markets in the study area.

Exhibit B-11: Mean in Albany



[5] See *Report to Congress on the Feasibility of Establishing a Heating Oil Reserve Component to the Strategic Petroleum Reserve*, App. D., p. D-11.
[6] Robert Shiller, "Smoothness Priors and Nonlinear Regression," *JASA*, Vol. 79, No. 387, Sept. 1984, pp. 609-615.

Exhibit B-12: Model of Daily HDD Deviations in Albany

Model Summary

Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate
1	.689	.475	.472	6.85871

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	138089.3	22	6276.789	133.430	.000
	Residual	152510.0	3242	47.042		
	Total	290599.3	3264			

Coefficients[a,b]

Model		Unstandardized Coefficients		t	Sig.
		B	Std. Error		
1	INTERCEP	.003809	.364	.010	.992
	HDDDEV1	.785732	.017	45.677	.000
	HDDDEV2	-.279898	.021	-13.076	.000
	HDDDEV3	.127405	.017	7.410	.000
	YEAR85	-.540431	.627	-.862	.389
	YEAR86	.317643	.623	.510	.610
	YEAR87	.357118	.623	.573	.567
	YEAR88	.267743	.623	.430	.667
	YEAR89	.130671	.623	.210	.834
	YEAR90	-.043375	.623	-.070	.944
	YEAR91	-.811128	.624	-1.300	.194
	YEAR92	-.051701	.623	-.083	.934
	YEAR93	.611094	.624	.980	.327
	YEAR94	1.430801	.626	2.286	.022
	YEAR95	-1.270227	.625	-2.032	.042
	YEAR96	1.042957	.624	1.670	.095
	YEAR97	-.204087	.623	-.328	.743
	YEAR98	-.648967	.623	-1.041	.298
	YEAR99	-.404810	.623	-.649	.516
	YEAR00	-.667633	.624	-1.070	.285
	YEAR01	.630974	.626	1.008	.313
	YEAR02	-1.771813	.623	-2.842	.005
	YEAR03	1.321104	.622	2.125	.034
	YEAR04	.304067	.618	.492	.623

a. Dependent Variable: HDDDEV

b. Linear Regression through the Origin

As a set, the four models reflect the effects of temperature on prices and the effects of each price on the other two.

Exhibit B-13 shows the averages and other statistics from the base-case simulation, which used all the same assumptions as calibration mode. The average heating season HDD was 5175. By comparison the total HDD for the 2002-2003 heating season was 5645. Again, this indicates how cold that winter was relative to others. The days that each fuel was out of supply are lower, too, at 60, 2, and 10 for gas, distillate, and resid compared to 71, 7, and 16 in the calibration run.

The next column to the right in Exhibit B-13 shows statistics for a once-in-a-century heating season. At 6069 HHD, this extreme heating season is colder than any observed from 1984 to 2004; the season ending in 1994 was the coldest of those at 5826 HDD. The number of gas interruption days goes up by 25 over the mean to 85. Even this very cold heating season does not stress distillate supplies. The number of days that the base-price demand exceeds supply rises to 9, but no distillate burning entity runs out. For residual fuel the number of days of excess demand rises significantly, but still no residual-burning entities run out. The actual output of the model shows the days of runout, but those are not included here because they are all zero.

Exhibit B-13:

Statistics from from 1999 interations of the Simulation				
Entity	**Mean**	**Standard Deviation**	**Once in a Century**	**Cold Reduces Supply**
HDD	5175	406.7	6069	6181
Days Supply Exceeded:				
Gas	60	20.9	85	85
Distillate	2	2.4	9	18
Resid	10	5.2	21	21

In case our distillate and residual supplies estimates are too high, we ran a scenario to test the effect of reducing that supply. The most important time for supply is during colder weather, so we supposed that the survey data overestimate the ability of trucks to deliver fuel on very cold days and reduced the supply that could be obtained at zero F to 50 percent instead of the 30 percent used in the base case. The results of that run for the once-in-a-century heating season are shown in Exhibit B-13. The only important difference between this case and the last is that the number of days that the distillate demand exceeds supply rises from 9 to 18. This increase, however, does not result in any instances of distillate customers running out.

Exhibit B-7: Residential Sector

	Residential Distillate				Natural Gas
Day	Dem	CII	Cons	Inv	Demand
1	557	0	557	33333	1267
2	793	0	793	33333	1755
3	699	0	699	33333	1561
4	559	0	559	33333	1269
5	588	0	588	33333	1319
6	613	0	613	33333	1368
7	710	0	710	33333	1562
8	453	0	453	33333	1027
9	216	0	216	33333	542
10	98	0	98	33333	299
11	122	0	122	33333	348
12	427	0	427	33333	979
13	457	0	457	33333	1028
14	550	0	550	33333	1223
15	359	0	359	33333	833
16	760	0	760	33333	1659
17	713	0	713	33333	1562
18	633	0	633	33333	1416
19	610	0	610	33333	1366
20	531	0	531	33333	1219
21	602	0	602	33333	1365
22	502	0	502	33333	1171
23	596	0	596	33333	1365
24	525	0	525	33333	1219
25	578	0	578	33333	1316
26	598	0	598	33333	1364
27	860	0	860	33333	1900
28	954	0	954	33333	2094
29	765	0	765	33333	1706
30	553	0	553	33333	1268
31	813	0	813	33333	1803
32	759	0	759	33333	1706
33	1116	0	1116	33333	2435
34	1003	0	1003	33333	2191
35	977	0	977	33333	2143
36	956	0	956	33333	2094
37	886	0	886	33333	1947
38	791	0	791	33333	1753
39	1190	0	1190	33333	2579
40	1070	0	1070	33333	2336
41	905	0	905	33333	1996
42	734	0	734	33333	1654
43	774	0	774	33333	1750
44	585	0	585	33333	1359

45	585	0	585	33333	1359
46	764	0	764	33333	1748
47	1052	0	1052	33333	2329
48	1071	0	1071	33333	2379
49	879	0	879	33333	1991
50	454	0	454	33333	1115
51	643	0	643	33333	1505
52	525	0	525	33333	1262
53	609	0	609	33333	1456
54	726	0	726	33333	1699
55	797	0	797	33333	1845
56	772	0	772	33333	1797
57	937	0	937	33333	2137
58	725	0	725	33333	1701
59	654	0	654	33333	1555
60	877	0	877	33333	1993
61	544	0	544	33333	1313
62	641	0	641	33333	1509
63	921	0	921	33333	2091
64	888	0	888	33333	2041
65	770	0	770	33333	1796
66	840	0	840	33333	1942
67	919	0	919	33333	2088
68	1048	0	1048	33333	2323
69	793	0	793	33333	1798
70	759	0	759	33333	1748
71	1021	0	1021	33333	2277
72	974	0	974	33333	2185
73	951	0	951	33333	2136
74	970	0	970	33333	2184
75	1178	0	1178	33333	2594
76	1175	0	1175	33333	2592
77	1037	0	1037	33333	2309
78	1155	0	1155	33333	2486
79	1128	-198	1326	33134	2810
80	1273	0	1273	33134	2619
81	1060	0	1060	33134	2334
82	1229	-64	1293	33069	2700
83	1229	-64	1293	33004	2700
84	1128	-198	1326	32805	2785
85	1234	0	1234	32805	2553
86	1116	0	1116	32805	2381
87	951	0	951	32805	2122
88	1260	0	1260	32805	2534
89	1122	-197	1319	32607	2744
90	969	0	969	32607	2087
91	1083	0	1083	32607	2245
92	995	0	995	32607	2108

93	665	0	665	32607	1598
94	570	0	570	32607	1404
95	620	0	620	32607	1501
96	585	0	585	32607	1451
97	785	0	785	32607	1815
98	926	0	926	32607	2037
99	809	0	809	32607	1894
100	975	0	975	32607	2116
101	786	0	786	32607	1862
102	779	0	779	32607	1795
103	1067	0	1067	32607	2175
104	984	0	984	32607	2048
105	1145	0	1145	32607	2237
106	1232	0	1232	32607	2360
107	1190	-62	1252	32545	2410
108	1082	-190	1272	32354	2439
109	1138	0	1138	32354	2221
110	830	0	830	32354	1809
111	631	0	631	32354	1538
112	619	0	619	32354	1502
113	630	0	630	32354	1533
114	489	0	489	32354	1343
115	654	0	654	32354	1565
116	832	0	832	32354	1819
117	1036	0	1036	32354	2071
118	1144	0	1144	32354	2230
119	958	0	958	32354	1976
120	805	0	805	32354	1786
121	522	0	522	32354	1405
122	593	0	593	32354	1498
123	1076	0	1076	32354	2164
124	934	0	934	32354	1942
125	559	0	559	32354	1435
126	922	0	922	32354	1910
127	1021	0	1021	32354	2064
128	549	0	549	32354	1430
129	714	0	714	32354	1652
130	998	0	998	32354	2032
131	797	0	797	32354	1747
132	446	0	446	32354	1253
133	800	0	800	32354	1715
134	978	0	978	32354	1937
135	529	0	529	32354	1335
136	411	0	411	32354	1115
137	264	0	264	32354	775
138	467	0	467	32354	1163
139	591	0	591	32354	1363
140	639	0	639	32354	1427

Final Report
September, 2006

141	358	0	358	32354	872
142	382	0	382	32354	922
143	500	0	500	32354	1165
144	448	0	448	32354	1068
145	177	0	177	32354	484
146	438	0	438	32354	1019
147	446	0	446	32354	1069
148	325	0	325	32354	826
149	160	0	160	32354	484
150	585	0	585	32354	1331
151	757	0	757	32354	1553

Exhibit B-8: Commercial Sector

	Single Fuel Distillate				SF Gas	Single Fuel Residual				Dual Fuel Distillate					Dual Fuel Residual				
Day	Dem	CII	Cons	Inv	Dem	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv
1	505	0	505	13490	897	289	0	289	10352	149	0	0	0	5981	85	0	0	0	4126
2	612	0	612	13490	1245	364	0	364	10352	197	0	0	0	5981	116	0	0	0	4126
3	569	0	569	13490	1110	334	0	334	10352	178	0	0	0	5981	104	0	0	0	4126
4	505	0	505	13490	907	289	0	289	10352	150	0	0	0	5981	86	0	0	0	4126
5	516	0	516	13490	944	297	0	297	10352	155	0	0	0	5981	89	0	0	0	4126
6	526	0	526	13490	979	304	0	304	10352	160	0	0	0	5981	92	0	0	0	4126
7	569	0	569	13490	1114	334	0	334	10352	179	0	0	0	5981	104	0	0	0	4126
8	451	0	451	13490	742	252	0	252	10352	126	0	0	0	5981	71	0	0	0	4126
9	344	0	344	13490	409	177	0	177	10352	79	0	0	0	5981	42	0	0	0	4126
10	290	0	290	13490	240	139	0	139	10352	55	0	0	0	5981	27	0	0	0	4126
11	301	0	301	13490	274	147	0	147	10352	60	0	0	0	5981	30	0	0	0	4126
12	440	0	440	13490	711	244	0	244	10352	122	0	0	0	5981	69	0	0	0	4126
13	451	0	451	13490	745	252	0	252	10352	127	0	0	0	5981	72	0	0	0	4126
14	494	0	494	13490	880	282	0	282	10352	146	0	0	0	5981	83	0	0	0	4126
15	408	0	408	13490	608	222	0	222	10352	107	0	0	0	5981	59	0	0	0	4126
16	591	0	591	13490	1182	349	0	349	10352	188	0	0	0	5981	110	0	0	0	4126
17	569	0	569	13490	1114	334	0	334	10352	179	0	0	0	5981	104	0	0	0	4126
18	537	0	537	13490	1013	312	0	312	10352	165	0	0	0	5981	95	0	0	0	4126
19	526	0	526	13490	971	304	0	304	10352	159	0	0	0	5981	92	0	0	0	4126
20	494	0	494	13490	868	282	0	282	10352	144	0	0	0	5981	83	0	0	0	4126
21	526	0	526	13490	968	304	0	304	10352	159	0	0	0	5981	91	0	0	0	4126
22	483	0	483	13490	834	274	0	274	10352	140	0	0	0	5981	80	0	0	0	4126
23	526	0	526	13490	967	304	0	304	10352	158	0	0	0	5981	91	0	0	0	4126
24	494	0	494	13490	865	282	0	282	10352	144	0	0	0	5981	82	0	0	0	4126
25	515	0	515	13490	933	297	0	297	10352	154	0	0	0	5981	88	0	0	0	4126
26	526	0	526	13490	966	304	0	304	10352	158	0	0	0	5981	91	0	0	0	4126
27	644	0	644	13490	1341	386	0	386	10352	211	0	0	0	5981	124	0	0	0	4126
28	687	0	687	13490	1476	416	0	416	10352	230	0	0	0	5981	136	0	0	0	4126
29	601	0	601	13490	1206	357	0	357	10352	192	0	0	0	5981	112	0	0	0	4126
30	505	0	505	13490	902	289	0	289	10352	149	0	0	0	5981	86	0	0	0	4126

31	623	0	623	13490	1275	371	0	371	10352	202	0	0	0	5981	118	0	0	0	4126
32	601	0	601	13490	1208	357	0	357	10352	192	0	0	0	5981	113	0	0	0	4126
33	763	0	763	13490	1713	469	0	469	10352	119	142	0	142	5981	71	86	0	86	4126
34	709	0	709	13490	1541	431	0	431	10352	239	0	0	0	5981	142	0	0	0	4126
35	698	0	698	13490	1510	424	0	424	10352	235	0	0	0	5981	139	0	0	0	4126
36	687	0	687	13490	1473	416	0	416	10352	230	0	0	0	5981	136	0	0	0	4126
37	655	0	655	13490	1370	394	0	394	10352	215	0	0	0	5981	127	0	0	0	4126
38	612	0	612	13490	1235	364	0	364	10352	196	0	0	0	5981	115	0	0	0	4126
39	795	0	795	13490	1810	466	-24	490	10328	42	232	0	232	5981	41	117	0	117	4126
40	741	0	741	13490	1641	454	25	454	10352	215	37	0	37	5981	143	7	0	7	4126
41	666	0	666	13490	1404	401	0	401	10352	220	0	0	0	5981	130	0	0	0	4126
42	591	0	591	13490	1160	349	0	349	10352	186	0	0	0	5981	109	0	0	0	4126
43	612	0	612	13490	1222	364	0	364	10352	195	0	0	0	5981	114	0	0	0	4126
44	526	0	526	13490	945	304	0	304	10352	156	0	0	0	5981	90	0	0	0	4126
45	526	0	526	13490	945	304	0	304	10352	156	0	0	0	5981	90	0	0	0	4126
46	612	0	612	13490	1216	364	0	364	10352	194	0	0	0	5981	114	0	0	0	4126
47	741	0	741	13490	1613	454	0	454	10352	250	0	0	0	5981	149	0	0	0	4126
48	752	0	752	13490	1652	461	0	461	10352	256	0	0	0	5981	107	45	0	45	4126
49	666	0	666	13490	1387	401	0	401	10352	218	0	0	0	5981	129	0	0	0	4126
50	472	0	472	13490	773	267	0	267	10352	132	0	0	0	5981	75	0	0	0	4126
51	558	0	558	13490	1046	326	0	326	10352	170	0	0	0	5981	99	0	0	0	4126
52	504	0	504	13490	877	289	0	289	10352	147	0	0	0	5981	84	0	0	0	4126
53	547	0	547	13490	1013	319	0	319	10352	166	0	0	0	5981	96	0	0	0	4126
54	601	0	601	13490	1182	356	0	356	10352	189	0	0	0	5981	111	0	0	0	4126
55	633	0	633	13490	1284	379	0	379	10352	204	0	0	0	5981	120	0	0	0	4126
56	622	0	622	13490	1250	371	0	371	10352	199	0	0	0	5981	117	0	0	0	4126
57	698	0	698	13490	1488	424	0	424	10352	232	0	0	0	5981	138	0	0	0	4126
58	601	0	601	13490	1189	356	0	356	10352	190	0	0	0	5981	111	0	0	0	4126
59	569	0	569	13490	1088	334	0	334	10352	176	0	0	0	5981	102	0	0	0	4126
60	666	0	666	13490	1392	401	0	401	10352	219	0	0	0	5981	129	0	0	0	4126
61	515	0	515	13490	921	296	0	296	10352	152	0	0	0	5981	87	0	0	0	4126
62	558	0	558	13490	1061	326	0	326	10352	172	0	0	0	5981	100	0	0	0	4126
63	687	0	687	13490	1465	416	0	416	10352	217	11	0	11	5981	135	0	0	0	4126
64	676	0	676	13490	1423	409	0	409	10352	223	0	0	0	5981	132	0	0	0	4126

65	622	0	622	13490	1248	371	0	371	10352	199	0	0	0	5981	116	0	0	0	4126
66	655	0	655	13490	1350	394	0	394	10352	213	0	0	0	5981	125	0	0	0	4126
67	687	0	687	13490	1451	416	0	416	10352	80	145	0	145	5981	60	73	0	73	4126
68	741	0	741	13490	1589	454	0	454	10352	0	248	0	248	5981	0	148	0	148	4126
69	623	0	623	13490	1256	371	0	371	10352	200	0	0	0	5981	117	0	0	0	4126
70	612	0	612	13490	1216	364	0	364	10352	194	0	0	0	5981	114	0	0	0	4126
71	730	0	730	13490	1567	446	0	446	10352	0	242	0	242	5981	0	145	0	145	4126
72	709	0	709	13490	1517	431	0	431	10352	0	233	0	233	5981	14	125	0	125	4126
73	698	0	698	13490	1483	424	0	424	10352	35	194	0	194	5981	34	102	0	102	4126
74	709	0	709	13490	1515	431	0	431	10352	0	233	0	233	5981	0	139	0	139	4126
75	805	0	805	13490	1712	398	-99	497	10253	0	275	0	275	5981	0	144	-15	159	4110
76	805	0	805	13490	1706	398	-99	497	10153	0	275	0	275	5981	0	144	-15	159	4094
77	741	0	741	13490	1536	454	12	454	10164	0	247	0	247	5981	0	147	2	147	4096
78	794	0	794	13490	1449	392	-97	489	10066	0	270	0	270	5981	0	141	-15	156	4080
79	775	-136	911	13353	1010	315	-257	572	9809	0	315	0	315	5981	0	170	-18	188	4061
80	848	11	837	13364	1198	370	-120	490	9687	0	294	0	294	5981	0	159	-12	171	4048
81	751	126	625	13490	1479	461	15	461	9703	0	251	0	251	5981	0	150	2	150	4050
82	792	-87	879	13402	1047	275	-239	514	9463	0	304	0	304	5981	0	149	-32	181	4017
83	792	-87	879	13314	1047	275	-274	549	9188	0	304	0	304	5981	0	142	-34	176	3981
84	775	-136	911	13177	916	315	-257	572	8930	0	315	0	315	5981	0	170	-18	188	3963
85	837	89	748	13266	1097	365	-131	496	8798	0	288	0	288	5981	0	156	-14	170	3948
86	784	223	561	13490	1198	459	-23	482	8774	0	264	0	264	5981	0	152	0	152	3948
87	708	0	708	13490	1274	431	69	431	8843	0	231	0	231	5981	0	138	8	138	3956
88	848	0	848	13490	868	370	-131	501	8711	0	293	0	293	5981	0	159	-14	173	3941
89	738	-183	921	13305	605	203	-352	555	8358	0	317	0	317	5981	0	138	-55	193	3885
90	719	184	535	13490	987	439	50	439	8408	0	235	0	235	5981	0	140	6	140	3891
91	773	0	773	13490	831	452	-23	475	8384	0	259	0	259	5981	0	149	0	149	3891
92	730	0	730	13490	917	446	33	446	8417	0	240	0	240	5981	0	143	4	143	3895
93	579	0	579	13490	1099	341	253	341	8671	18	156	0	156	5981	21	81	30	81	3925
94	536	0	536	13490	964	311	364	311	9035	95	62	0	62	5981	64	27	44	27	3969
95	558	0	558	13490	1032	326	273	326	9308	34	131	0	131	5981	29	67	33	67	4001
96	547	0	547	13490	993	319	317	319	9625	65	95	0	95	5981	47	46	38	46	4039
97	644	0	644	13490	1016	386	175	386	9800	0	200	0	200	5981	0	119	21	119	4060
98	719	0	719	13490	797	438	54	438	9855	0	231	0	231	5981	0	139	7	139	4066

99	675	0	675	13490	858	408	133	408	9987	0	210	0	210	5981	0	126	16	126	4082
100	751	0	751	13490	639	438	-13	451	9973	0	244	0	244	5981	0	140	-5	145	4076
101	665	0	665	13490	889	401	158	401	10130	0	206	0	206	5981	0	123	21	123	4097
102	654	0	654	13490	783	393	179	393	10310	0	202	0	202	5981	0	120	24	120	4120
103	783	0	783	13490	408	459	-23	482	10285	0	260	0	260	5981	0	141	-6	147	4113
104	740	0	740	13490	533	453	19	453	10305	0	242	0	242	5981	0	143	4	143	4117
105	815	0	815	13490	186	430	-27	457	10276	0	275	0	275	5981	0	156	1	156	4118
106	858	0	858	13490	46	348	-186	534	10089	0	293	0	293	5981	0	152	-16	168	4101
107	835	-43	878	13446	0	413	-137	550	9952	0	300	0	300	5981	0	176	0	176	4101
108	783	-137	920	13307	0	261	-287	548	9664	0	313	0	313	5981	0	155	-36	191	4064
109	815	182	633	13490	126	430	-53	483	9610	0	274	0	274	5981	0	156	-5	161	4058
110	676	0	676	13490	532	408	115	408	9725	0	212	0	212	5981	0	125	11	125	4068
111	590	0	590	13490	716	348	199	348	9924	0	173	0	173	5981	0	101	18	101	4087
112	579	0	579	13490	728	341	207	341	10131	0	170	0	170	5981	0	99	19	99	4106
113	590	0	590	13490	697	348	198	348	10329	0	173	0	173	5981	0	102	18	102	4124
114	525	0	525	13490	884	304	23	304	10352	0	145	0	145	5981	0	84	2	84	4126
115	600	0	600	13490	665	356	0	356	10352	0	178	0	178	5981	0	105	0	105	4126
116	686	0	686	13490	415	416	0	416	10352	0	215	0	215	5981	0	128	0	128	4126
117	772	0	772	13490	161	475	0	475	10352	0	255	0	255	5981	0	147	0	147	4126
118	826	0	826	13490	5	384	-127	511	10224	0	278	0	278	5981	0	143	-15	158	4110
119	740	0	740	13490	255	453	29	453	10253	0	240	0	240	5981	0	142	4	142	4114
120	675	0	675	13490	442	408	99	408	10352	0	210	0	210	5981	0	124	12	124	4126
121	546	0	546	13490	818	318	0	318	10352	0	153	0	153	5981	0	88	0	88	4126
122	579	0	579	13490	714	341	0	341	10352	0	167	0	167	5981	0	97	0	97	4126
123	804	0	804	13490	58	398	-99	497	10253	0	266	0	266	5981	0	139	-14	153	4111
124	729	0	729	13490	277	446	64	446	10317	0	235	0	235	5981	0	139	10	139	4120
125	557	0	557	13490	777	326	35	326	10352	0	159	0	159	5981	0	92	5	92	4126
126	719	0	719	13490	308	438	0	438	10352	0	231	0	231	5981	0	137	0	137	4126
127	772	0	772	13490	133	428	-47	475	10305	0	253	0	253	5981	0	137	-14	151	4111
128	557	0	557	13490	759	326	48	326	10352	0	158	0	158	5981	0	92	15	92	4126
129	632	0	632	13490	540	378	0	378	10352	0	191	0	191	5981	0	113	0	113	4126
130	761	0	761	13490	165	468	0	468	10352	0	249	0	249	5981	0	144	0	144	4126
131	665	0	665	13490	446	401	0	401	10352	0	207	0	207	5981	0	122	0	122	4126
132	504	0	504	13490	844	289	0	289	10352	29	108	0	108	5981	16	62	0	62	4126

133	654	0	654	13490	477	393	0	393	10352	0	204	0	204	5981	0	121	0	121	4126
134	730	0	730	13490	258	446	0	446	10352	0	239	0	239	5981	0	143	0	143	4126
135	526	0	526	13490	852	304	0	304	10352	0	148	0	148	5981	0	87	0	87	4126
136	472	0	472	13490	773	266	0	266	10352	46	81	0	81	5981	30	43	0	43	4126
137	397	0	397	13490	538	214	0	214	10352	99	0	0	0	5981	54	0	0	0	4126
138	483	0	483	13490	803	274	0	274	10352	20	112	0	112	5981	12	66	0	66	4126
139	537	0	537	13490	808	312	0	312	10352	0	156	0	156	5981	0	93	0	93	4126
140	558	0	558	13490	746	327	0	327	10352	0	166	0	166	5981	0	99	0	99	4126
141	419	0	419	13490	604	229	0	229	10352	108	0	0	0	5981	0	60	0	60	4126
142	429	0	429	13490	642	237	0	237	10352	113	0	0	0	5981	0	63	0	63	4126
143	483	0	483	13490	811	274	0	274	10352	41	94	0	94	5981	0	78	0	78	4126
144	462	0	462	13490	744	259	0	259	10352	128	0	0	0	5981	0	72	0	72	4126
145	333	0	333	13490	338	169	0	169	10352	70	0	0	0	5981	0	37	0	37	4126
146	451	0	451	13490	710	252	0	252	10352	123	0	0	0	5981	0	70	0	70	4126
147	462	0	462	13490	748	259	0	259	10352	128	0	0	0	5981	0	73	0	73	4126
148	408	0	408	13490	580	222	0	222	10352	104	0	0	0	5981	0	58	0	58	4126
149	333	0	333	13490	338	169	0	169	10352	70	0	0	0	5981	0	37	0	37	4126
150	526	0	526	13490	839	304	0	304	10352	0	153	0	153	5981	0	91	0	91	4126
151	601	0	601	13490	621	357	0	357	10352	0	187	0	187	5981	0	111	0	111	4126

Exhibit B-9: Industrial Sector

	Single Fuel Distillate				SF Gas	Single Fuel Residual				Dual Fuel Distillate					Dual Fuel Residual				
Day	Dem	CII	Cons	Inv	Dem	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv
1	66	0	66	1076	208	119	0	119	2699	18	0	0	0	305	38	0	0	0	931
2	78	0	78	1076	250	140	0	140	2699	21	0	0	0	305	45	0	0	0	931
3	73	0	73	1076	234	132	0	132	2699	20	0	0	0	305	42	0	0	0	931
4	66	0	66	1076	209	119	0	119	2699	18	0	0	0	305	38	0	0	0	931
5	67	0	67	1076	213	121	0	121	2699	18	0	0	0	305	39	0	0	0	931
6	68	0	68	1076	217	124	0	124	2699	18	0	0	0	305	39	0	0	0	931
7	73	0	73	1076	234	132	0	132	2699	20	0	0	0	305	42	0	0	0	931
8	60	0	60	1076	188	109	0	109	2699	16	0	0	0	305	35	0	0	0	931
9	48	0	48	1076	147	89	0	89	2699	13	0	0	0	305	27	0	0	0	931
10	41	0	41	1076	126	79	0	79	2699	11	0	0	0	305	24	0	0	0	931
11	43	0	43	1076	130	81	0	81	2699	11	0	0	0	305	25	0	0	0	931
12	59	0	59	1076	184	107	0	107	2699	16	0	0	0	305	34	0	0	0	931
13	60	0	60	1076	188	109	0	109	2699	16	0	0	0	305	35	0	0	0	931
14	65	0	65	1076	205	117	0	117	2699	17	0	0	0	305	37	0	0	0	931
15	55	0	55	1076	172	101	0	101	2699	15	0	0	0	305	32	0	0	0	931
16	76	0	76	1076	242	136	0	136	2699	21	0	0	0	305	44	0	0	0	931
17	73	0	73	1076	234	132	0	132	2699	20	0	0	0	305	42	0	0	0	931
18	70	0	70	1076	222	126	0	126	2699	19	0	0	0	305	40	0	0	0	931
19	68	0	68	1076	217	124	0	124	2699	18	0	0	0	305	39	0	0	0	931
20	65	0	65	1076	204	117	0	117	2699	17	0	0	0	305	37	0	0	0	931
21	68	0	68	1076	217	124	0	124	2699	18	0	0	0	305	39	0	0	0	931
22	64	0	64	1076	200	115	0	115	2699	17	0	0	0	305	37	0	0	0	931
23	68	0	68	1076	217	124	0	124	2699	18	0	0	0	305	39	0	0	0	931
24	65	0	65	1076	204	117	0	117	2699	17	0	0	0	305	37	0	0	0	931
25	67	0	67	1076	212	121	0	121	2699	18	0	0	0	305	39	0	0	0	931
26	68	0	68	1076	216	124	0	124	2699	18	0	0	0	305	39	0	0	0	931
27	82	0	82	1076	263	146	0	146	2699	22	0	0	0	305	47	0	0	0	931
28	87	0	87	1076	279	154	0	154	2699	24	0	0	0	305	50	0	0	0	931

29	77	0	77	1076	246	138	0	138	2699	21	0	0	0	305	44	0	0	0	931
30	66	0	66	1076	208	119	0	119	2699	18	0	0	0	305	38	0	0	0	931
31	79	0	79	1076	254	142	0	142	2699	22	0	0	0	305	46	0	0	0	931
32	77	0	77	1076	246	138	0	138	2699	21	0	0	0	305	44	0	0	0	931
33	95	0	95	1076	308	169	0	169	2699	12	14	0	14	305	30	25	0	25	931
34	89	0	89	1076	287	158	0	158	2699	24	0	0	0	305	51	0	0	0	931
35	88	0	88	1076	283	156	0	156	2699	24	0	0	0	305	51	0	0	0	931
36	87	0	87	1076	279	154	0	154	2699	24	0	0	0	305	50	0	0	0	931
37	83	0	83	1076	266	148	0	148	2699	23	0	0	0	305	48	0	0	0	931
38	78	0	78	1076	250	140	0	140	2699	21	0	0	0	305	45	0	0	0	931
39	99	0	99	1076	320	148	-25	173	2673	5	22	0	22	305	11	45	0	45	931
40	93	0	93	1076	300	164	26	164	2699	20	5	0	5	305	43	11	0	11	931
41	84	0	84	1076	270	150	0	150	2699	23	0	0	0	305	49	0	0	0	931
42	76	0	76	1076	241	136	0	136	2699	20	0	0	0	305	44	0	0	0	931
43	78	0	78	1076	249	140	0	140	2699	21	0	0	0	305	45	0	0	0	931
44	68	0	68	1076	215	123	0	123	2699	18	0	0	0	305	39	0	0	0	931
45	68	0	68	1076	215	123	0	123	2699	18	0	0	0	305	39	0	0	0	931
46	78	0	78	1076	248	140	0	140	2699	21	0	0	0	305	45	0	0	0	931
47	93	0	93	1076	298	164	0	164	2699	25	0	0	0	305	54	0	0	0	931
48	94	0	94	1076	302	166	0	166	2699	19	6	0	6	305	35	19	0	19	931
49	84	0	84	1076	269	150	0	150	2699	23	0	0	0	305	49	0	0	0	931
50	62	0	62	1076	194	113	0	113	2699	17	0	0	0	305	36	0	0	0	931
51	72	0	72	1076	227	130	0	130	2699	19	0	0	0	305	42	0	0	0	931
52	66	0	66	1076	207	119	0	119	2699	18	0	0	0	305	38	0	0	0	931
53	71	0	71	1076	223	128	0	128	2699	19	0	0	0	305	41	0	0	0	931
54	77	0	77	1076	244	138	0	138	2699	21	0	0	0	305	44	0	0	0	931
55	81	0	81	1076	257	144	0	144	2699	22	0	0	0	305	46	0	0	0	931
56	79	0	79	1076	252	142	0	142	2699	21	0	0	0	305	46	0	0	0	931
57	88	0	88	1076	282	156	0	156	2699	24	0	0	0	305	51	0	0	0	931
58	77	0	77	1076	245	138	0	138	2699	21	0	0	0	305	44	0	0	0	931
59	73	0	73	1076	232	132	0	132	2699	20	0	0	0	305	42	0	0	0	931
60	84	0	84	1076	270	150	0	150	2699	23	0	0	0	305	49	0	0	0	931

61	67	0	67	1076	211	121	0	121	2699	18	0	0	0	305	39	0	0	0	931
62	72	0	72	1076	229	130	0	130	2699	19	0	0	0	305	42	0	0	0	931
63	87	0	87	1076	278	154	0	154	2699	21	2	0	2	305	40	10	0	10	931
64	86	0	86	1076	274	152	0	152	2699	23	0	0	0	305	49	0	0	0	931
65	79	0	79	1076	252	142	0	142	2699	21	0	0	0	305	46	0	0	0	931
66	83	0	83	1076	265	148	0	148	2699	23	0	0	0	305	48	0	0	0	931
67	87	0	87	1076	277	154	0	154	2699	11	13	0	13	305	20	30	0	30	931
68	93	0	93	1076	296	164	0	164	2699	0	25	0	25	305	0	53	0	53	931
69	79	0	79	1076	253	142	0	142	2699	21	0	0	0	305	46	0	0	0	931
70	78	0	78	1076	248	140	0	140	2699	21	0	0	0	305	45	0	0	0	931
71	92	0	92	1076	293	162	0	162	2699	0	25	0	25	305	0	53	0	53	931
72	89	0	89	1076	286	158	0	158	2699	0	24	0	24	305	0	51	0	51	931
73	88	0	88	1076	281	156	0	156	2699	6	18	0	18	305	13	38	0	38	931
74	89	0	89	1076	285	158	0	158	2699	0	24	0	24	305	0	51	0	51	931
75	100	0	100	1076	315	150	-25	175	2673	0	27	0	27	305	0	58	0	58	931
76	100	0	100	1076	315	150	-25	175	2646	0	27	0	27	305	0	58	0	58	931
77	93	0	93	1076	292	164	3	164	2649	0	25	0	25	305	0	53	0	53	931
78	99	0	99	1076	295	157	-16	173	2632	0	27	0	27	305	0	57	0	57	931
79	90	-21	111	1054	283	128	-68	196	2563	0	29	-1	30	304	0	65	0	65	931
80	105	2	103	1055	286	120	-54	174	2508	0	29	0	29	304	0	54	-5	59	925
81	94	21	73	1076	290	158	-3	161	2504	0	25	1	25	305	0	51	-2	53	923
82	98	-10	108	1065	281	134	-45	179	2457	0	28	0	28	304	0	60	-2	62	920
83	98	-10	108	1054	281	133	-56	189	2400	0	28	0	28	303	0	62	0	62	920
84	90	-21	111	1032	277	128	-68	196	2332	0	29	-1	30	301	0	65	0	65	920
85	104	13	91	1045	277	128	-48	176	2283	0	28	1	28	302	0	54	-5	59	914
86	98	32	66	1076	275	155	-16	171	2266	0	26	3	26	305	0	56	0	56	914
87	89	0	89	1076	268	158	19	158	2285	0	24	0	24	305	0	51	1	51	915
88	105	0	105	1076	263	120	-56	176	2227	0	29	0	29	305	0	54	-5	59	909
89	91	-22	113	1053	256	109	-81	190	2145	0	29	-1	30	304	0	59	-5	64	903
90	90	23	67	1076	250	160	14	160	2159	0	24	2	24	305	0	52	1	52	904

91	97	0	97	1076	248	161	-7	168	2150	0	26	0	26	305	0	55	0	55	904
92	92	0	92	1076	247	162	9	162	2159	0	25	0	25	305	0	53	0	53	904
93	74	0	74	1076	235	134	71	134	2230	4	16	0	16	305	4	39	4	39	908
94	70	0	70	1076	218	125	102	125	2332	11	7	0	7	305	24	16	5	16	913
95	72	0	72	1076	226	129	76	129	2408	5	14	0	14	305	10	31	4	31	917
96	71	0	71	1076	222	127	88	127	2496	8	11	0	11	305	16	24	4	24	921
97	82	0	82	1076	239	146	49	146	2545	0	22	0	22	305	0	47	2	47	924
98	90	0	90	1076	236	160	15	160	2560	0	24	0	24	305	0	52	1	52	924
99	85	0	85	1076	234	152	37	152	2597	0	23	0	23	305	0	49	2	49	926
100	94	0	94	1076	230	166	2	166	2600	0	25	0	25	305	0	54	0	54	926
101	84	0	84	1076	234	150	41	150	2641	0	22	0	22	305	0	48	2	48	928
102	83	0	83	1076	225	148	47	148	2688	0	22	0	22	305	0	48	2	48	931
103	98	0	98	1076	219	146	-25	171	2662	0	26	0	26	305	0	50	-5	55	925
104	93	0	93	1076	221	164	11	164	2673	0	25	0	25	305	0	53	2	53	927
105	101	0	101	1076	209	134	-17	151	2655	0	27	0	27	305	0	52	0	52	926
106	106	0	106	1076	206	121	-64	185	2589	0	29	0	29	305	0	55	-5	60	919
107	98	-10	108	1065	202	133	-56	189	2532	0	28	0	28	304	0	62	0	62	919
108	91	-22	113	1043	173	89	-95	184	2436	0	29	-1	30	302	0	52	-11	63	907
109	101	34	67	1076	205	134	-35	169	2400	0	27	3	27	305	0	52	-4	56	902
110	85	0	85	1076	210	152	46	152	2446	0	23	0	23	305	0	49	5	49	907
111	76	0	76	1076	209	135	80	135	2527	0	20	0	20	305	0	43	8	43	915
112	74	0	74	1076	208	133	83	133	2610	0	20	0	20	305	0	43	8	43	923
113	76	0	76	1076	208	135	80	135	2690	0	20	0	20	305	0	43	8	43	930
114	68	0	68	1076	211	123	9	123	2699	0	18	0	18	305	0	39	1	39	931
115	77	0	77	1076	208	137	0	137	2699	0	20	0	20	305	0	44	0	44	931
116	87	0	87	1076	204	154	0	154	2699	0	23	0	23	305	0	50	0	50	931
117	96	0	96	1076	200	161	-7	168	2691	0	26	0	26	305	0	55	0	55	931
118	103	0	103	1076	198	135	-44	179	2646	0	28	0	28	305	0	53	-5	58	925
119	93	0	93	1076	201	164	12	164	2658	0	25	0	25	305	0	53	1	53	927
120	85	0	85	1076	204	152	42	152	2699	0	23	0	23	305	0	49	5	49	931
121	71	0	71	1076	209	127	0	127	2699	0	19	0	19	305	0	41	0	41	931

122	74	0	74	1076	207	133	0	133	2699	0	20	0	20	305	0	43	0	43	931
123	100	0	100	1076	198	158	-17	175	2682	0	27	0	27	305	0	57	0	57	931
124	92	0	92	1076	201	162	11	162	2693	0	24	0	24	305	0	53	0	53	931
125	72	0	72	1076	208	129	6	129	2699	0	19	0	19	305	0	41	0	41	931
126	90	0	90	1076	202	160	0	160	2699	0	24	0	24	305	0	52	0	52	931
127	96	0	96	1076	198	145	-25	170	2674	0	26	0	26	305	0	50	-5	55	926
128	72	0	72	1076	207	129	26	129	2699	0	19	0	19	305	0	41	6	41	931
129	80	0	80	1076	204	144	0	144	2699	0	21	0	21	305	0	46	0	46	931
130	95	0	95	1076	199	168	0	168	2699	0	25	0	25	305	0	55	0	55	931
131	84	0	84	1076	203	150	0	150	2699	0	22	0	22	305	0	48	0	48	931
132	66	0	66	1076	204	119	0	119	2699	2	15	0	15	305	11	26	0	26	931
133	83	0	83	1076	203	148	0	148	2699	0	22	0	22	305	0	48	0	48	931
134	92	0	92	1076	200	162	0	162	2699	0	25	0	25	305	0	53	0	53	931
135	68	0	68	1076	208	123	0	123	2699	0	18	0	18	305	0	39	0	39	931
136	62	0	62	1076	194	113	0	113	2699	5	11	0	11	305	11	25	0	25	931
137	54	0	54	1076	165	99	0	99	2699	14	0	0	0	305	31	0	0	0	931
138	63	0	63	1076	198	115	0	115	2699	3	14	0	14	305	9	27	0	27	931
139	70	0	70	1076	207	126	0	126	2699	0	19	0	19	305	0	40	0	40	931
140	72	0	72	1076	206	130	0	130	2699	0	19	0	19	305	0	42	0	42	931
141	56	0	56	1076	173	103	0	103	2699	15	0	0	0	305	0	32	0	32	931
142	57	0	57	1076	178	105	0	105	2699	15	0	0	0	305	0	33	0	33	931
143	64	0	64	1076	198	115	0	115	2699	4	13	0	13	305	0	37	0	37	931
144	61	0	61	1076	190	111	0	111	2699	16	0	0	0	305	0	35	0	35	931
145	46	0	46	1076	140	87	0	87	2699	12	0	0	0	305	0	27	0	27	931
146	60	0	60	1076	186	109	0	109	2699	16	0	0	0	305	0	35	0	35	931
147	61	0	61	1076	190	111	0	111	2699	16	0	0	0	305	0	35	0	35	931
148	55	0	55	1076	170	101	0	101	2699	15	0	0	0	305	0	32	0	32	931
149	46	0	46	1076	140	87	0	87	2699	12	0	0	0	305	0	27	0	27	931
150	68	0	68	1076	208	124	0	124	2699	0	18	0	18	305	0	39	0	39	931
151	77	0	77	1076	204	138	0	138	2699	0	21	0	21	305	0	44	0	44	931

Exhibit B-10: Electric Utility Sector

	Single Fuel Distillate				SF Gas	Single Fuel Residual				Dual Fuel Distillate					Dual Fuel Residual				
Day	Dem	CII	Cons	Inv	Dem	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv	Gas	Dem	CII	Cons	Inv
1	75	0	75	408	365	667	0	667	16907	6	0	0	0	157	286	0	0	0	8328
2	79	0	79	408	717	820	0	820	16907	8	0	0	0	157	368	0	0	0	8328
3	77	0	77	408	608	759	0	759	16907	7	0	0	0	157	338	0	0	0	8328
4	75	0	75	408	445	667	0	667	16907	7	0	0	0	157	293	0	0	0	8328
5	76	0	76	408	505	682	0	682	16907	7	0	0	0	157	303	0	0	0	8328
6	76	0	76	408	541	698	0	698	16907	7	0	0	0	157	311	0	0	0	8328
7	77	0	77	408	643	759	0	759	16907	8	0	0	0	157	341	0	0	0	8328
8	73	0	73	408	348	591	0	591	16907	6	0	0	0	157	258	0	0	0	8328
9	70	0	70	408	113	438	0	438	16907	5	0	0	0	157	186	0	0	0	8328
10	68	0	68	408	0	361	0	361	16907	4	0	0	0	157	148	0	0	0	8328
11	68	0	68	408	4	377	0	377	16907	4	0	0	0	157	156	0	0	0	8328
12	73	0	73	408	342	575	0	575	16907	6	0	0	0	157	253	0	0	0	8328
13	73	0	73	408	368	591	0	591	16907	6	0	0	0	157	260	0	0	0	8328
14	75	0	75	408	477	652	0	652	16907	7	0	0	0	157	290	0	0	0	8328
15	72	0	72	408	242	530	0	530	16907	5	0	0	0	157	228	0	0	0	8328
16	78	0	78	408	700	790	0	790	16907	8	0	0	0	157	356	0	0	0	8328
17	77	0	77	408	645	759	0	759	16907	8	0	0	0	157	341	0	0	0	8328
18	76	0	76	408	564	713	0	713	16907	7	0	0	0	157	319	0	0	0	8328
19	76	0	76	408	470	698	0	698	16907	7	0	0	0	157	305	0	0	0	8328
20	75	0	75	408	373	652	0	652	16907	6	0	0	0	157	281	0	0	0	8328
21	76	0	76	408	448	698	0	698	16907	7	0	0	0	157	303	0	0	0	8328
22	74	0	74	408	347	636	0	636	16907	6	0	0	0	157	274	0	0	0	8328
23	76	0	76	408	435	698	0	698	16907	7	0	0	0	157	302	0	0	0	8328
24	75	0	75	408	354	652	0	652	16907	6	0	0	0	157	280	0	0	0	8328
25	75	0	75	408	408	682	0	682	16907	6	0	0	0	157	295	0	0	0	8328
26	76	0	76	408	430	698	0	698	16907	7	0	0	0	157	302	0	0	0	8328
27	80	0	80	408	756	866	0	866	16907	8	0	0	0	157	387	0	0	0	8328
28	81	0	81	408	865	927	0	927	16907	9	0	0	0	157	417	0	0	0	8328

29	78	0	78	408	648	805	0	805	16907	8	0	0	0	157	357	0	0	0	8328
30	75	0	75	408	404	667	0	667	16907	6	0	0	0	157	289	0	0	0	8328
31	79	0	79	408	716	835	0	835	16907	8	0	0	0	157	373	0	0	0	8328
32	78	0	78	408	661	805	0	805	16907	8	0	0	0	157	358	0	0	0	8328
33	84	0	84	408	1057	1034	0	1034	16907	5	4	0	4	157	259	207	0	207	8328
34	82	0	82	408	893	958	0	958	16907	9	0	0	0	157	430	0	0	0	8328
35	82	0	82	408	893	942	0	942	16907	9	0	0	0	157	425	0	0	0	8328
36	81	0	81	408	837	927	0	927	16907	9	0	0	0	157	415	0	0	0	8328
37	80	0	80	408	746	881	0	881	16907	8	0	0	0	157	392	0	0	0	8328
38	79	0	79	408	637	820	0	820	16907	8	0	0	0	157	361	0	0	0	8328
39	85	0	85	408	1099	1024	-53	1077	16853	2	7	0	7	157	98	321	0	321	8328
40	83	0	83	408	963	1004	54	1004	16907	7	2	0	2	157	362	88	0	88	8328
41	81	0	81	408	772	896	0	896	16907	8	0	0	0	157	399	0	0	0	8328
42	78	0	78	408	522	789	0	789	16907	7	0	0	0	157	341	0	0	0	8328
43	79	0	79	408	531	820	0	820	16907	7	0	0	0	157	352	0	0	0	8328
44	76	0	76	408	256	697	0	697	16907	6	0	0	0	157	287	0	0	0	8328
45	76	0	76	408	256	697	0	697	16907	6	0	0	0	157	287	0	0	0	8328
46	79	0	79	408	474	820	0	820	16907	7	0	0	0	157	348	0	0	0	8328
47	83	0	83	408	730	1003	0	1003	16907	8	0	0	0	157	432	0	0	0	8328
48	84	0	84	408	803	1018	0	1018	16907	8	1	0	1	157	399	44	0	44	8328
49	81	0	81	408	626	896	0	896	16907	8	0	0	0	157	387	0	0	0	8328
50	74	0	74	408	96	621	0	621	16907	5	0	0	0	157	248	0	0	0	8328
51	77	0	77	408	337	743	0	743	16907	6	0	0	0	157	310	0	0	0	8328
52	75	0	75	408	201	667	0	667	16907	6	0	0	0	157	272	0	0	0	8328
53	76	0	76	408	309	728	0	728	16907	6	0	0	0	157	302	0	0	0	8328
54	78	0	78	408	450	804	0	804	16907	7	0	0	0	157	340	0	0	0	8328
55	79	0	79	408	532	850	0	850	16907	7	0	0	0	157	363	0	0	0	8328
56	79	0	79	408	505	835	0	835	16907	7	0	0	0	157	355	0	0	0	8328
57	82	0	82	408	705	942	0	942	16907	8	0	0	0	157	409	0	0	0	8328
58	78	0	78	408	508	804	0	804	16907	7	0	0	0	157	345	0	0	0	8328
59	77	0	77	408	426	758	0	758	16907	7	0	0	0	157	323	0	0	0	8328
60	81	0	81	408	671	896	0	896	16907	8	0	0	0	157	390	0	0	0	8328

61	75	0	75	408	306	682	0	682	16907	6	0	0	0	157	286	0	0	0	8328
62	77	0	77	408	461	743	0	743	16907	7	0	0	0	157	320	0	0	0	8328
63	81	0	81	408	771	926	0	926	16907	6	2	0	2	157	287	115	0	115	8328
64	81	0	81	408	678	911	0	911	16907	8	0	0	0	157	396	0	0	0	8328
65	79	0	79	408	491	835	0	835	16907	7	0	0	0	157	354	0	0	0	8328
66	80	0	80	408	573	881	0	881	16907	7	0	0	0	157	377	0	0	0	8328
67	81	0	81	408	654	926	0	926	16907	2	5	0	5	157	80	305	0	305	8328
68	83	0	83	408	534	1003	0	1003	16907	0	7	0	7	157	0	422	0	422	8328
69	79	0	79	408	552	835	0	835	16907	7	0	0	0	157	359	0	0	0	8328
70	79	0	79	408	480	819	0	819	16907	7	0	0	0	157	348	0	0	0	8328
71	83	0	83	408	605	988	0	988	16907	0	7	0	7	157	0	415	0	415	8328
72	82	0	82	408	696	957	0	957	16907	0	7	0	7	157	0	400	0	400	8328
73	82	0	82	408	669	942	0	942	16907	0	6	0	6	157	20	373	0	373	8328
74	82	0	82	408	675	957	0	957	16907	0	7	0	7	157	0	400	0	400	8328
75	85	0	85	408	30	929	-163	1092	16743	0	8	0	8	157	0	413	0	413	8328
76	85	0	85	408	0	929	-163	1092	16579	0	8	0	8	157	0	413	0	413	8328
77	83	0	83	408	92	1003	19	1003	16598	0	7	0	7	157	0	417	0	417	8328
78	85	0	85	408	0	970	-107	1077	16490	0	8	0	8	157	0	405	0	405	8328
79	71	-17	88	390	0	685	-560	1245	15929	0	7	0	7	157	0	428	-47	475	8280
80	87	1	86	392	0	751	-337	1088	15592	0	9	0	9	157	0	443	-45	488	8234
81	83	16	67	408	0	967	-19	986	15571	0	7	0	7	157	0	403	-18	421	8215
82	79	-8	87	399	0	721	-406	1127	15164	0	7	0	7	157	0	461	-44	505	8170
83	79	-8	87	390	0	840	-359	1199	14804	0	7	0	7	156	0	429	0	429	8170
84	71	-17	88	372	0	685	-560	1245	14244	0	7	0	7	156	0	428	-47	475	8123
85	86	10	76	383	0	798	-296	1094	13946	0	8	0	8	156	0	431	-43	474	8078
86	85	25	60	408	0	956	-105	1061	13840	0	7	1	7	157	0	375	0	375	8078
87	82	0	82	408	0	957	134	957	13974	0	6	0	6	157	0	388	11	388	8089
88	87	0	87	408	0	751	-352	1103	13621	0	8	0	8	157	0	437	-43	480	8045
89	71	-17	88	390	0	695	-518	1213	13102	0	6	0	6	157	0	485	-49	534	7995
90	82	18	64	408	0	972	96	972	13198	0	6	0	6	157	0	395	8	395	8004
91	84	0	84	408	0	995	-51	1046	13146	0	7	0	7	157	0	371	0	371	8004
92	83	0	83	408	0	987	63	987	13208	0	6	0	6	157	0	398	5	398	8009

93	77	0	77	408	262	773	484	773	13693	1	4	0	4	157	31	264	42	264	8051
94	76	0	76	408	156	712	696	712	14389	4	1	0	1	157	227	53	60	53	8111
95	77	0	77	408	220	743	521	743	14910	0	4	0	4	157	15	267	45	267	8156
96	76	0	76	408	150	727	606	727	15516	2	2	0	2	157	116	164	52	164	8208
97	80	0	80	408	0	865	335	865	15852	0	5	0	5	157	0	340	29	340	8237
98	82	0	82	408	0	972	104	972	15956	0	5	0	5	157	0	382	9	382	8246
99	81	0	81	408	0	910	254	910	16209	0	4	0	4	157	0	345	22	345	8268
100	83	0	83	408	0	1018	17	1018	16226	0	5	0	5	157	0	398	1	398	8269
101	80	0	80	408	0	895	283	895	16509	0	4	0	4	157	0	338	24	338	8294
102	80	0	80	408	0	880	321	880	16830	0	4	0	4	157	0	325	28	325	8321
103	84	0	84	408	0	1008	-52	1060	16777	0	6	0	6	157	0	348	0	348	8321
104	83	0	83	408	0	1002	38	1002	16815	0	6	0	6	157	0	382	2	382	8323
105	85	0	85	408	0	832	-184	1016	16629	0	7	0	7	157	0	391	-38	429	8284
106	87	0	87	408	0	876	-291	1167	16337	0	7	0	7	157	0	390	0	390	8284
107	79	-8	87	399	0	720	-479	1199	15858	0	6	0	6	157	0	378	-41	419	8242
108	71	-17	88	381	0	694	-484	1178	15373	0	5	0	5	156	0	456	-43	499	8199
109	85	27	58	408	0	832	-228	1060	15143	0	6	1	6	157	0	388	-38	426	8159
110	81	0	81	408	0	910	273	910	15417	0	4	0	4	157	0	334	26	334	8186
111	78	0	78	408	0	788	474	788	15891	0	3	0	3	157	0	273	45	273	8231
112	77	0	77	408	0	773	491	773	16382	0	3	0	3	157	0	271	47	271	8278
113	78	0	78	408	0	788	471	788	16853	0	3	0	3	157	0	278	45	278	8323
114	75	0	75	408	0	696	54	696	16907	0	2	0	2	157	0	232	5	232	8328
115	78	0	78	408	0	803	0	803	16907	0	3	0	3	157	0	285	0	285	8328
116	81	0	81	408	0	925	0	925	16907	0	4	0	4	157	0	334	0	334	8328
117	84	0	84	408	0	994	-51	1045	16854	0	6	0	6	157	0	350	0	350	8328
118	86	0	86	408	0	954	-167	1121	16686	0	6	0	6	157	0	363	0	363	8328
119	83	0	83	408	0	1002	49	1002	16735	0	5	0	5	157	0	365	0	365	8328
120	81	0	81	408	0	910	171	910	16907	0	4	0	4	157	0	320	0	320	8328
121	76	0	76	408	0	726	0	726	16907	0	2	0	2	157	0	229	0	229	8328
122	77	0	77	408	0	772	0	772	16907	0	3	0	3	157	0	252	0	252	8328
123	85	0	85	408	0	983	-108	1091	16798	0	5	0	5	157	0	357	0	357	8328
124	82	0	82	408	0	986	71	986	16868	0	5	0	5	157	0	361	0	361	8328

125	77	0	77	408	0	742	38	742	16907	0	3	0	3	157	0	244	0	244	8328
126	82	0	82	408	0	971	0	971	16907	0	5	0	5	157	0	361	0	361	8328
127	84	0	84	408	0	995	-51	1046	16854	0	5	0	5	157	0	379	-19	398	8308
128	77	0	77	408	0	742	52	742	16907	0	2	0	2	157	0	248	20	248	8328
129	79	0	79	408	0	849	0	849	16907	0	3	0	3	157	0	301	0	301	8328
130	84	0	84	408	0	1031	0	1031	16907	0	5	0	5	157	0	347	0	347	8328
131	80	0	80	408	0	895	0	895	16907	0	4	0	4	157	0	326	0	326	8328
132	75	0	75	408	0	665	0	665	16907	0	2	0	2	157	25	195	0	195	8328
133	80	0	80	408	0	880	0	880	16907	0	5	0	5	157	0	334	0	334	8328
134	83	0	83	408	0	987	0	987	16907	0	6	0	6	157	0	400	0	400	8328
135	76	0	76	408	0	697	0	697	16907	0	3	0	3	157	0	257	0	257	8328
136	74	0	74	408	95	620	0	620	16907	2	1	0	1	157	124	110	0	110	8328
137	71	0	71	408	0	513	0	513	16907	4	0	0	0	157	196	0	0	0	8328
138	74	0	74	408	95	636	0	636	16907	1	3	0	3	157	63	188	0	188	8328
139	76	0	76	408	0	713	0	713	16907	0	5	0	5	157	0	293	0	293	8328
140	77	0	77	408	0	743	0	743	16907	0	5	0	5	157	0	314	0	314	8328
141	72	0	72	408	0	545	0	545	16907	4	0	0	0	157	0	216	0	216	8328
142	73	0	73	408	25	560	0	560	16907	5	0	0	0	157	0	224	0	224	8328
143	74	0	74	408	158	636	0	636	16907	1	3	0	3	157	0	261	0	261	8328
144	74	0	74	408	107	606	0	606	16907	5	0	0	0	157	0	248	0	248	8328
145	69	0	69	408	0	422	0	422	16907	3	0	0	0	157	0	161	0	161	8328
146	73	0	73	408	78	591	0	591	16907	5	0	0	0	157	0	245	0	245	8328
147	74	0	74	408	145	606	0	606	16907	5	0	0	0	157	0	251	0	251	8328
148	72	0	72	408	14	529	0	529	16907	4	0	0	0	157	0	213	0	213	8328
149	69	0	69	408	0	422	0	422	16907	3	0	0	0	157	0	160	0	160	8328
150	76	0	76	408	0	698	0	698	16907	0	5	0	5	157	0	296	0	296	8328
151	78	0	78	408	0	805	0	805	16907	0	6	0	6	157	0	348	0	348	8328

APPENDIX C – WATERBORNE DATA

This Appendix describes the methodology behind the use of the U.S. Army Corps of Engineers' *Waterborne Commerce* data in this report.

Waterborne Commerce data lists many different ports and waterways. For the purposes of the study area, the data for five different ports/waterways will satisfy the data needs. These five include: the Port of New York Consolidated Report, the Hudson River/Deepwater in Upper Bay, NY to Waterford NY Consolidated Report (includes Port of Albany), Hempstead Harbor, Port Jefferson Harbor, and Oyster Bay. The data that is reported for each of these ports or waterways encompasses all the movements in the study area. Therefore, for each year and each type of movement (foreign, domestic, internal), only data for these five ports/waterways were extracted.

Waterborne Commerce data also is broken out in three different transaction types with the following numbers: 1-cargo, 2-tonmiles, 3-trips. Only data for transaction type 1-cargo, was studied.

In terms of what type of traffic the barge movements are, the data are broken out into several categories. The traffic codes for the data that have been summarized are as follows: 11-foreign imports, 12-foreign exports, 21-Canadian imports, 22-Canadian exports, 30-coastwise, 50-internal.

The *Waterborne Commerce* data also has codes for the "direction" the shipments are moving. These codes are: 1-inbound receiving, 2-outbound shipping, 3-local, 4-thru. Only codes 1 and 2 were used. The use of data that has "direction" codes of 3 or 4 may result in the double counting of shipments. An example of this is if Albany is receiving a foreign import from the Atlantic. This shipment would have to pass through an area that is included in the Port of New York statistics, and therefore, would be reported in the volumes of the Port of New York with code 4. The final destination however is Albany, and the objective is to record the volume reported by the Port of Albany, which is code 1, inbound receiving. Hence, counting the volume of code 4 for the Port of New York and the volume of code 1 for the Port of Albany would double count the shipment.

In compiling the foreign import and export movements, data with traffic codes 11, 12, 21, and 22 were extracted for the five ports/waterways listed above. These four traffic codes with "direction" codes of 1-inbound receiving are foreign imports, and likewise, these four traffic codes with "direction" codes of 2-outbound shipping are foreign exports.

In order to summarize shipments that are strictly domestic, data with traffic code 30-coastwise was used. Waterborne Commerce defines coastwise as domestic traffic receiving carriage over the ocean, or the Gulf

of Mexico. Looking at a map, one can see that if any of the five ports/waterways in the study area has a direction code of 1 or 2 and a traffic code of 30, the shipment must have came from or is headed out of the study area. For a shipment to be considered coastwise, it has to touch an ocean at some point. Therefore, the destination or origin of shipments with traffic code 30 is outside of the study area because all five of the ports/waterways are considered on inland waterways.

This leads to the final type of movement, which is internal. Data for internal movements has traffic code 50-internal. *Waterborne Commerce* defines internal movements as vessel movements which take place solely on inland waterways. An inland waterway is one geographically located within the boundaries of the contiguous 48 states or within the boundaries of the State of Alaska. In the study area, only the Port of New York and Hudson/Deepwater in Upper Bay, NY to Waterford, NY (including Port of Albany) had any internal movement data reported. Therefore, this means that any internal movements are basically tracking the shipments north and south on the Hudson River, because there are no other inland waterways connecting the Port of New York and Albany. A data point reported for the Port of New York with traffic code 50-internal and "direction" code 1-inbound receiving means that it was a movement from Albany/Hudson region south to the Port of New York. Likewise, in the same scenario the "direction" code 2-outbound shipping, means that it was a shipment from the Port of New York to a destination on the Hudson, possibly as far as Albany. For all of the products and for a majority of the years, the internal shipping data from the Port of New York matches the internal receiving data for Hudson/Albany region, and vice versa. Discrepancies may possibly be explained by the shipping in canals to and from Albany in upstate New York.

The U.S. Army Corps of Engineers also collects specific data on the ports of origin and the destination port of all individual voyages, although they no longer publish this. The Corps was kind enough to extract the data showing domestic waterborne shipment from southern New Jersey into the study area and from the study area into the New England ports.

APPENDIX D – PERMITS AND REGULATORY PROCESS REQUIRED FOR PETROLEUM STORAGE TANKS AND TERMINALS AND END-USERS

New York Regulations and Permitting for Fuel Oil Storage Tanks

1.- Terminals and Dealers

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
New York State Environmental Quality Review (SEQR)	Lead Agency Lead Agency means an involved agency principally responsible for undertaking, funding or approving an action, and therefore responsible for determining whether an environmental impact statement is required. Involved agency means an agency that has jurisdiction by law to fund, approve or directly undertake an action. If an agency will ultimately make a discretionary decision to fund, approve or undertake an action, then it is an "involved agency", notwithstanding that it has not received an application for funding or approval at the time the	Step 1 Classify the Action Step 2 Complete an Environmental Assessment Step 3 Coordinate Review Step 4 Determine Significance of Action on Environment • Issue Negative Declaration If no significant negative impacts • Issue Conditioned Negative Declaration If impacts can be avoided or mitigated • Issue Positive Declaration If there are significant negative impacts Optional steps Scope EIS Step 5 Preparation of Draft EIS Step 6 Determine Adequacy of Draft EIS Step 7 Publish Notice that EIS is Accepted for Public Review Step 8 Receive Public Comment	6 NYCRR Part 617 State Environmental Quality Review Adopted: September 20, 1995; Effective: January 1, 1996 Amended June 26, 2000; Effective: July 12, 2000

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
	SEQR process is commenced. The lead agency is also an "involved agency".	Step 9 Decide Whether to Hold Public Hearing Step 10 Prepare Final EIS Step 11 SEQR findings are made by all involved agencies	
Air Permits	New York State Department of Environmental Conservation Division of Air Resources. The Bureau of Stationary Sources	Owners and/or operators of air contamination sources are required to obtain a Title V Facility Permit, State Facility Permit, or Registration certificate for source construction and operation. Authorizations are for all sources at a facility, not for individual emission points.	6NYCRR Parts 200 through 317 Original rule effective 1/12/75 Part 201: Permits and Certificates *Original rules effective 7/7/96* Part 202: Emissions Verification *Effective date 8/14/94* Part 204: NOx Budget Trading Program. *Effective date 2/25/00* Part 212: General Process Emission Sources. Effective date 11/15/85 Revisions effective 9/22/94 Part 229: Petroleum and Volatile Organic Liquid Storage and Transfer Effective date 4/4/1993
Solid Waste, Hazardous Waste And Hazardous Substance Permits	New York State Department of Environmental Conservation Division of Environmental Remediation; Bureau of Spill Prevention and Response; Regional Office	Petroleum Facility Permits - DEC requires that major petroleum facilities (i.e., those that have a storage capacity of 400,000 gallons or more) be licensed. This license controls the transfer and storage of petroleum, while license fees support a fund to ensure prompt cleanup and removal of petroleum discharges. DEC also requires smaller facilities to register petroleum storage tanks. This requirement applies to facilities with an aggregate storage capacity of 1,101 to 399,999 gallons. Heating oil tanks with	6NYCRR 612-614 Part 612: Registration of Petroleum Storage Facilities Part 613: Handling and Storage of Petroleum Part 614: Standards for New and Substantially Modified Petroleum Storage Facilities Effective 12/27/85 Amended 2/12/92 Petroleum bulk storage registration Combined Storage Capacity at Facility 5-Year Fee for Facility

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
		a capacity of 1,100 gallons or less are exempt. The state has delegated program responsibility to the counties of Nassau, Suffolk, Westchester, Rockland, and Cortland. DEC must be notified of the installation of new tanks or modifications to existing tanks (including replacing, repairing or reconditioning a tank) before work begins. Leak Detection and Monitoring: Petroleum storage tanks (including pipes) must be tested for leaks, and the tester must be certified by the manufacturer. All tanks which require testing must be re-tested every five years from the date of the last test.	Greater than 1,100 to 2,000 gallons: $100 per storage facility Greater than 2,000 gallons to less than 5,000 gallons: $300 per storage facility 5,000 gallons to less than 400,000 gallons: $500 per storage facility
Hazardous Waste Management Facilities	New York State Department of Environmental Conservation Divisions of Solid and Hazardous Materials	Requires owners to register all tanks containing any of 1,000 hazardous chemicals. Chemical storage regulations Regulates the management of hazardous waste from generation to treatment, storage or disposal (TSD) consistent with, and no less stringently than, the Federal Resource Conservation and Recovery Act (RCRA) of 1976. REGULATED ACTIVITIES: Storage, transfer, processing, recovery, reclamation, combustion or disposal of any hazardous substance	6NYCRR Parts 370, 371, 372, 373, 374 & 376 Part 370 : Hazardous Waste Management System--General and Part 371: Identification and Listing of Hazardous Wastes Effective March 15, 2002 Part 372: Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities Part 373: Hazardous Waste Management Facilities Effective April 10, 2004 Part 374: Standards for the Management of Specific Hazardous Wastes and

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
		as listed in 371 or which exhibits any of the following characteristics: o Ignitability. o Corrosivity. o Reactivity. o Leachibility of toxic compounds	Specific Types of Hazardous Waste Management Facilities and Part 376: Land Disposal Restrictions Effective March 15, 2002.
State Pollutant Discharge Elimination System (SPDES)	New York State Department of Environmental Conservation Division of Water	To maintain reasonable standards of purity of the waters of the state consistent with public health and enjoyment thereof, propagation and protection of fish and wildlife, and the industrial development of the state; and to that end require the use of all known available and reasonable methods to prevent and control the pollution of the New York State waters. Need storm water pollution prevention plans.	6NYCRR Parts 750-752 and Federal Regulations 40 CFR (many parts) Subpart 750-01: Obtaining a SPDES Permit Subpart 750-02: Operating in Accordance with a SPDES Permit Effective Date: 05/11/03 Each person required to obtain a permit or certificate pursuant to the SPDES program must annually submit to the department a SPDES program fee. For purposes of determining annual fees for new and existing facilities, the department will use the design flow in the SPDES permit to establish the average daily rate of flow.
Coastal Erosion Hazard Areas	New York State Department of Environmental Conservation Division of Water	To protect and preserve the natural protective features such as dunes and bluffs of coastal areas, limit erosion, and ensure that erosion control structures are properly constructed.	6NYCRR Part 505 Coastal Erosion Management Effective March, 1988

2. - End User underground storage tanks more than 1100 gallons

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
		Leak Detection and Monitoring: Non complying petroleum storage tanks (including pipes) must be tested for leaks, and the tester must be certified by the manufacturer. Must be re-tested every five years from the date of the last test.	6NYCRR Part 614 Standards for New and Substantially Modified Petroleum Storage Facilities
Chemical Underground Storage Tanks (USTs)	New York State Department of Environmental Conservation	Unprotected tanks - such as bare steel and tanks retrofitted with cathodic protection or interior linings - must be tested when 10 years old. Tanks installed with corrosion resistant materials, must be tested when 15 years old. Corrosion resistant tanks and pipes equipped with leak monitoring systems do not require testing, but do require periodic monitoring.	RCRA (Subtitle I) requiring the Environmental Protection Agency (EPA) to regulate underground storage tanks (USTs).
Installation, Alteration, Testing and Repairing Permits	New York City's Fire Department	Tank owners must notify the city, town or village building or fire code enforcement official of proposed construction of storage tanks. Local building permits also may be required. Nassau, Suffolk, Rockland and Cortland counties have individual programs through the Fire Commission or Department of Health.	Fire department rules and regulations, Rules of the City of New York (R.C.N.Y.), Title III, Chapter 21, are contained in the NYC Fire Law Handbook. The NYC regulations are additional to the state requirements. These regulations are equal to or more stringent than state requirements and operate in lieu of state regulations
Stage II Vapor Recovery	Local Agencies in Nassau, Suffolk, Rockland, and Westchester counties, in addition to all five boroughs of New York City and parts of Orange County	Stage II Vapor recovery controls are required. Certain USTs may be exempt from the Stage II controls, depending on age and size.	.

New York Air Permit: Article 19 Air Title V Facility

TITLE V - MAJOR STATIONARY SOURCES			
Classification of Area	**Affected Area (by Region)**	**Contaminant**	**Quantity (TPY)**
Attainment	Areas not specifically listed in any of the areas classified as nonattainment.	Regulated Air Pollutants	100
Marginal Nonattainment NOx& VOC	Region 4: Albany, Greene, Montgomery, Rensselaer, Region 5: Schenectady Saratoga, Essex County-Whiteface Region 6: Mtn. area above 4500' Region 9: Jefferson Erie, Niagara	NOx	100
		VOC	50
Moderate Nonattainment NOx, VOC, CO & PM-10	Region 3: Dutchess, Orange County Area except for LOCMA, Putnam [LOCMA = Lower Orange County Metropolitan Area (Towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick and Woodbury)] Region 1: Nassau Region 2: New York City Region 3: Westchester Region 2: Manhattan	NOx	100
		VOC	50
		CO	50
		PM-10	100
Severe Nonattainment NOx& VOC	Region 1: Nassau, Suffolk Region 2: New York City LOCMA, Region 3: Rockland, Westchester	NOx	25
		VOC	25
Ozone Transport Region	All of New York State	NOx	100
	All of New York State	VOC	50

New Jersey Regulations and Permitting for Fuel Oil Storage Tanks

1.- Terminals and Dealers

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
Facility-wide Permitting	New Jersey State Department of Environmental Protection Pollution Prevention and Release Prevention Office	Implements the programs which gather information on the use, storage and release of toxic chemicals to the environment. This office also offers project applicants seeking multimedia permits the opportunity to manage their permitting issues through a single point of entry into the Department.	New Jersey Community Right to Know and Superfund Amendments and Reauthorization Act (SARA) Title III
Environmental Assessment(EA) and Environmental Impact Statements (EIS)	New Jersey State Department of Environmental Protection Permit Coordination & Environmental Review Office	The objective of this Order is to reduce or eliminate any potential adverse environmental impacts of projects initiated or funded by the State.	National Environmental Policy Act (NEPA) and New Jersey Executive Order No. 215 of 1989 (EO#215)
Air Permits	New Jersey State Department of Environmental Protection Division of Air Quality	No above ground storage of VOCs in a 2,000 – 10,000 gallon tank unless the tank is painted white or has an equivalent method of emission control No above ground storage of VOCs in a 10,000 gallon or greater unless the tank is equipped with the one of the following controls: Range I – no controls necessary Range II – Conservation vent required Range III – Floating roof required Ranges are determined by vapor pressure and tank capacity	New Jersey Administrative Code Title 7, Chapter 27, Subchapter 16 Control And Prohibition of Air Pollution by Volatile Organic Compounds The Air Quality Permitting Program (AQPP) is Responsible for implementing the Federal Clean Air Amendments of 1990 and the New Jersey Air Pollution Control Act with respect to permitting, testing and monitoring emissions of air contaminants from stationary sources.

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
		Any tank in Range III must have a double seal floating roof or equivalent control. External floating roof tanks can only be used for storing VOCs with a vapor pressure of 1.0 psia and a capacity of 20,000 gal or more and all openings must be covered when not in use.	The state and federal laws require two types of permits: preconstruction permits for new and modified sources and operating permits for existing major facilities.
New Jersey Pollutant Discharge Elimination System (NJPDES) permit	New Jersey Department of Environmental Protection Division of Water Quality	Hydrostatic Test Water Discharges permit, covers discharges occurring during the hydrostatic testing of storage tanks and pipelines that have been cleaned pursuant to recognized federal, state or general industry documented procedures. Includes Tank and Vessel Cleaning Requirements.	Conditions for Authorization Under The NJPDES Discharge To Surface Water General Permit For Short-Term Discharges (NJ0132993)
Land Use Permits	New Jersey Department of Environmental Protection Land Use Regulation Program	These permit authorizations are typically required in order for individuals to undertake land development or other applicable activities throughout the state.	Waterfront Development, Coastal Area Facilities Review (CAFRA), Flood Hazard Area Control (Stream Encroachment), Wetlands of 1970 and Freshwater Wetlands Protection Acts (FWPA).

2. Underground storage tanks

PERMIT TYPE	AGENCY	DESCRIPTION	STATUTORY AUTHORITY/ APPLICABLE REGULATIONS
Construction permit and permit prior to the repair, installation, substantial modification or upgrade of	New Jersey State Department of Environmental Protection Bureau of Underground Storage Tanks	New Jersey's program covers all federally regulated USTs, as well as commercial heating oil tanks and nonresidential heating oil tanks with	New Jersey Administrative Code Title 7, Chapter 14B Underground Storage Tanks

the underground storage tank system.		capacities of more than 2,000 gallons used for onsite consumption.	
Fire Department Permits	Local Fire Departments	Regulates the installation and closure of USTs at the local level. The reference standard is National Fire Protection Association (NFPA) Code 30. The UCC has been amended to include the UST program.	The Uniform Construction Code (UCC, N.J.S.A. 52:27D-119 NFPA 30 :Flammable and Combustible Liquids Code

APPENDIX E: SURVEY INSTRUMENTS

ICF originally proposed to conduct the study using publicly available data. However, many of the interruptions are of short duration, one to two days. While price and weather data are available on a daily basis, consumption data is estimated on a weekly basis, and only fully reported on a monthly basis. Therefore to fully answer the questions posed by the Public Service Commission and the New York State Energy, Research and Development Authority, ICF required cooperation from industry in accessing private data. At the kick-off meeting for the project in Albany with the agreement of the industry associations it was decided that a survey would be sent out.

A package containing a introductory letter from ICF, a confidentiality agreement and the following survey instruments was mailed to fuel oil distributors, local distribution companies and terminals. The survey tried to capture data related to interruptible gas contracts, and a detailed quantification of the infrastructure. While there is substantial public data available on terminals, pipelines, barges, and tankers, the finer details are missing. Data on individual products stored, demand, and product transported is not publicly available.

Survey for New York State Energy Development Authority's (NYSERDA) Petroleum Infrastructure Study

This survey consists of three parts:

1. Questions for fuel oil distributors (pages 2-9);
2. Questions for Local Distribution Companies (LDCs) (pages 10-11); and
3. Questions for terminals (pages 12-40).

In many cases more than one business category may apply to your company. Please fill in all appropriate sections.

Please note that the terminal questions have one cover sheet, then multiple sets of three sheets by type of fuel. In many cases, you will not need to provide information for the fuel types that are not applicable to your business.

Also, please keep in mind that we will take data in any form you have. If you do not have time to compile or manipulate the data to give us the answer we are requesting, you can send us the data and we will put it into the appropriate form. Data can be sent to us electronically, on disk, or in hard format: whichever way places the least burden on you.

Questions for

FUEL OIL DISTRIBUTORS

Fuel Oil Dealer Survey Questions

Fuel Oil Distributor Name and Location
Owner:

Address:

1. We would like to know where, geographically, your customers are located. Information like zip codes, cities, towns, and counties is acceptable information. If this is not acceptable, you could provide a distance radius that you do not or very rarely exceed and describe why and when you would exceed this delivery radius.

What areas do you serve?

2. Given your answer to question 1, please give the physical amount of each distillate and residual product you sold in thousand gallons during the June 2002 to May 2004 period which includes two full heating seasons. If you have data from previous heating oil seasons readily available, we would gladly receive that information as one of our goals is to understand trends in the fuel oil business.

The second part of the question is: which sector do you sell these products to? Please describe, as best you can, what distillate and residual products you sell to the sectors listed below. Responses may be either in volumes or percentages.

	Kerosene	Diesel ≤ 15 ppm (ULSD)	Onroad Diesel > 15 ppm and ≤ 500 ppm	Offroad No. 2 Fuel Oil ≤ 0.37% S	Offroad No. 2 Fuel Oil > 0.37 % and ≤ 1.00% S	Offroad No. 2 Fuel Oil > 1.00% S	No. 4 Fuel Oil	No. 6 Residual Oil ≤ 0.37% S	No. 6 Residual Oil > 0.37 % and ≤ 1.00% S	No. 6 Residual Oil > 1.00% S
Total Amount June 2002 - May 2004 (thousand gallons)										
Residential										
Industrial										
Commercial										
Farm										
Military										
Railroad										
Vessel Bunkering										
Electric Utilities										
Other _____										
Other _____										

3. Do you currently have any customers that use fuel oil as back-up for interruptible gas service? How many? During the period under review (June 2002 to May 2004) what was the volume of fuel oil purchased by these customers?

4. We would also like to know how much you sell on a monthly basis. We will accept actual data or average data or even your estimate by month using percentages. Again, we will gladly accept data from previous years if you have it readily available. Please let us know what the time period is for the data you provide. Multiple years' data, in any format, would be extremely beneficial. How much of each product do you sell per month by type?

	Kerosene	Diesel ≤ 15 ppm (ULSD)	Onroad Diesel > 15 ppm and ≤ 500 ppm	Offroad No. 2 Fuel Oil ≤ 0.37% S	Offroad No. 2 Fuel Oil > 0.37 % and ≤ 1.00% S	Offroad No. 2 Fuel Oil > 1.00% S	No. 4 Fuel Oil	No. 6 Residual Oil ≤ 0.37% S	No. 6 Residual Oil > 0.37 % and ≤ 1.00% S	No. 6 Residual Oil > 1.00% S
Jun-02										
Jul-02										
Aug-02										
Sep-02										
Oct-02										
Nov-02										
Dec-02										
Jan-03										
Feb-03										
Mar-03										
Apr-03										
May-03										
Jun-03										
Jul-03										
Aug-03										
Sep-03										
Oct-03										
Nov-03										
Dec-03										
Jan-04										
Feb-04										
Mar-04										
Apr-04										
May-04										

5. The following question relates to tankage capacity and the utilization of this capacity by product type within a given year.

Fuel	Tank Capacity Owned (thousand gallons)	Tank Capacity Rented (thousand gallons)	Total Across all Tank Capacity for a Fuel		
			Total Capacity (thousand gallons)	Minimum Inventory Level (thousand gallons)	Safety Inventory Level (thousand gallons)
Kerosene					
Diesel ≤ 15 ppm (ULSD)					
Onroad Diesel > 15 ppm and ≤ 500 ppm					
Offroad No. 2 Fuel Oil ≤ 0.37% S					
Offroad No. 2 Fuel Oil > 0.37 % and ≤ 1.00% S					
Offroad No. 2 Fuel Oil > 1.00% S					
No. 4 Fuel Oil					
No. 6 Residual Oil ≤ 0.37% S					
No. 6 Residual Oil > 0.37 % and ≤ 1.00% S					
No. 6 Residual Oil > 1.00% S					

6. How many trucks and barges are needed to sell the amount of product you sell to your market from June 2002 to May 2004?

	Common Carriers	**Proprietary Fleet Tankers**	**Proprietary Fleet Tank Wagons**	**Commercial Barge**	**Other** _____
Total Trucks				**N/A**	
Average Size of Truck				**N/A**	
Total Shipped June 2002 to May 2004 (thousand gallons)					
Kerosene					
Diesel ≤ 15 ppm (ULSD)					
Onroad Diesel > 15 ppm and ≤ 500 ppm					
Offroad No. 2 Fuel Oil ≤ 0.37% S					
Offroad No. 2 Fuel Oil > 0.37 % and ≤ 1.00% S					
Offroad No. 2 Fuel Oil > 1.00% S					
No. 4 Fuel Oil					
No. 6 Residual Oil ≤ 0.37% S					
No. 6 Residual Oil > 0.37 % and ≤ 1.00% S					
No. 6 Residual Oil > 1.00% S					

7. What is the typical maximum delivery capacity for an 8 hour shift in "normal" and "inclement" winter weather for your proprietary truck fleet?

Tank Wagons:

Tanker Trucks:

8. What is the level of competition in your market? Who are your competitors in your market area and how much of your market do they sell to?

9. And, finally, we would like to know what types of financial processes you use to purchase and sell your fuel. A few examples are Guaranteed Maximum Price, Spot, Long-Term Contracts, and Harbor Price.

What types of transactions do you use to buy and sell your petroleum products? Does it differ by type of product? By type of buyer? Does it differ by season? Please explain how the contracts work.

Purchasing Contracts:

Selling Contracts:

Questions for

LOCAL DISTRIBUTION COMPANIES (LDCs)

LDC Survey Questions

LDC Name and Location
Owner:

Address:

We will be trying to quantify how much demand there is for the different fuel oils when interruptible gas customers swing from gas to petroleum during an interruption. We want to understand the following issues.

1. What is the interruptible load by rate class – for example, residential, industrial, commercial, power? Is there any information on their installed alternative fuel?
2. Do you have an estimate by rate class or customer type of the economic switchability between gas and fuel oils? Do you have data for when customers went from gas to oil for economic reasons?
3. How does interruption occur? We understand that some of the interruptibles are cut off when the temperature reaches a certain point; others are interrupted as needed. How much load is represented by each type of interruption?
4. As each type of interruption occurs, how much gas is cut off (Dth/hour or day)? Has anyone ever estimated how much gas would have been consumed by the interruptibles if they had not been cut off? If this information exists, we may be able to estimate the fuel consumed when these customers switch to oil?
5. Do you know how the interruptibles use the gas (e.g., boilers, heaters, hot water, feedstock)?
6. What information do you have about the on-site fuel oil storage capacity of interruptible customers?
7. Can we see some historical data on interruptions, sendout, temperature and the other conditions that surrounded the interruption days? For the last five years.

What do LDCs know about direct purchase customers behind the citygate? We would like to obtain any such market information you may have on these customers to allow us to answer the same questions raised above. .

What does LDC marketing staff know about any large switchable loads outside the LDC? How big is it; is it interruptible (I would presume it is)? These loads may be using LDC released capacity.

An issue not raised is how do nearby interruptible loads outside the study area affect the demand for fuel oil when they are interrupted? (Connecticut, northern NJ for example). Do the NY LDCs have any insights into these loads?

Questions for

PETROLEUM TERMINALS

Petroleum Terminal Name and Location

Terminal Owner:

Address:

Storage Capacity and Utilization

Please provide information about your normal storage levels during the heating oil season (September to March) for each of the products listed in the table below. The questions that follow all relate specifically to this "List of Products".

Storage Capacity by Refined Product

Fuel	No. of Tanks	Total Across all Tanks for a Product			
		Total Capacity (barrels)	Minimum Inventory Level (barrels)	Typical Safety Inventory (barrels)*	Average Drop or Receipt Size (barrels)
Kerosene					
Diesel ≤ 15 ppm (ULSD)					
Onroad Diesel > 15 ppm and ≤ 500 ppm					
Offroad No. 2 Fuel Oil ≤ 0.37% S					
Offroad No. 2 Fuel Oil > 0.37 % and ≤ 1.00% S					
Offroad No. 2 Fuel Oil > 1.00% S					
No. 4 Fuel Oil					
No. 6 Residual Oil ≤ 0.37% S					
No. 6 Residual Oil > 0.37 % and ≤ 1.00% S					
No. 6 Residual Oil > 1.00% S					

*Safety Inventory is defined as volume above suction that is typically held constant

[The following set of questions is repeated for every fuel type as listed in the table above. There are three pages to fill out for each type of fuel. PLEASE FILL IN THE TABLES THAT COVER FUELS THAT YOUR COMPANY DEALS WITH.

Please feel free to attach any additional documents or explanation to provide details.]

Diesel ≤ 15 ppm Sulfur (ULSD)

Inventory

a. We would also like monthly Diesel ≤ 15 ppm inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for Diesel ≤15 ppm during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for **Diesel** ≤ 15 ppm over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving Diesel ≤ 15 ppm within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of Diesel ≤ 15 ppm do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming Diesel ≤ 15 ppm loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy Diesel ≤ 15 ppm under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of Diesel ≤ 15 ppm do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum Diesel ≤ 15 ppm send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for Diesel ≤ 15 ppm?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for Diesel ≤ 15 ppm during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for Diesel ≤ 15 ppm, please indicate so and provide the overall operating cost per barrel of throughput.

Onroad Diesel > 15 ppm and ≤ 500 ppm Sulfur

Inventory

a. We would also like monthly Onroad Diesel > 15 ppm and ≤ 500 ppm inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for Onroad Diesel > 15 ppm and ≤ 500 ppm during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for Onroad Diesel > 15 ppm and ≤ 500 ppm over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving Onroad Diesel > 15 ppm and ≤ 500 ppm within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of Onroad Diesel > 15 ppm and ≤ 500 ppm do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming Onroad Diesel > 15 ppm and ≤ 500 ppm loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy Onroad Diesel > 15 ppm and ≤ 500 ppm under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of Onroad Diesel > 15 ppm and ≤ 500 ppm do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum Onroad Diesel > 15 ppm and ≤ 500 ppm send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for Onroad Diesel > 15 ppm and ≤ 500 ppm?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

b. What are your average operating and maintenance costs for Onroad Diesel > 15 ppm and ≤ 500 ppm during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for Onroad Diesel > 15 ppm and ≤ 500 ppm, please indicate so and provide the overall operating cost per barrel of throughput.

Offroad No. 2 Fuel Oil ≤ 0.37% Sulfur

Inventory

a. We would also like monthly Offroad No. 2 Fuel Oil ≤ 0.37% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for Offroad No. 2 Fuel Oil ≤ 0.37% during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for Offroad No. 2 Fuel Oil ≤ 0.37% over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving Offroad No. 2 Fuel Oil ≤ 0.37% within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of Offroad No. 2 Fuel Oil ≤ 0.37% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming Offroad No. 2 Fuel Oil ≤ 0.37% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy Offroad No. 2 Fuel Oil ≤ 0.37% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of Offroad No. 2 Fuel Oil ≤ 0.37% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum Offroad No. 2 Fuel Oil ≤ 0.37% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for Offroad No. 2 Fuel Oil ≤ 0.37%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for Offroad No. 2 Fuel Oil ≤ 0.37% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for Offroad No. 2 Fuel Oil ≤ 0.37%, please indicate so and provide the overall operating cost per barrel of throughput.

Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% Sulfur

Inventory

a. We would also like monthly Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% inventory during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for Offroad No. 2 Fuel Oil > 0.37% and ≤ 1.00%, please indicate so and provide the overall operating cost per barrel of throughput.

Offroad No. 2 Fuel Oil > 1.00% Sulfur

Inventory

d. We would also like monthly Offroad No. 2 Fuel Oil > 1.00% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

e. For the period June 2002 to May 2004, we would like daily inventory levels for Offroad No. 2 Fuel Oil > 1.00% inventory during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

f. Please provide information on the total capacity and throughput (or sales) for Offroad No. 2 Fuel Oil > 1.00% over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

d. What are the planned capacity-changes involving Offroad No. 2 Fuel Oil > 1.00% within the next five years?

e. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

f. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

d. What volume of Offroad No. 2 Fuel Oil > 1.00% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

e. What is the average incoming Offroad No. 2 Fuel Oil > 1.00% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

f. What type of contracts do you buy Offroad No. 2 Fuel Oil > 1.00% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

e. What volume of Offroad No. 2 Fuel Oil > 1.00% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

f. What is the average and maximum Offroad No. 2 Fuel Oil > 1.00% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

g. What type of customers do you have for Offroad No. 2 Fuel Oil > 1.00%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

h. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

b. What are your average operating and maintenance costs for Offroad No. 2 Fuel Oil > 1.00% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for Offroad No. 2 Fuel Oil > 1.00%, please indicate so and provide the overall operating cost per barrel of throughput.

No. 4 Fuel Oil

Inventory

a. We would also like monthly No. 4 Fuel Oil inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for No. 4 Fuel Oil during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for No. 4 Fuel Oil over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving No. 4 Fuel Oil within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of No. 4 Fuel Oil do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming No. 4 Fuel Oil loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy No. 4 Fuel Oil under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of No. 4 Fuel Oil do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum No. 4 Fuel Oil send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for No. 4 Fuel Oil?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for No. 4 Fuel Oil during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for No. 4 Fuel Oil, please indicate so and provide the overall operating cost per barrel of throughput.

No. 6 Residual Fuel Oil ≤ 0.37% Sulfur

Inventory

a. We would also like monthly No. 6 Residual Fuel Oil ≤ 0.37% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for No. 6 Residual Fuel Oil ≤ 0.37% during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for No. 6 Residual Fuel Oil ≤ 0.37% over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving No. 6 Residual Fuel Oil ≤ 0.37% within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of No. 6 Residual Fuel Oil ≤ 0.37% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming No. 6 Residual Fuel Oil ≤ 0.37% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy No. 6 Residual Fuel Oil ≤ 0.37% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of No. 6 Residual Fuel Oil ≤ 0.37% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum No. 6 Residual Fuel Oil ≤ 0.37% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for No. 6 Residual Fuel Oil ≤ 0.37%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for No. 6 Residual Fuel Oil ≤ 0.37% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for No. 6 Residual Fuel Oil ≤ 0.37%, please indicate so and provide the overall operating cost per barrel of throughput.

No. 6 Residual Fuel Oil > 0.37% and ≤ 1.00% Sulfur

Inventory

a. We would also like monthly No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for **No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00%** over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for No. 6 Residual Fuel Oil > 0.37 and ≤ 1.00%, please indicate so and provide the overall operating cost per barrel of throughput.

No. 6 Residual Fuel Oil > 1.00% Sulfur

Inventory

a. We would also like monthly No. 6 Residual Fuel Oil > 1.00% inventory levels for the period June 2002 till May 2004. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

b. For the period June 2002 to May 2004, we would like daily inventory levels for No. 6 Residual Fuel Oil > 1.00% during any period of gas interruption. Please provide date and inventory level data from 5 days before the start of the interruption till 5 days after the end of the interruption. We will gladly accept the data in any format (papers attached to this survey, or electronic) that you already have.

c. Please provide information on the total capacity and throughput (or sales) for No. 6 Residual Fuel Oil > 1.00% over the last twenty years.

Year	Storage Capacity (barrels)	Actual Throughput (barrels)
1985		
1990		
1995		
2000		

Facility Expansion

a. What are the planned capacity-changes involving No. 6 Residual Fuel Oil > 1.00% within the next five years?

b. Is there additional land available at your specific location that can be used to build terminals? Do you own or lease this land? How much additional storage capacity (tanks or barrels) could you build on this land? What product are you likely to use this extra storage capacity for?

c. Are there plans to relocate to another terminal site? If yes, what will happen to the vacated terminal? If the location is new to the industry, where will it be and what will its capacities be for listed products?

Incoming Product Supply

a. What volume of No. 6 Residual Fuel Oil > 1.00% do you receive by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Rail		
Trucks		
Marine Tankers		
Barges		

b. What is the average incoming No. 6 Residual Fuel Oil > 1.00% loading capacity during the heating oil season?

Loading Method	Capacity (bbl/day)	Actual Receipt Volume (bbl/day)
Wharf		
Truck Rack		
Rail		
Pipeline Transfer		

c. What type of contracts do you buy No. 6 Residual Fuel Oil > 1.00% under?

Contract type	Average Contract Size (bbl/contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Purchase (0-14 days in advance)		
Spot Purchase (15-30 days in advance)		
Spot Purchase (31-60 days in advance)		
Spot Purchase (more than 60 days in advance)		
Any other contract type (please specify)		
a.		
b.		

Outgoing Fuel Delivery

a. What volume of No. 6 Residual Fuel Oil > 1.00% do you send-out by different modes of transportation?

Transport Mode	Vol. of Product (bbl/day)	% of total product
Pipeline		
Trucks		
Rail		
Marine Tankers		
Barges		

b. What is the average and maximum No. 6 Residual Fuel Oil > 1.00% send-out capacity during the heating oil season?

Outbound handling Method	Capacity (bbl/day)	Actual Throughput Volume (bbl/day)
Wharf		
Truck Rack		
Rail Rack		
Pipeline Transfer		

c. What type of customers do you have for No. 6 Residual Fuel Oil > 1.00%?

Customer type	Volume of Product (bbl/day)	% of total supply
Electric Generation		
Industrial		
Vessel Bunkering		
Fuel Oil Distributor		
Other (please specify)		
a.		
b.		

d. What type of contracts do you sell your products under?

Contract type	Volume of Fuel (gal/ contract)	% of product purchase
Fixed contract for the entire heating oil season (September to March)		
Spot Sale		
Other (Please Specify)		
a.		
b.		

Costs

a. What are your average operating and maintenance costs for No. 6 Residual Fuel Oil > 1.00% during the heating oil season in $ per barrel of throughput? If you cannot isolate the operating cost for No. 6 Residual Fuel Oil > 1.00%, please indicate so and provide the overall operating cost per barrel of throughput.