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ENERGY SECURITY

Federal Responses to December 1989 Heating Fuel Shortages Were Limited

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Resources, Community, and
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The Honorable John Heinz
United States Senate

The Honorable Larry Pressler
United States Senate

The Honorable Paul E. Kanjorski
House of Representatives

In December 1989 the nation experienced a severe and unpredicted cold spell, causing an unexpected surge in heating fuel demand and prices. In response to your individual requests, this report examines (1) allegations of shortages of heating fuels during that period, (2) the type of data collected and the analyses performed on heating fuel supply and demand by the Department of Energy's (DOE) Energy Information Administration (EIA), (3) the impact of delays in processing waivers of the Jones Act on heating fuel supplies (the act requires the use of U.S. vessels to transport cargo between U.S. ports), and (4) the impact of interruptible natural gas contracts on heating fuel supplies and availability (these contracts allow natural gas suppliers to discontinue supplies to nonresidential customers during the winter in exchange for price concessions).

Results in Brief

Short-term physical shortages of heating fuels—propane and distillate—occurred on the East Coast in December 1989. Customers could not purchase all the product they demanded at the time it was needed, even if they were willing to pay higher prices. According to industry officials we interviewed, two principal reasons for the shortages were (1) increased demand because of the extremely cold temperatures and (2) the inability of the distribution systems to move heating fuel stocks from refineries and storage terminals to areas experiencing shortages.

EIA maintained historical data and prepared forecasts on demand and supply for distillate (but not for propane). However, data limitations, particularly on the secondary inventory data (inventories held by wholesalers and retailers) needed to measure short-term distillate supplies, reduced EIA's ability to predict or monitor the supply shortages. Federal agencies took from 6 to 17 days to process Jones Act waivers that would have allowed the use of foreign-flagged vessels to transport heating fuels between U.S. ports. In two cases the foreign ships became

unavailable before decisions were made on the waiver applications. A new waiver process has been established, but the criteria for granting waivers are not completely clear.

In December 1989 utilities and commercial and industrial customers with interruptible natural gas contracts had gas services discontinued. These customers entered distillate and propane markets, thus reducing the supplies of these fuels available to residential consumers. EIA is undertaking a study that will provide some additional information on the impact of the interruptible gas contracts on heating fuel supplies.

Background

The United States experienced a period of extremely cold weather during December 1989 and January 1990. According to EIA, temperatures during the period were the coldest recorded in the last 60 years. In terms of heating-degree days (the number of degrees per day the average daily temperature is below 65 degrees Fahrenheit), December 1989 was 27 percent colder than normal nationally and 33 percent colder than normal on the East Coast.

Demand for heating fuels increased sharply during the period. Nationally, the demand for heating distillate increased by 1 million barrels a day (MMBD) to 4.1 MMBD, or 31 percent, from November to December 1989, reaching a peak of 4.4 MMBD during the week of December 22. Propane demand also rose from 1.074 MMBD in November to 1.525 MMBD in December 1989, a 42-percent increase. These increases were more dramatic on the East Coast, where distillate and propane demand rose by 53 percent and 83 percent, respectively, between November and December.

Several federal agencies have responsibilities related to heating fuel supply shortages such at those that occurred in December 1989. EIA has the responsibility to maintain and analyze data on energy resource reserves, production, consumption, and distribution, as well as to develop information on the adequacy of energy supplies to meet short- and long-term future demands for the nation. For heating fuels these data include information on distillate and propane supply. Information on supply consists of data on production, inventories and imports. Of the three supply components, inventories are most critical in meeting short-term, weather-induced demand surges like the one that took place in December 1989 because of the time required to obtain additional supplies from production and imports.

During the 1989 heating fuels crisis, petroleum companies attempted to supplement the transportation of distillate and propane products by requesting waivers of the Jones Act requirement that U.S. vessels be used between U.S. ports. A waiver can be granted if it is in the interest of national defense. The Customs Service, Department of the Treasury, seeks the advice of the Department of Defense (DOD) on defense issues, of the Department of Transportation's (DOT) Maritime Administration on the availability of qualified U.S. vessels to ship the cargo, and of DOE on the need for additional energy supplies. The Customs Service then makes a recommendation to Treasury's Assistant Secretary for Regulatory, Tariff, and Trade Enforcement or his representative, who makes the final decision on whether or not to grant a waiver. Treasury must grant a waiver if the Secretary of Defense determines that it is in the interest of national defense to do so.

Shortages Occurred During the 1989 Heating Fuel Crisis

In December 1989 some short-term shortages of distillate and propane occurred in all segments of the energy supply chain on the East Coast, while propane terminals experienced shortages in South Dakota.[1] Industry officials we interviewed attributed the shortages to increased demand due to the extremely cold temperature and the inability of the distribution systems to move heating fuel stocks from refineries and storage terminals to areas in need. The energy supply chain consists of (1) the primary segment—refiners that produce the finished products, (2) the secondary segment—various wholesalers and/or retailers of petroleum products that obtain supplies from the primary suppliers or imports, and (3) the tertiary segment—residential, commercial, and industrial customers who are the end-users (see app. I for details).

For example, at a major Mid-Atlantic refining company, demand for distillate and propane in December 1989 exceeded its forecast demand and, therefore, its planned supply for the period. The company told us that it could not supply noncontract customers and, in some cases, could not satisfy the demand of contract customers who wanted distillate and/or propane supplies in excess of their contract amount, even though these

[1] According to our definition, shortages include situations in which customers were unable to purchase all the supplies they needed from a heating fuel supplier even though they were willing to pay the higher price. EIA's Director, Office of Oil and Gas, believes that the distillate supply problems in December 1989 were "supply dislocations" rather than actual shortages because sufficient amounts of these products existed at the primary inventory levels (stocks held at refineries, in pipelines, and at bulk terminals). In his view, when product inventories were sharply drawn down at the secondary levels to meet demand, dislocations began to occur at the secondary levels because distribution systems could not move heating fuel stocks fast enough from refineries and storage terminals to areas like New England.

customers were willing to pay the price. According to its Vice President, a major propane supplier to the New England market experienced protracted supply shortages at various times in December for a combined period of at least 14 days. During these periods the company could not meet the demands of its contract customers and also turned away many noncontract customers because of product scarcity.

Some secondary suppliers in the Northeast agreed that short-term shortages occurred. For example, by the third week in December, only two out of eight wholesalers we contacted in New England had distillate. The two wholesalers rationed available supplies to retailers who, in turn, rationed supplies to residential and/or commercial customers.

State energy officials in five Northeastern states also reported propane shortages for residences. According to officials from the Pennsylvania State Energy Office, only about 30 percent of propane demand was supplied in some parts of the state.

Officials of a major propane pipeline terminal in the Northeast said that the demand for propane on the pipeline system in December exceeded its operating capacity. Although they adjusted the product flow through the pipeline to maximum levels, demand still exceeded supply. Thus, the company was forced to ration supplies to its customers from the second week of December 1989 until January 1990.

In South Dakota, propane terminals experienced shortages, and distillate and propane prices rose sharply. However, secondary suppliers we interviewed were able to obtain heating oil and propane. According to state energy officials, both fuels were available, but at substantially higher prices. For example, the average retail price of heating oil rose $.20 per gallon while propane rose by $.50 per gallon. Propane is the primary heating fuel on the Rose Bud and Pine Ridge Indian Reservations, where many residents could not pay the higher prices. According to a tribal official who monitored propane prices on the Pine Ridge Reservation, one retailer raised prices by 62 percent between November 7 and December 26, 1989, while another retailer raised the price by 92 percent between November 3 and December 29, 1989.[2] As a result, tribal officials from both reservations said that some families burned wood,

[2]Similarly, the spot price of distillate at New York Harbor increased by 90 percent between Nov. 27 and Dec. 27, 1989. The rise in propane prices was even more dramatic. Between Dec. 1, 1989, and Jan. 2, 1990, the spot price of propane rose by 305 percent and 211 percent, respectively, at the Conway, Kansas, and Mt. Belvieu, Texas, markets—two major supply points through which a majority of the U.S. domestic supply is marketed and distributed.

tires, and old clothes to stay warm, while others went to a Red Cross shelter or moved in with relatives.

1989 Crisis Revealed Limitations in EIA's Collection and Analysis of Heating Fuels Data

The heating fuel supply crisis of December 1989 revealed limitations in EIA's data collection and analysis capabilities. Specifically, EIA lacked information such as the following that could have been useful in predicting or responding to the crisis:

- In December 1989 EIA had limited data on propane supply. While EIA collected weekly data on distillate inventory, it did not collect comparable data on propane. Because of the short duration of the December 1989 crisis, weekly inventory data would have been useful in monitoring short-term supply potential for propane. In February 1990 EIA instituted an emergency telephone survey to collect weekly propane supply data for the remainder of the 1989-90 heating season.
- EIA collected weekly, monthly, and annual data on distillate inventories, but only primary inventory data were included (see app. II). EIA did not collect data on inventories held by wholesalers and/or retailers (secondary inventories). Data on secondary inventories would have provided a more accurate picture of inventories available at the start of the heating season and, thus, given a better indication of whether and where a short-term shortage was likely to occur.
- The primary inventory data EIA collected on distillate fuels did not indicate how much of that inventory would be available to meet a surge in demand, either nationally or in a specific region. Supplies available from primary inventory are determined by the minimum operating inventory—the minimum level suppliers need to keep their systems operating. Below these levels, operating problems and supply shortages would begin to appear in a distribution system. The National Petroleum Council estimated a minimum operating inventory for distillate of 85 million barrels (MMB) in 1988.[3] This estimate assumes that any amount above this level is available for use. However, National Petroleum Council officials told us that the minimum operating inventory estimate was based on consensus judgments of industry experts and, therefore, may not always be relied upon for determining supply availability. Further, inventory supply problems occurred last December even though primary inventory data collected by EIA for December 31, 1989, showed

[3]The National Petroleum Council is a federal advisory committee to the Secretary of Energy. The Council advises, informs, and makes recommendations to the Secretary on any requested matter relating to petroleum or the petroleum industry.

that there were 105.7 MMB of distillate fuel oil available nationally—20 MMB over the National Petroleum Council's estimate of MOI.

- Under the EIA/State Heating Oil Program, states provided data to EIA on the retail price of distillate on a state-by-state basis. In addition, EIA collected and reported wholesale prices and primary inventory data for each state participating in the program. These data allowed state energy officials to compare prices among states, and provided an opportunity for states to determine where primary inventories were still available among the participating states. The number of states participating in the program declined from 14 in the 1987-88 winter season to 11 in the 1988-89 and 1989-90 winter seasons after federal funding for the program was eliminated.

EIA has recognized weaknesses in its data collection and analysis efforts and has made some improvements since last winter. First, it now collects weekly data on propane supply and demand for publication between the beginning of October and the end of March. Second, because of the reinstatement of funding, the number of states that provide retail price data on heating fuels to EIA under the EIA/State Heating Oil and Propane Program has increased from 11 in 1989-90 to 26 this winter. However, EIA will no longer publish inventory data on a state-by-state basis, as it did in previous seasons. According to EIA officials, state energy offices preferred that EIA collect and publish data by Petroleum Administration for Defense Districts (PADD), rather than states collecting state-level data.[4]

In the view of EIA officials, the collection of data on secondary inventory levels was not warranted, although they have not carried out a formal cost-benefit analysis to support this view. They pointed out that inventory capacity for distillate at the secondary level was considerably smaller than at the primary level. As of March 31, 1988, the National Petroleum Council estimated that secondary inventory capacity was 37 million barrels, compared to 261 million barrels for the primary level. EIA officials also said that information EIA currently collects on primary inventory levels could be used to estimate whether secondary inventory levels are likely to be higher or lower than normal. Further, in their opinion, a secondary data collection system would be too costly to implement because EIA would have to institute a new survey of secondary suppliers. They added that even if EIA can determine that secondary inventories are low going into the heating season, heating oil and propane are not regulated, and companies cannot be required to maintain specific inventory levels.

[4]PADDs divide the nation into five geographical areas for purposes of administration.

In the view of four of the five state energy offices we contacted on the East Coast (where supply problems occurred), secondary inventory information on heating fuels is a useful tool for monitoring supplies during the winter. Officials from four state energy offices told us that it would be very useful if EIA collected secondary inventory data for distillate and propane; the fifth state's officials believed that, although this information might be useful, it would be too expensive to collect. According to one state energy official, secondary inventory is particularly beneficial to the East Coast because it reduces the region's vulnerability to supply bottlenecks that may arise from dependence on Gulf Coast pipelines and imports during emergencies. According to these state energy officials, EIA should collect these data because such data (1) would provide a more comprehensive estimate of stocks at the secondary level on the East Coast, which, if collected and reported on a regional basis, would permit states to know how much stock was easily accessible to them within their regions, (2) would provide actual data on the amount of fuels at the secondary level, rather than estimates made on the basis of reductions at the primary level inventory, and (3) could reveal potential hoarding of fuels at the secondary level that may not be reflected in EIA's primary inventory data.

EIA officials also did not consider it worthwhile at this time to reexamine the National Petroleum Council's minimum operating inventory estimate for distillate. While they acknowledged that supply problems occurred last winter even though primary inventories were well above the 85 MMB minimum operating inventory level, they believed that the supply problems occurred because available inventories could not be transported to the locations where they were needed.

Problems With Jones Act Waivers Affected Energy Supplies

Over an 8-day period in December 1989, the Customs Service received six applications for waivers of the Jones Act so that foreign vessels could be used to move heating fuels from Puerto Rico and the Gulf Coast to the East Coast. Overall, the federal agencies took 6 to 17 days between the date of application and the date of Treasury's written response to the applicants to process these requests.

Three waiver applications for distillate or residual oil were all denied by Treasury because U.S. vessels were available. Of the other three applications for propane, one resulted in 50,000 barrels being shipped to the Northeast. However, the foreign vessels named in the other two propane applications became unavailable before Treasury made a decision. In

one of those cases, DOD and Maritime took 6 days from the date of application to advise Treasury, but after the fifth day the vessel was no longer available to travel to the Northeast. In the other case, DOD and Maritime took 5 days from the date of application to advise Treasury. Treasury granted the waiver 1 day later, a few hours after the vessel had sailed to another destination. More specific information about the six applications is contained in appendix III.

In July 1990, DOE, Maritime, and Customs Service officials signed a procedural agreement called a "Memorandum of Understanding" to expedite waiver applications during future actual or imminent energy shortages. The Treasury Department, which is responsible for final approval of the Jones Act waivers, and DOD are not parties to the agreement. The agreement clarifies the roles and responsibilities of DOE and Maritime. Under the agreement DOE monitors energy supplies and Maritime monitors ship availability. DOE determines whether an actual or imminent energy shortage exists and assesses whether the waiver is necessary in the interest of national defense, while Maritime determines the availability of U.S. vessels. The agreement requires both agencies to respond to the Customs Service regarding these issues within 48 hours. Customs would then make its recommendation to Treasury.

Agreement Does Not Resolve All Problems

Although the agreement may permit quicker processing of waiver applications, two obstacles will continue to impede the process. First, DOE will not have all the data needed to determine that an energy shortage exists or is imminent. For example, EIA does not collect data on the secondary inventories held by wholesalers and/or retailers, in which significant supply shortages occurred in December 1989. According to the Director of the Energy Emergencies Planning Division in DOE's Office of Energy Emergencies, the greatest impediment in December 1989 was obtaining sufficient and timely supply data. He acknowledged that quantifying a shortage would be difficult without, at least, secondary inventory data.

Second, Treasury's Deputy Assistant Secretary for Regulatory, Tariff, and Trade Enforcement, who is responsible for approving Jones Act waivers, told us that he is concerned about DOE's interpretation of national defense. While DOE believes that "national defense" encompasses domestic energy shortages, the Deputy Assistant Secretary said he believed that domestic shortages alone do not satisfy the "national defense" criterion; in his view only shortages experienced by DOD installations or strategic suppliers satisfy this criterion. The Deputy Assistant Secretary said that Treasury's Office of General Counsel doubted that

the two waivers granted by Treasury in December 1989 satisfied the national defense requirement. He said Treasury will more closely examine the national defense interest of future applications. He also told us that in December 1989 Treasury suggested to DOE and Maritime that the Jones Act be changed to provide a broader basis for granting waivers.

When preparing the Oil Pollution Act of 1990, a House Committee on Merchant Marine and Fisheries staff member told us that the Committee staff drafted legislation that would authorize waivers in the interest of "national defense" or "national security." However, the version of the bill the Congress passed did not include a new criterion for granting waivers.

Interruptible Natural Gas Contracts Affected Energy Markets

In December 1989 natural gas consumers with interruptible contracts (i.e., electric utilities and commercial and industrial concerns) had gas service discontinued and entered the heating oil and propane markets, competing with residential consumers for available supplies. In a June 1990 report, EIA estimated that this activity affected the December 1989 heating oil market by, at most, 141 thousand barrels of distillate per day (MBD), or about 5 percent of total distillate sales for the month. However, EIA officials said that this figure was just a rough estimate.

In February 1990 the Senate Subcommittee on Energy Regulation and Conservation, Committee on Energy and Natural Resources, requested that EIA conduct a comprehensive, nationwide study on the impact of interruptible gas contracts on heating fuel demand. EIA subsequently determined that a comprehensive study would cost an estimated $850,000 and could take up to 2 years to complete. Such a study would involve a survey of interruptible natural gas consumers who may have switched to distillate or propane. In November 1990 EIA told us that it does not support a comprehensive study but rather will use existing EIA resources to compare what happened last winter with the previous winter, focusing on a representative sample of electric utilities in the Mid-Atlantic area. EIA intends to complete the study by June 1991, although the exact scope and methodology had not been determined as of January 10, 1991.

According to the Director of EIA's Reserves and Natural Gas Division, EIA decided on this focus for the study because most of last winter's unanticipated demand for distillate occurred in the Mid-Atlantic states and appeared to be attributable to electric utilities. She said that the study

would show, among other things, whether these companies switched from natural gas to distillate and propane last winter, the extent to which the companies maintain inventories of these fuels in case their natural gas supplies are interrupted, and whether state regulations require minimum inventories and allow the costs of the purchases to be passed on to their customers. However, the study will not identify the extent or impact of issues and problems experienced by electric utilities in other geographic areas or identify problems that may have been caused by industrial or commercial gas users with interruptible contracts.

Conclusions

Federal agencies have taken actions to address the problems experienced during the December 1989 crisis. However, some limitations in EIA data collection and analysis remain, and problems in processing Jones Act waivers may still occur.

We understand the concern of EIA officials about the cost of collecting information on secondary inventory levels for distillate and propane. However, in our view, EIA has not analyzed the issue sufficiently to demonstrate whether the costs of collecting such information outweigh its benefits. While questions also remain regarding the accuracy of the National Petroleum Council's estimate of the minimum operating inventory for distillate, we have no firm basis to dispute EIA's view that a reexamination of the estimate is not warranted at this time.

We believe that the Memorandum of Understanding on Jones Act waivers may not work as intended because of potential problems with the data DOE is expected to provide to meet the national defense criterion for granting waivers. It is not clear whether DOE will have the kinds of data it needs to determine whether or not supply shortages are occurring, or if DOE must show an impact on defense installations or suppliers before Treasury will grant the waiver. Actions by DOE and the other federal agencies involved in the waiver process are needed to address these problems. If the agencies are unable to resolve these problems administratively, they may wish to seek legislation that would further define the criteria needed for heating fuel waivers.

Recommendation

We recommend that the Secretary of Energy (1) determine the costs and benefits of collecting information on secondary inventory data, including whether these data are needed to satisfy DOE's responsibilities under the Memorandum of Understanding on Jones Act waivers, and (2)

work with the Secretary of the Treasury to clarify—either administratively or legislatively if necessary—whether DOE will need to show that defense installations and suppliers are affected in order to satisfy the national defense criterion for granting waivers.

To determine if companies experienced shortages of distillate and propane in the December 1989 crisis, we contacted companies in the primary and secondary segments in the energy supply chain, pipeline companies, and state energy offices. To obtain information on EIA's data collection, analysis, and dissemination, we reviewed records and interviewed officials at EIA, the state energy offices, and companies in the various segments of the industry. To obtain information on Jones Act waivers, we reviewed agency records and interviewed officials at DOE, DOT, and Treasury as well as in industry. We also contacted the six companies that applied for waivers in December 1989. Details of our objectives, scope, and methodology appear in appendix IV.

We discussed factual information in this report with DOE, DOT, and Treasury officials. They generally agreed with the facts presented and their comments were incorporated where appropriate. However, as requested by your offices, we did not obtain official agency or industry comments on this report.

As arranged with your offices, unless you publicly announce its contents earlier, we will make no further distribution of this report until 15 days from the date of this letter. At that time, we will send copies to the Secretaries of Energy, Transportation, and the Treasury; the Director, Customs Service; and other interested parties. Copies will also be made available to others upon request.

This work was done under the direction of Victor S. Rezendes, Director, Energy Issues, who may be reached at (202) 275-1441. Other major contributors to this report are listed in appendix V.

J. Dexter Peach
Assistant Comptroller General

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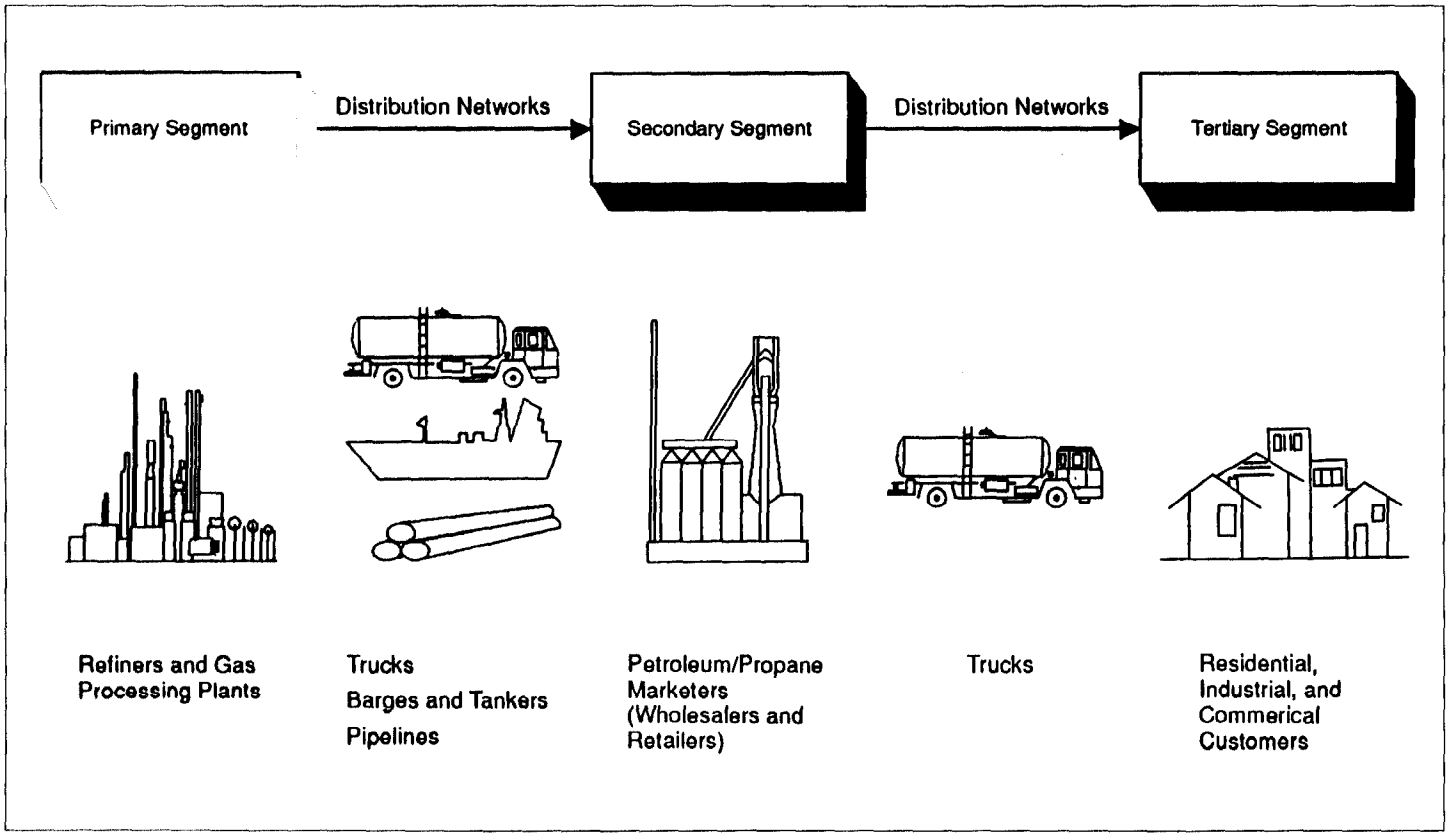
Abbreviations

DOD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
EIA	Energy Information Administration
GAO	General Accounting Office
MBD	thousand barrels per day
MMB	million barrels
MMBD	million barrels per day
OEE	Office of Energy Emergencies
PADD	Petroleum Administration for Defense Districts
F	Fahrenheit

The Energy Supply Chain

The energy supply chain includes (1) the primary segment—refiners that produce the finished products, (2) the secondary segment—various wholesalers and/or retailers of petroleum products that obtain supplies from the primary suppliers or imports, and (3) the tertiary segment—residential, commercial and industrial customers that are the end-users. Energy products flow from segment to segment via the various distribution networks illustrated in figure I.1.

Figure I.1: Energy Supply Chain



Home heating oil is available at most refineries and terminals, and is shipped and stored at atmospheric pressure. Propane, a liquified petroleum gas, must be kept under pressure to remain liquid, and thus is stored and transported in pressurized containers.

Domestically refined petroleum products enter the U.S. distribution system at the refinery gate, while imports enter the system at ports of entry. The northeastern states also import refined petroleum products,

which are shipped to terminals by pipelines, barges, or tankers. From the terminals, products are transported by truck or rail to smaller bulk storage facilities or directly to service stations or large end-users.

DOE's Role in Energy Emergencies

Data Collection and Forecasts

The Department of Energy's (DOE) Office of Energy Emergencies (OEE) and Energy Information Administration (EIA) are the focal points for federal collection and monitoring of heating fuels data. However, the scope of their activities differs because of differences in the responsibilities and missions of the two organizations.

The overall mission of the Office of Energy Emergencies is to reduce U.S. vulnerability to energy supply disruptions by planning for and responding to severe national energy emergencies. In this context, OEE monitors current trends in the heating fuels supply and demand through data from EIA, the American Petroleum Institute, and oil industry periodicals; through informal contacts with heating fuels industry representatives; and through staff analyses. DOE's responsibilities in determining and quantifying energy shortages in order to expedite Jones Act waiver requests are discussed in appendix III.

EIA Publications

EIA's mission is to provide essential, relevant, and timely energy information to the Executive Branch, the Congress, state governments, and the public so that those who make decisions about energy have the tools needed to make those decisions. EIA collects and publishes national and regional petroleum supply and demand historical statistics and forecasts the nation's production and consumption of petroleum products over varying time periods.

EIA's major statistical publications for historical information on heating fuels and other petroleum products are the Weekly Petroleum Status Report, the Petroleum Supply Monthly, and the Petroleum Supply Annual. These publications differ in the degree of detail of information presented, the timeliness of the data, and data collection methods.

- The Weekly Petroleum Status Report provides weekly aggregate data (nationwide and by Petroleum Administration for Defense Districts [PADD]) on supply and demand of distillate fuel oil as well as gasoline, residual fuel, and jet fuel oil. The report does not include data on propane. The information provided on distillate supply includes levels of refinery production, imports, and primary stocks. Demand data are reported as "product supplied" at the primary segment of the supply chain.[1]

[1]EIA defines and reports demand as product supplied. However, heating fuel demand is the amount of heating fuel consumers are willing and able to buy at a given time for a given price. Thus, product supplied does not account for potential unmet demand. Measuring shortages will require a survey of heating fuel demand at the end-use level, which EIA does not perform.

- The Petroleum Supply Monthly expands the volume, product coverage, and time frame of information provided in the weekly report. It provides monthly supply and demand data for distillate and propane/propylene, as well as other petroleum products.
- The Petroleum Supply Annual provides historical information on both the domestic and international situation for the nation as a whole. While it contains annual petroleum statistics, it also provides some monthly information on movements of crude oil and products among the PADDs for the current year.

The information for all three publications is obtained from the same petroleum industry sources. EIA's universe for petroleum (distillate) data includes all (1) petroleum refineries in the United States and its territories, (2) domestic bulk terminal facilities with a minimum of 50,000 barrels of storage capacity, (3) pipeline companies that carry petroleum products, (4) importers of petroleum products, and (5) companies and plants that have custody of petroleum products transported by tanker and barge between PADDs.

The data are reported with varying time lags in the three publications. For example, weekly data are published 1 week after the report period in the Weekly Petroleum Status Report; monthly data are published about 60 days after the report month. The Petroleum Supply Annual is published about 6 months after the report year.

Up to and including the 1989-90 winter season, EIA published a Winter Distillate Report that provided additional information on distillate supply and prices for PADDs and selected states. The Winter Distillate Report was published biweekly from the first week of October to the end of March to provide three categories of data on distillate fuel oil: (1) weekly data on refinery gross inputs, production, imports, and primary stocks for distillate fuel oil in PADDs (import data are reported for the entire United States only), (2) biweekly data on state primary distillate storage for each of the states participating in the EIA/State Heating Oil Program (11 states participated in the program in the 1989-90 winter season), and (3) monthly residential and wholesale distillate prices for each of the State Heating Oil Program states. The Winter Distillate Report did not provide data on propane. These data highlighted weekly and/or biweekly trends in the various supply components for each PADD and allowed the reader to determine the relative sources of primary distillate supplies by PADD during the crucial winter months. This report was replaced in the 1990-91 winter season with the Winter Fuels

Report, which now contains weekly, biweekly, and monthly data on distillate and propane for 26 states that participate in the EIA/State Heating Oil and Propane Program.

EIA Energy Forecasts

EIA forecasts and analyzes relationships among energy supply, demand, prices, and other variables such as weather and the economy. Two types of forecasting models provide short- and long-term energy outlooks, respectively. The short-term model uses historical monthly data to provide quarterly projections (up to eight quarters) of nationwide supply, demand, and prices of heating distillate and other fuels. The demand projections for heating distillate are based primarily on assumptions about the weather. For instance, if a colder than "normal" temperature (as measured by the heating degree-days) is assumed, the short-term model will forecast a higher demand for heating distillate for the winter, and vice versa.[2] The results of the short-term model forecast are published in the quarterly Short-Term Energy Outlook. On the other hand, the long-term model forecasts nationwide energy supply and demand outlook over the long term (up to the year 2010), using annual data. The long-term results are published in the Annual Energy Outlook.

EIA's Analysis of the December 1989 Crisis

In response to congressional concerns about the supply and escalating price of heating fuels during December 1989, EIA conducted two analyses. A short-term analysis dealing with prices, supplies, and margins, using immediately available data, was completed in January 1990. The second analysis assessing the heating fuel crises from a broader and longer-term perspective, was completed in June 1990. EIA concluded in both analyses that in the face of extraordinary and unexpected increases in demand, petroleum markets performed as might have been expected, by responding to temporary imbalances in supply and demand through higher prices, quickly followed by increased supplies and declining prices. According to EIA's Director, Office of Oil and Gas, while propane shortages occurred, the distillate supply problems in December 1989 were "supply dislocations" rather than actual shortages because there was sufficient amount of the product at the primary inventory levels (stocks held at refineries, in pipelines, and at bulk terminals). The Director pointed out that when product inventories were sharply drawn down at the secondary levels to meet demand, dislocations began to

[2]Heating degree-days measure the number of degrees per day the average daily temperature is below 65 degrees F. The daily average temperature is the mean of the maximum and minimum temperature for a 24-hour period.

occur at the secondary levels because distribution systems could not move heating fuel stocks fast enough from refineries and storage terminals to areas such as New England.[3]

[3]EIA uses the term "supply dislocations" to describe actual physical shortages. We defined the situation as a shortage because customers could not obtain all the fuels they wanted at the time they wanted them, even though they were willing to pay the increased price.

Impact of Jones Act Waivers on Energy Supplies

The Jones Act, 46 U.S.C. app. 883, requires the use of American vessels to transport merchandise between points in the United States. Authority to waive the Jones Act is contained in the Act of December 27, 1950 (ch. 1155, 64 Stat. 1120 [1950]). It provides that if the Secretary of Treasury determines a waiver is in the interest of national defense, he may grant the waiver on his own initiative or upon the written recommendation of the head of any other government agency. The Secretary is also directed to grant the waiver if the Secretary of Defense requests it in the interest of national defense.

Waiver Applications in December 1989

In December 1989, the Customs Service, Department of the Treasury, received six applications for Jones Act waivers to permit the use of foreign vessels to transport heating and residual fuels from the Gulf Coast and Puerto Rico to the East Coast. After receipt of a waiver application, Customs sought the advice of DOD regarding defense issues, of the Maritime Administration on the availability of qualified U.S. vessels to ship the cargo, and of DOE on the transportation of energy supplies. On the basis of this advice, Customs recommended that Treasury grant or deny the waiver requests.

DOD responded to the first three applications in 5 calendar days, stating that it could not support granting the waivers. Instead, DOD deferred to other federal agencies that were more directly involved. DOD responded to the other three applications more quickly, in a maximum of 2 calendar days. DOD supported granting these waivers if no U.S. vessels were available. However, DOD noted that because the proposed shipments had no direct impact on its operations, it could not request that the waivers be granted.

Maritime's response time varied from less than 1 day to 5 calendar days. To determine the availability of U.S. vessels, Maritime advertised in industry publications and telephoned a shipping association and some ship owners. On the basis of the responses, Maritime determined that U.S. vessels were available to transport the distillate and residual oil. Maritime recommended denial of the waiver applications for the distillate and residual oil and suggested using the available U.S. vessels. Maritime did not object to granting the waiver applications for propane because the only U.S. flag tanker capable of carrying propane was unavailable.

DOE's OEE responded to Customs within 1 day on most requests; only one response required 2 days. DOE's responses to Customs did not state how

much fuel was needed to prevent or alleviate a shortage or how soon delivery was needed. A Maritime official said if DOE had been more specific about the details and urgency of the energy shortages in December 1989, Maritime could have more easily made appropriate recommendations. According to an OEE official, OEE based its responses on experience; observation of production, inventory, import, and usage levels; and contacts with state energy offices. OEE's response to Customs stated that failure to grant the waivers would imperil the adequacy of energy supply and repeatedly linked adequate energy supplies and national defense. DOE recommended that all six waivers be granted if U.S.-flag vessels were not available.

After receiving responses from DOD, DOE, and Maritime, Customs recommended that Treasury deny the three applications concerning heating and residual oil and grant the two applications concerning propane. One propane application had become moot: the foreign vessel named in the application was no longer available when Customs made its recommendation to Treasury. In all cases Treasury acted in accordance with Customs' recommendations.

One of the waivers granted resulted in the shipment of 50,000 barrels of propane to the Northeast. The other was granted a few hours after the foreign vessel had sailed. Overall, the process took 6 to 17 days between the date of application and the date of Treasury's written response to the applicants.

Federal Agencies Have Entered Into a Memorandum of Understanding

In December 1989 no written guidelines or procedures existed for evaluating applications during an energy shortage. However, in July 1990 DOE, Maritime, and Customs officials signed an agreement describing procedures to expedite waiver applications during actual or imminent energy shortages. The agreement clarifies the roles and responsibilities of DOE and Maritime; DOD is not an active participant in the process.

According to the agreement, DOE will monitor energy supplies to determine at the earliest possible time whether an energy shortage actually exists or is imminent. After determining that a shortage exists, DOE will provide Customs and Maritime with the following information:

- the area in need;
- the products needed;
- the location of supply; and

- the amount of product needed, the duration of the shortage, and the time period during which delivery of product is necessary to alleviate the shortage.

After DOE receives a waiver application from Customs, it must advise Customs within 48 hours whether or not the waiver is necessary in the interest of national defense.

While DOE monitors energy supplies, Maritime will monitor the general availability of U.S. vessels. After Maritime receives an application from Customs, it must advise Customs of U.S. vessel availability within 48 hours. Maritime's method of determining ship availability is unchanged; it will continue to contact industry associations and shippers to determine whether U.S. vessels are available. To assist in general planning, Maritime is creating a data base of information on the U.S. merchant fleet to determine vessel availability. Maritime expects the data base to be completed in 1 to 2 years.

Objectives, Scope, and Methodology

In December 1989 and January 1990, we were asked by congressional requesters to examine several questions stemming from reported shortages in December 1989 of home heating fuels—primarily distillate and propane.

As agreed with the requesters' offices, our analysis of distillate and propane supplies at the time of the shortages included the following areas:

- allegations of shortages of distillate and propane supplies during the period,
- the data collected and analyses performed on heating fuel supply and demand by DOE's Energy Information Administration,
- the impact of delays in processing waivers of the Jones Act on heating fuel supplies, and
- the impact of interruptible natural gas contracts on heating fuels supplies and availability.

Federal agencies undertook several new initiatives after January 1990 to produce new data on heating fuel prices and supplies and to clarify the roles of the federal agencies involved in Jones Act waiver requests. As agreed with the requesters' offices, this report includes our analysis of these initiatives.

In reviewing allegations concerning shortages of distillate and propane supplies, we contacted federal, state, and industry officials to document their experiences during December 1989 and to obtain an understanding of the home heating fuels industry and market. For information on industry's reaction to the crisis, we visited several companies in the energy supply chain, including 12 companies operating in the primary segment and 15 companies operating in the secondary segment (wholesalers and/or retailers). We interviewed officials of these companies to obtain information on supply and demand of heating fuels in December 1989. Specifically, we obtained information on refinery production, inventories, and imports and problems encountered in distributing heating fuel products in December 1989. To understand how the nation's energy distribution system functions, we contacted officials of five major pipeline companies that transported heating oil and propane in December 1989. Two of these companies also operated marine terminal facilities.

To determine how selected states responded to the heating fuel crisis, we contacted state officials responsible for energy oversight in Connecticut, Louisiana, Maryland, Massachusetts, Michigan, New Hampshire,

New Jersey, New York, Pennsylvania, South Dakota, and Texas. Most of these states were selected because of the major production and storage points and pipeline networks in the Gulf states and of the allegations of shortages on the East Coast.

Regarding the collection and analysis of data on heating fuel supply and the processing of Jones Act waivers, we collected data, analyzed records and reports, and interviewed federal officials from the Departments of Energy (EIA and OEE), Defense, Treasury (the Customs Service), Transportation (Maritime Administration and Federal Highway Administration), and the Federal Energy Regulatory Commission. At OEE and EIA, we obtained data and met with officials about the roles these agencies played in the December 1989 crisis, including the Jones Act waiver process, as well as new initiatives DOE has taken to collect and analyze data. At the Departments of Defense, Transportation, and the Treasury, we interviewed officials and reviewed data concerning six applications for Jones Act waivers processed in December 1989. We interviewed officials from DOE, Maritime, and Customs about their new duties and responsibilities for processing waivers to the Jones Act under a July 1990 Memorandum of Understanding.

State officials were also interviewed concerning the type of state level inventory or supply data maintained on home heating oil and propane. Data concerning the actions taken by the states to disseminate critical supply and demand information between consumers and dealers were also obtained.

We inquired about the impact of interruptible natural gas contracts on heating fuel supplies and availability at EIA and the states we visited. At EIA we obtained data and met with officials about their work regarding the impact of interruptible natural gas contracts on heating fuel supplies and availability that was included in a June 1990 report on the December 1989 crisis.

We also discussed issues related to heating fuels supplies with various industry research and study groups, and associations including the National Petroleum Council, the Petroleum Industry Research Foundation, Inc., the American Gas Association, the Gas Research Institute, the Edison Electric Institute, the National Propane Gas Association, the Association of American Railroads, the Mid-Continent Oil and Gas Association, the Pennsylvania Petroleum Association, the South Dakota Petroleum Marketers Association, the South Dakota Propane Gas Association, and the South Dakota Rural Electric Association.

We conducted our work from March 1990 through December 1990 in accordance with generally accepted government auditing standards. We discussed factual information in this report with DOE, DOT, and Treasury officials. They generally agreed with the facts presented, and their comments were incorporated where appropriate. However, as agreed with the requesters' offices, we did not obtain official agency or industry comments on this report.

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