Decisions and Orders
Massachusetts Energy Facilities Siting Council

Volume 4

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In the Matter of:

Energy Facilities Siting Council
Room 300, 73 Tremont Street, Boston, Massachusetts 02108 (617) 727-1136

ENERGY FACILITIES SITING COUNCIL

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COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of the Second Annual Supplement to the Long-Range Gas Forecasts of Commonwealth Gas Company, *et al*.	)	EFSC Nos. 78-5 *et al*.

Memorandum and Order:

1978 Supplements to Certain Long Range Gas Forecasts

This memorandum and order concerns the 1978 Supplements to the Long Range Forecasts of the following gas companies: Commonwealth Gas Company (EFSC No. 78-5); New Bedford Gas and Edison Light Company (EFSC No. 78-7); Lowell Gas Company (EFSC No. 78-16); Cape Cod Gas Company (EFSC No. 78-19); Fall River Gas Company (EFSC No. 78-20); Holyoke Gas and Electric Department (EFSC No. 78-23); Berkshire Gas Company (EFSC No. 78-29); Bay State Gas Company (EFSC No. 78-13); Fitchburg Gas and Electric Company (EFSC No. 78-11); Boston Gas Company (EFSC No. 78-25) and Haverhill Gas Company (EFSC No. 78-15).

INTRODUCTION

In its review of the forecasts and supplements filed by the state's gas utilities, the Council staff has found that, in certain areas, the reporting requirement of the Council's existing regulations need be improved to afford a better data base for review and to eliminate unnecessary reporting. For example, portions of the data presently filed do not correspond to the planning criteria employed by the industry as closely as may be possible. Here and elsewhere, the need for improvements in the Council's gas utility filing requirements has become apparent. To meet this need, further cooperation between the companies and the Council will also be necessary. Amending these filing requirements for the contents of future gas forecasts and supplements will, it is hoped, improve the usefulness of these documents and ease each company's filing burden.

With this end in mind, the Council staff undertook its review of the 1978 supplements of the gas companies listed on the preceding page. A standard information request was prepared and sent to each of these companies; their responses have been received and reviewed. To assimilate these responses better, the staff proposes to suspend the pending review of the 1978 filings and to

pick it up again in conjunction with its review of the 1979 supplements due to be filed on July 2, 1979.

However, the need of the companies for "feedback" on their 1978 supplements must be considered. Given the staff's wish for company cooperation in its efforts to improve the filing requirements, it is only reasonable to let each company know as clearly as possible the staff's areas of concern with respect to its filing. Thus, Marc G. Hoffman, EFSC Chief Economist, has prepared the following comments based on each company's supplement and response to the recent information request. Mr. Hoffman's comments are advisory in nature, and he is available to discuss them with any and all of the companies; please contact him at the Council offices at 727-1136.

COMMENTS

Commonwealth Gas Company (EFSC No. 78-5)

Forecasts of sendout requirements did not adequately quantify the impact of conservation. Historical conservation for residential and non-residential heating customers should be quantified on a per average customer basis. Forecasts of sendout requirements should specify the

projected impact of conservation per average customer and the derivation of the projection of net customer additions and average use per new customer. The impact of improved appliance efficiencies should be quantified.

The use of pipeline company supply projections as the primary basis of forecasting sendout is reasonable even though the longer run projections may be conservative. The inclusion of specific unapproved gas supply projects in the pipeline supply projections should be segregated from supplies without the unapproved project(s). Supplemental gas supplies should be reported at their maximum if the concept of expected available resources is continued rather than the concept of resources expected to be utilized to meet sendout requirements. Generally, the information on historical sendout and projected sendouts and supply was well presented.

New Bedford Gas and Edison Light Company (EFSC No. 78-7)

The above comments on the filing of Commonwealth Gas are also appropriate for New Bedford Gas and should be read as comments on the New Bedford filing.

Fitchburg Gas & Electric Company (EFSC No. 78-11)

The Company did not supply the additional information as it had promised not allowing adequate time for the Staff to comment on their Supplement.

Bay State Gas Company (EFSC No. 78-13)

The Company forecast of sendout requirements is based on the assumption that the next two years will remain at 1977 levels and will increase at 1.5% per year thereafter. This judgement is based on the observation that firm sales have remained fairly stable during the past four years. The Company should explain the 1,071,000 MMBTU difference between the 1977 normalized firm sendout and projected 1978 firm sendout. While the projection of sendout requirements contains implicit historical conservation and other changing determinants of sendout requirements, the Company claims it cannot quantifiably differentiate among the potential determinants of reduced sendout. Additional effort by the Company is required. Segregation of historical sendout by customer class, by heating versus non-heating, by existing customers versus new customers should allow some analysis of the determinants of reduced sendout. The second step to improve the projections of sendout requirements is to systematically incorporate the determinants presently handled in an aggregate, judgemental fashion into the forecast methodology. The Council staff can provide some suggestions on these matters upon request.

The key projections of pipeline deliveries are based on information from Tennessee Gas Pipeline Company and

assumptions about deliveries from Algonquin Gas Transmission Company. Projections from a supplier in the absence of other information is a reasonable basis for planning. The Council recognizes the difficulty of forecasting the development of systematic approaches to estimating future curtailment levels.

Haverhill Gas Company (EFSC No. 78-15)

Sendout requirement projections appear reasonably based on the assumption of two percent additional conservation and about four percent new load additions per year. Two percent per year historical conservation has been quantified and is reflected in base year requirements. The sendout forecast thus includes previous conservation and projects additional conservation at the observed historical rate.

Haverhill's pipeline supply projections are based on information from its sole supplier - Tennessee. It appears that Tennessee's proposed importation projects have been included in the supply projections. Given the tentative nature of these sources, it would be better to disaggregate these projects from other pipeline supplies in the future.

Lowell Gas Company (EFSC No. 78-16)

Lowell's forecast of sendout requirements include

historic conservation but implicitly assumes no additional conservation from existing customers. Future forecasts should consider potential additional conservation from this group of customers. New customer requirements are estimated at less than existing customer requirements. This indicates an attempt to include conservation effects and should be documented in the next forecast.

Lowell's forecast of pipeline deliveries is based on Tennessee data for "traditional" supplies and on its own projections of the effects of deregulation of new domestic gas and the timing of importation projects. In addition to the sources of information used to develop these independent projections, the method and calculation of the projections will be of interest to the Staff in the next forecast.

Cape Cod Gas Company (EFSC No. 78-19)

The forecast of sendout requirements is based on an analysis of per customer requirements which reflects historical conservation of 2.5% per year and additional conservation at 1% per year through 1982. The general method of forecasting sendout, as outlined in the Supplement, appears appropriate although it needs to be supplemented by additional documentation. The Company should continue to monitor conservation in order to assess its

assumption of 1% additional conservation per year. The projections of number of future customers should be presented together with its methodology.

The forecast of resources needs additional discussion of the approach to projecting future deliveries from Algonquin. A demonstration of the adequacy of the approach of using "spot purchases for storage in off peak periods not contracted for," to provide for sendout requirements projected for colder than normal winters and greater than 4,811,000 MMBTU of total resources is also in order.

Fall River Gas Company (EFSC No. 78-20)

The Company's forecast of sendout requirements does not adequately explain how the factors, which the Company claims are the basis for the "assumptions" of anticipated growth of sendout requirements, relate quantitatively to those "assumptions" of anticipated growth in sendout requirements. The Company apparently forecasts by "scaling up" historic use. No evidence of the effects of weather, number of customers, or historic conservation is apparent. The Company was asked to quantify the extent of customer conservation over the historic period 1973-1977 and to quantify the extent to which customer conservation will affect sendout requirements during the forecast period.

The Company's response was inadequate.

It is also not clear whether the forecast of sendout requirements is for a normal or design year because the Company inadequately addressed this question on the information request. When asked for both normal and design year forecasts, the Company referred to the sole set of data it had submitted in its Supplement. It is not clear whether these responses are indicative of an inability or unwillingness to respond. The Company should be on notice that the Council will not tolerate superficial treatment of its information requirements. If the Company is not capable of the analysis requested, it should seek assistance from the Council staff.

Similarly, in making its supply projections, the Company should be prepared to explain how its own estimates of possible curtailment are taken into account and how its own estimates were derived.

Holyoke Gas and Electric Department (EFSC No. 78-23)

The Department provided a very informative response to the information request which indicated that conservation, in a general way, was incorporated in the sendout forecast. The Department is urged to continue to monitor conservation by its customers and report to the Council its findings. The Department is requested to explain in

its next filing, the differences in the relationship between normal and design year sendout forecasts for 1978-1981. There appears to be some shortfall between resources and design year requirements in 1979-1983. The Department is requested to explain how it would meet design year requirements in the next filing.

The Department's supply projections are based on the best information available to the Department - five year projections from its supplier - Tennessee Gas Pipeline Co. For a municipal gas department this is a reasonable basis for projecting supplies.

Berkshire Gas Company (EFSC No. 78-29)

The Company provided very useful and complete data in its response to the information request. This information raises two questions which the Company should address. The first concerns how adquately conservation is reflected in the forecast. Normalizing the historic use per heating customer data indicates the forecast of sendout requirements per heating customer is greater than present consumption. The second question concerns demonstrating the ability of the Company to obtain additional supplemental supplies to meet design year conditions. The basis of projecting pipeline deliveries appears reasonable. In addition, the Company should be

able to justify its assumption of growth in residential customers.

Boston Gas Company (EFSC No. 78-25)

The Company's request to include additional information requested by the Council in next year's Supplement was granted because the Company had already been directed to improve its forecast of sendout requirements and did disaggregate its supply resources this year as requested in the review of last year's Supplement. The Council, however, notes that the Company's independent estimates of pipeline deliveries will need to be documented and justified in the next Supplement.

ORDER

Given the considerations and comments detailed above, it is now ORDERED:

(1) That the pending review of the 1978 supplements of the companies listed above be, and hereby is suspended so that this review may be continued in conjunction with the 1979 supplements due to be filed on or before July 2, 1979;

(2) That the Council staff and the gas companies work together to develop and implement new, improved,

more useful data filing requirements with the goal of amending EFSC regulations to this end as need be;

(3) That such interim adjustments to the filing requirements be made as are consistent with this goal.

Energy Facilities Siting Council

by Dennis J. LaCroix

Dennis J. LaCroix, Esq.
Chief Counsel

Dated at Boston this 15th day of February, 1979.

DECISION and ORDER

In the Matter of Algonquin SNG, Inc., et al.

ALGONQUIN SNG (#79-34)

Algonquin SNG filed its third annual supplement to its long range forecast on July 30, 1979, pursuant to G.L. c. 164, §69I. There has been no substantial change in the company's recent filing when compared with its past three filings. Cf. 2 DOMSC 34 (1977) and 2 DOMSC 105 (1978). The company continues to sell its entire SNG production to its parent company, Algonquin Gas Transmission Company (hereafter Algonquin) who then sells it to its customers pursuant to long-term service agreements under rate schedule SNG-1 on file with the Federal Energy Regulatory Commission. As in past years the only significant determinant of the company's future sendout is the contract demand by Algonquin. As explained in Part I of the supplement, the SNG plant will produce 100% of the total annual contract demand, with most of that total being produced from November 1 through March 31 in each fiscal year.

The present filing does contain a new element which may have an impact on the company's forecast of SNG sendout: a"flexibility provision" which the FERC has authorized Algonquin to institute on a trial basis.[1] Under the FERC order,Algonquin's customers have the option to reduce their purchases, for November and March only, by a maximum of fifty percent (50%) of the sum of the SNG

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[1] The Federal Energy Regulatory Commission authorized this provision under Rate Schedule SNG-1 for one year, 1979-80.

contract demands of all customers. To this end Algonquin must canvass its customers before November and March to determine whether the customers want to reduce their purchases. The customers are required to respond within a prescribed period of time. If the requested reductions total less than fifty percent of the sum of the SNG contract demands of all customers for the month under consideration, the company grants the reductions as requested. If the requested reductions are greater than the fifty percent of the sum of the SNG contract demands of all customers for the month under consideration, the company pro-rates the reductions among its customers so that the total reductions do not exceed the fifty percent cut-off point mentioned above. The exercise of such options affecting sendout in November, 1979, are reflected in the present filing while options affecting March, 1980, are not reflected therein as the customers were not required to exercise these options prior to the filing date.[2]

In Table G-14 of the present supplement the company states that its SNG plant has a peak daily sendout of 118,575 MMBtu. The peak day sendout figures in Table G-6 exceed this capacity in current and past years. The company explains the discrepancy stating that the 118,575 figure is the plant's sustained operation capacity under unimpaired operating conditions while greater rates of production have been achieved by pushing the plant for short periods of time under optimum operating conditions.[3]

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[2] The customers elected not to take 1,778,640 MMBtu for November, 1979.

[3] See letter dated July 1, 1980 from Robert Wilmot, Hearing Officer to Mr. Anderson, Assistant to the Vice President of Algonquin SNG, in EFSC Docket #79-34.

The highest peak day sendout as of this filing is 129,978 achieved in the 1975/76 period.

While continuing to reserve"any questions of jurisdiction of the Council over its facilities," the company again indicates that, at present, it does not plan to construct any facilities subject to Council jurisdiction within the forecast period. This reservation is duly noted. The Council continues to appreciate the company's annual filing of sendout and supply figures as background data useful in the exercise of the Council's regulatory responsibilities. The Council thanks the company for including the contract demand of its Massachusetts customers in the 1979 filing. The Council APPROVES the third annual supplement of Algonquin SNG, Inc.

HOPKINTON LNG (#78-6)

Review of the third supplement to the long-range forecast of Hopkinton LNG Corporation shows no substantial change from its first three filings. Cf. 1 DOMSC 74 (1976), 2 DOMSC 20 (1977) and 2 DOMSC 105 (1977). The corporation is jointly owned by New England Gas and Electric Association (NEGEA) and Air Products and Chemicals, Inc., a corporation otherwise unrelated to NEGEA or its subsidiaries.

The company owns two LNG facilities; one in Hopkinton, Massachusetts which consists of storage tanks and associated liquefaction and vaporization equipment and the other in Acushnet, Massachusetts consisting of Storage tanks and associated vaporization equipment. The company provides the services of liquefaction and storage for the New Bedford Gas and Edison Light Company. Both the Commonwealth Gas Company and the New Bedford Gas and Edison Light Company are subsidiaries of NEGEA. The subsidiaries own the gas and purchase the services mentioned above from Hopkinton.

Hopkinton LNG does not intend to construct new facilities during the forecast period, and given that there is no significant change from past filings as noted above, the Council APPROVES the Company's third annual supplement.

NEW ENGLAND LNG CO., Inc. (Docket #79-14)

On July 16, 1979, New England LNG Co., Inc. (hereafter NELNG) filed a letter in lieu of formally completing the requisite forms for its third annual supplement. NELNG explains this procedure by pointing out that it is not currently selling any gas, has not sold any gas since 1975, does not forecast any future sales, does not own or operate any gas facilities, does not currently contemplate constructing any such facilities and is not currently a party to any unexpired contracts for purchase or sale of gas. The company notes that the historical data is a matter of record and offers to

provide additional information upon request.

In fact, NELNG is essentially an inert company. The only facilities purported to be owned or controlled by NELNG, existing or planned are proposed storage facilities in Fall River. As detailed in previous decisions, the Council's jurisdiction over these proposed facilities was the subject of litigation. Cf. 1 DOMSC 164 (1977) and 2 DOMSC 105 (1978). The company has since decided not to proceed with plans for these facilities and the litigation has been dismissed. Cf. EFSC Docket No. 78-14: Stipulation of Dismissal filed in the Supreme Judicial Court.

Thus, given NELNG's continuing inactive status as described above, the Council reaffirms its earlier decisions at 1 DOMSC 105, 108 and DISAPPROVES the present NELNG filing. (The company's letter filed on July 16, 1979 will suffice in lieu of a formal annual supplement, again given NELNG's inactivity.) This disapproval is without prejudice to the company's right and ability to modify its EFSC filings upon becoming more active. See also 1 DOMSC at 204.

Energy Facilities Siting Council

By Robert Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 21 July, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Bay State Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-13

DECISION and ORDER

I. Introduction

This decision concerns the Bay State Gas Company's (hereafter Bay State or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, Sec. 691 and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the staff to document the Company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision includes a discussion of Bay State's forecast methodology, sendout requirements, adequacy of

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1 The EFSC Staff's information requests are contained in letters dated April 25, 1980 and June 27, 1980. The Company's replies are contained in letters dated June 17, 1980 and July 21, 1980. See Docket #79-13.

resources and conservation. In its review of this and other gas forecasts, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council's APPROVAL of the present Bay State supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2) (a), (b), and (c) as applied on a case-by-case base by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Bay State's Methodology

Normal Year

The Company used a normal year (i.e., a year not colder or warmer than average) consisting of 6222 degree days (hereafter DD), based on the average of the DD at Logan and Bedford airports for the 30 year period 1934-1963.

Bay State forecasted its firm sales on a customer class level. The Company assumed that all firm customer classes would experience a linear 3% annual growth rate. The basis for this judgement was an analysis of Bay State's total Company level firm gas sendout for the twelve month period ending April 1979 which revealed that the Company had experienced a net growth rate of approximately 3% as compared to the preceding twelve

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[3] The documentation must include a description of: any historical data used and its source, the significant determinats (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

month period. In that and many other preceding years Bay State had experienced little if any growth in its firm on-system load. Given this sudden change in growth trends and the lack of supporting data relative to the future market potential, a linear growth rate of 3% per year was assumed.

The forecast for the residential class with gas heating (Table G-1) was derived on a normalized basis by using actual class sales data for the twelve month period ending March 31, 1979. The current base use and heating increment were calculated using the ordinary least squares regression technique. The projected sendouts were then calculated assuming that a simple growth rate of 3% is applied evenly to the base use and heating increment for each year of the forecast period. In other words, the number of customers, base use and heating increment were projected to grow each year by a constant 3% of the base year level.

Forecasts of the residential class without gas heating, the commercial class and the industrial class (Tables G-2 and G-3 respectively) were also developed by taking sales data from the twelve (12) month period ending March 31, 1979 and applying the oridinary least squares regression technique to calculate the current base use. Then the simple linear growth rate of 3%, discussed above was applied.

The record indicates that the Company's method of reflecting conservation in the forecast involved partially offsetting booked sales by the conservation efforts of existing customers. No quantification was provided.

Design Year

A "design year" is defined as the coldest year for which a Company plans to meet its firm customer requirements. The Company used a design year consisting of 6844 degree days (hereafter DD), based on a year which is ten (10) percent colder than a normal year. The Company assumed that all additional DD occurring during a design year were to occur during the heating season (November 1 - March 31). This results in a forecast of non-heating season (April 1 - October 31) sendout which is the same under design conditions as under normal weather conditions. Design year sendout was then derived by taking the total Company firm non-heat sensitive load (or base load) and heating increment factor forecast for each season under normal weather conditions and applying these to the number of days and DD assumed to occur each season under design weather conditions.

In a design year, the Company expects to meet its supply obligations to other gas companies by using gas which would have otherwise been sold to interruptible customers during the heating season as well as gas which would have remained in inventory (See Sales and Resale - Table G-4B).

Peak Day

A peak day is the coldest day that the Company feels may occur in a twelve month period; Bay State's peak day is one consisting of 67 DD. Peak day sendout is calculated by taking the base use and heating increment expected under normal heating season conditions and applying them to that one day of 67 DD.

C. The Review Criteria Applied to Bay State's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the following comments is to aid the Company in its continuing efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are for the most part reserved for a later Council decision so that both the Council and the Company can focus on the element of reviewability here.

Normal Year

As mentioned earlier, the Company bases the definition of a normal year on DD data that is at least seventeen (17) years old. As the Company did not explain its reasons for using such data to define its normal year, the Council must question whether updated data might be more appropriate. The Council asks that the Company explain its rationale for basing its normal year sendout data on seventeen year old information.

The Company's normal year class level forecast is the equivalent of a total company forecast in which each class grows proportionately to the total. The basis for the forecast of each class is the total company's actual growth in the last twelve months rather than any class based behavior.

While it may not be unreasonable to assume such proportionate class growth, sufficient explanation for this assumption was not offered in this case.

In support of this assumption, the Company simply cited "... sudden change in growth trends and lack of supporting data relative to future market potential".[4] This bare statement indicates that very limited bases were used for the Company's customer class level forecasts and that the Company needs to develop a more reasonable method of forecasting. For example, customer use studies, when done correctly, may provide a more reasonable basis for forecasting future customer requirements than the Company's present method.

A more reasonable forecasting method would also aid the Company in its efforts to address the effects of conservation as reflected in its forecast. While this will be discussed more fully later in this section, suffice it to say now that the Company will be better able to maximize the number of new customers it accepts if it has a more reliable basis upon which to forecast the amount of gas which will become available due to conservation by existing customers. As discussed above the bases offered for this forecast raise questions as to the appropriateness and reliability of the forecast. As Bay State is one of the three largest gas companies in Massachusetts, it is incumbant on it to develop a forecast method that is appropriate to the size and nature of its service area.

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[4] See answer number 1 in the Company's letter dated July 21, 1980 in EFSC Docket #79-13.

Total actual growth in the last twelve months is not a sufficient basis upon which to forecast sendout and requirements for a service area as large and diverse as Bay State's. Logically, where the appropriateness of a forecast method is questionable, its reliability is also subject to doubt as an inappropriate forecast method is less likely to produce a forecast that is likely to occur. Therefore the Council urges the Company to re-examine its forecast methodology and the judgements upon which it is based and to explain such methodology and judgements clearly.

As for conservation, the Company states that conservation was reflected in the forecast by assuming a growth of only 3% in total sendout although sendout attributable to new load additions is expected to increase by more than 3%. However, this is not supported by the data in the record. Table G-1 shows that the Company assumes that base use per customer and heating use per customer per DD for the residential heating class will remain constant at the 1978-1979 level throughout the forecast period. If the Company were forecasting load losses due to conservation by existing customers then these measures should decrease. The Council expects a company forecasting conservation to show its effects on base use per customer and heating use per customer per DD as well as on new load additions and total sendout.

The record also indicates that the Company has not adequately incorporated conservation because the number of customers in Table G-1 is forecast to grow proportionately to sendout. This normally implies no net change in existing customer use. By utilizing use per customer factors from the most recent data, the Company has in effect only reflected the effects of past conservation by existing customers

in the forecast.

A forecast is significantly less reviewable and reliable when the effects of conservation are not manifest in the base use per customer, the heating use per customer per DD and the number of customers due to the relationship between these customer factors and conservation. Therefore the Council asks that the Company state how much conservation it expects from existing customers, the method by which such expectation is forecast, and the extent to which the conservation is manifest in base use per customer, the heating use per customer per DD and the forecast of number of customers.

A last note on normal year documentation: the base use per customer and heating use per average customer per degree day for the years 1974-1978 on Table G-1 were not provided. The reviewability of a forecast is reduced when historical data is not provided. Therefore the Council asks the Company to provide the historical data for the base use per customer and heating use per customer per DD in its next forecast.

Design Year

The Company's allocation of all the additional DD that occur in a design year to the heating season can be said to be a conservative judgement designed for a "worst case" scenario. This judgement is difficult to review if its bases are not clearly and adequately explained. Therefore the Council asks the Company to explain the bases for its judgement that all additional DD occurring in a design year be allocated to the heating season.

III. Forecasts of Resources

A. Supply Contracts and Facilities

Pipeline Gas

The Company has a pipeline gas contract with the Tennessee Gas Transmission Company (hereafter Tennessee) for the purchase of pipeline gas which terminates November 1, 1985. The forecast indicates that Tennessee's deliveries to Bay State will decrease each year throughout the forecast period; this is based, according to the Company, on the latest information from Tennessee.

Bay State has a Long Term Storage Service (LTSS-6) contract with Tennessee, providing for injection of pipeline gas into storage during the non-heating season for withdrawal and use in the heating season. This contract terminates on August 3, 1980, but the Company states that Tennessee has indicated that this contract will be extended for twenty (20) years.

Bay State also buys pipeline gas from Algonquin Gas Transmission Company (hereafter Algonquin). The primary contract is for F-1 gas and expires on November 1, 1989. The Company anticipates receiving its full annual contractual entitlement from Algonquin throughout the forecast period although the basis for this judgement was not given. Bay State also has contracts for Winter Service (WS) and Synthetic Natural Gas (SNG) from Algonquin terminating in 1989 and 1987, respectively. A contract with Algonquin for storage (ST) of pipeline gas in the non-heating season and withdrawal in the heating season terminates on April 15, 1980. However, the Company reports that Algonquin has indicated that these contracts will be extended for twenty (20) years.

Liquified Natural Gas

Bay State had a contract for liquified natural gas (hereafter LNG) storage with AGT for the August, 1979 through March, 1980 period; the record indicates that this contract was not renewed. The Company has a twenty (20) year contract for LNG supply with the Distrigas of Massachusetts Corporation which expires on December 31, 1997. The Company expects the full yearly amount under this contract to be delivered in the last four (4) years of the forecast, but offers no reason for this expectation.

Bay State owns and operates two LNG vaporization facilities located at Scituate and Ludlow and an LNG vaporization and storage facility at Lawrence. The Company also leases LNG storage, vaporization and liquification facilities from Industrial Leasing Corporation under a contract which runs through 1997. Its LNG storage capacity amounts to 13 MMCF owned and 1800 MMCF leased.

Propane

The Company has contracts with three suppliers for the purchase of propane, which contracts will terminate by March 31, 1982. While the Company reports that it has not yet decided whether to renew the contracts, it has nonetheless included propane as a supply source in the two (2) remaining years of the forecast period after this termination date.

Bay State owns and operates propane/air vaporization and storage facilities in seven locations. The total storage capacity amounts to 320 MMCF.

B. Comparison of Resources and Requirements

Normal Year and Design Year

Table G-22 "Comparison of Resources and Requirements" illustrates the Company's use of resources to meet firm customer requirements under normal weather conditions. Gas from Algonquin is expected to supply approximately 39% of the non-heating season firm load and 41% of the heating season firm load. Tennessee is expected to supply approximately 58% of the non-heating season firm load and 50% of the heating season firm load. LNG is expected to supply about 3-4% of the non-heating season firm load, and between three (3) and six (6) percent of the heating season firm load. Approximately 76% of the LNG is from Distrigas, the remainder is liquified Tennessee pipeline gas. Propane is not expected to be sent out in the non-heating season. However, during the heating season, it is expected to supply between 3 and 6% of the heating season firm load.

In the non-heating season, pipeline gas in excess of that needed to meet requirements is shown as available to meet Sales for Resale & Interruptible sales (Tables G-4A and 4B). This is regardless of whether normal or design year conditions are encountered since the Company assumed all additional DD will occur in the heating season.

The Company has adequate contracted supplies to meet both normal and design year sendout requirements for the first three (3) heating seasons of the forecast period. In the final two (2) heating seasons of the forecast period,

contract supplies of pipeline gas and LNG are sufficient to meet design year conditions for firm customers, but additional resources as yet uncontracted-for will be required to meet Bay State's committment to other companies during design year conditions in 1982-83 and design and normal conditions in 1983-84.

Peak Day

The Company shows the resources available to meet its Peak Day in Table G-23. If the pipeline gas is available at maximum daily quantities, and all the Company's propane and LNG vaporization facilities are operable at maximum daily capacities, the company will have sufficient resources available to meet a peak day occurring during the forecast period. Given the above, the Company would potentially have 48% more supply available than is necessary to meet the peak day requirements of firm customers as forecast in 1979-80. This margin declines to 32% in 1983-84. The Company potentially has 44% more supply available than is necessary to meet firm customers requirements plus committed sales for resale peak day requirements in 1979-80; this margin declines to 29% in 1983-84. (Storage facilities for propane and LNG would also allow for at least three (3) days of operation at maximum vaporization capacity.)

C. Evaluation of Forecast Resources

The Company expects Algonquin and Distrigas to deliver the full contractual entitlement and the full contractual amount, respectively, throughout the forecast period, but

the bases for these expectations were not given. Since these sources supply 40-45% of the Company's firm load, the Council would like to understand the Company's rationale for such expectations.

The Company has not yet determined whether its listed propane contracts will be renewed. It is noted that supply over and above the presently contracted-for amounts is needed in the last two (2) years of the forecast in order to meet Bay State's committments to other companies. The Council asks that Bay State advise the Council as to how it will handle this supply need.

Similarly, the storage contracts with the pipeline companies, due to expire in 1980, are expected by the Company to continue. When the contracts are so renewed, the Council would like to be notified.

When judgements concerning supply and storage are not clearly explained the Council's review of a Company's forecast is hampered. In the case at hand, the record indicates that the Company did not: a) document its assumption that Algonquin and Distrigas will deliver the full contractual entitlement and contractual amounts during the forecast period; b) state whether propane supply contracts would be renewed nor how it plans to obtain the additional propane which it will need during the last two years of the forecast period. Thus, the Council's approval of Bay State's forecast must be conditional to the extent that the forecast of resources is based on unexplained, undocumented and uncontracted for supply or storage.

In accord with the above comments, the Council APPROVES Bay State Gas Company's 1979 Supplement subject to the following conditions to be implemented/incorporated in the next filing:

1) That the Company re-examine its forecast methodology and the judgements upon which it is based and clearly explain the bases for such methodology and judgements.
2) That the Company provide the historical data for the base use per customer and heating use per customer per DD. See EFSC Administrative Bulletin 80-2.
3) That the Company explain its rationale for using a normal year that is based on seventeen year old data or use an updated period.
4) That the Company explain why it allocates all additional DD occurring in a design year to the heating season.
5) That the Company detail how much conservation is forecast, the method by which it is forecast and the extent to which the conservation is manifest in base use per customer and heating use per customer per DD.
6) That the Company explain and document its judgements concerning pipeline gas and LNG deliveries; explain how it plans to obtain a supply of propane needed to meet the use forecast for the last two years of the forecast period.

7) That the Company explain how it plans to address the short- and long-term impacts of an immediate cessation of Algerian LNG deliveries to its supplier, Distrigas of Massachusetts. Specifically, please detail how the Company will meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

by Robert Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 9 September, 1980.

Joseph S. Fitzpatrick

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Berkshire Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-29

DECISION and ORDER

I. Introduction

This decision concerns the Berkshire Gas Company's (hereafter Berkshire or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. Council's Staff has reviewed the docket which consists of the supplement and further information requested by the Staff to document the Company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative decision and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision includes a discussion of Berkshire's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and

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[1] The EFSC Staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 13, 1980. See Docket No. 79-29.

other gas forecasts, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council APPROVES the present Berkshire supplement, subject to the conditions stated in the Order set out in Section IV, below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Berkshire's Methodology

Normal Year Sendout

The Company uses a normal year consisting of 7389 degree days (hereafter DD). This is based on an average of the number of degree days during the most recent twenty (20) year period. A "normal year" is defined as a year that is not colder or warmer than average. Compare this to the definition of a "design year" which is the coldest year for which the Company plans.

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[3] The documentation must include a description of: any historical data used and its source, the significant determimants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

The Company discussed the following "significant determinants" (see footnote 3) in its forecast: supply, price of fuels, conservation, employment and population growth in its service area. The Company assumed that improved availability of supply and higher #2 fuel oil prices would bring about an increase in the number of customers, but also recognized that customer conservation efforts will bring about a reduction in the base use per customer as well as the heating use per average customer per degree day (See Table G-1). Indeed, the Company stated that, as a matter of policy, it promotes conservation and the efficient utilization of gas by its customers. In addition, the Company utilized the latest available information from the Berkshire County Development Commission, the Berkshire County Regional Planning Commission and the Massachusetts Office of State Planning to gather data on water consumption, employment and population growth in the area. The Company also utilized in-house historical operating data in preparing the forecast.

In Tables G-1 through G-4, the Berkshire Gas Company forecasted firm sendout by customer class, using historical data. The customer class forecasts are then summed to represent total firm sendout in Table G-5.

The Company developed projections for the base use[4] per customer, heating use[5] per average customer per DD, and the average number of heating and non-heating customers to calculate sendout for each customer class. These projections were used to forecast the sendout for each class. It is noted here that in the description of the forecast methodology for the Residential Heating class, the terms "base use per customer" (Table G-1) and "heating use per customer per degree day" (Table G-1) raised a question for the Council. Specifically, the data on Table G-1 labelled "base use per customer" appears to represent only average use during the non-heating season[6]; the data on Table G-1 labelled "heating use per customer per DD" appears to represent only average use during the heating season[7]. This question is discussed further in Section II-C, below.

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4 Base Use or Load is a figure representing non-temperature or non-weather sensitive uses for which a company or department will supply gas to a customer throughout the year, i.e., gas used for cooking as opposed to space heating and other temperature related uses.

5 Heating Use or Increment is a figure representing those uses which are temperature or weather sensitive, i.e., that amount of gas used for space heating and other temperature sensitive uses.

6 The non-heating season is the period from April 1 through October 31.

7 The heating season is the period from November 1 through March 31.

The total split-year sendouts for Non-Heating Residential, Commercial & Industrial classes were calculated by multiplying the projected number of future customers in each class by the projected average annual use per customer. The annual sendout for the forecast period was disaggregated into the heating season and non-heating season. The Company did not specifically explain the disaggregation except to say that it recognized that there is some heating in non-heating classes.

Design Year Sendout

The Company used a design year consisting of 8128 DD. It defined the design year as 10% colder than a normal year and assumed that the heating season and non-heating season in a design year each have 10% more DD than their counterparts in a normal year. The Company calculated the forecast of design sendout by multiplying the forecast of normal sendout by a factor of 1.045. The source of and rationale for the use of this factor was unexplained in the filing. However, the Company agreed by telephone to provide that explanation in the next supplement.[8]

Peak Day Sendout

A peak day is the coldest day that is likely to occur during a twelve month period. The Company used a

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[8] See memo dated June 2, 1980, from Jeannie Nachimson, EFSC Staff Engineer, to Docket #79-29.

peak day consisting of seventy (70) DD which it stated was based on actual experience over the past forty (40) years and which has been reached a number of times.[9]

The forecast of Peak Day Sendout for the first year of the forecast period (1980-1981) was calculated by multiplying a projected heating increment per DD by the number of DD expected on a peak day and adding this product to a projected base load per day. The peak day loads for each of the last four (4) years of the forecast were calculated by assuming that peak day sendout would grow at an annual rate of 2.5%.

C. The Review Criteria Applied to Berkshire's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The Company provided complete data on all tables and is commended for that effort. The purpose of the following comments is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are for the most part reserved for a later Council decision so that both the Council and the Company can focus on the element of reviewability here.

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9 See the Company's answer to the EFSC's 1978 Supplemental Information Request in EFSC Docket #79-29.

The Council is concerned with the Company's forecast documentation. As stated earlier, to be reviewable a forecast must essentially be capable of duplication by another person given the same information. This requires a certain level of documentation/explanation that is missing in this year's Berkshire supplement. For example, the methods by which the Company derived its projections for base use per customer, heating use per customer per DD, average use per customer and the average number of heating and non-heating customers used in forecasting normal year and peak day sendouts were not explained. Duplication and review of these projections is difficult if the reviewer has no idea how these numbers were derived, calculated and/or figured. Other instances where explanation of projections, assumptions and data used in the forecast are lacking or are insufficient are discussed in the following paragraphs.

In Section II-B, above, the Council had a question concerning the Company's method of forecasting normal year sendout for the heating classes. The description of this method indicates that the terms "base use per customer" and "heating use per customer per DD" in Table G-1 were misused. Specifically, the base use per customer data presented in Table G-1 appears to represent only average use during the non-heating season; the heating use per customer per DD data in Table G-1 appears to represent only average use during the heating season.

To restrict the base use per customer figure to the non-heating season and the heating use per customer per DD to the heating season is, the Council finds, an inappropriate use of that data. In the non-heating season, there is both base use and heating use data; similarly in the heating, there is both base use and heating use data. Not to use this data in both seasons is to chance incomplete calculations leading to potentially inaccurate projections and an unreliable forecast. If the Company had detailed its basis for its treatment of base use and heating use per customer data, perhaps this apparent inappropriate use of that data would not arise. Thus, the Council asks that the Company derive and apply the base use per customer and heating use per customer per DD data for both the non-heating season and the heating season.

Since the Council considers a forecast of peak day sendout to be indicative of the supply necessary to meet firm customer requirements on the coldest day likely to occur, the actual occurance of a day colder than the Company's defined peak day is also of concern to the Council. The Company bases its peak day forecast of sendout on a seventy (70) DD despite the fact that Table G-7 shows a seventy-three (73) DD peak day in 1979. This, of course, causes the Council to wonder why the Company has not upgraded its peak day standard to a seventy-three (73) DD and made appropriate adjustments to its sendout

calculation. Therefore, the Council strongly urges the Company to explain its continued use of the seventy (70) DD peak day or to revise its peak day standard.

Also with respect to its peak day forecast, the Company did not explain the basis for its assuming that peak day sendout would grow annually at 2.5% over the last four years of the forecast. The Council also urges the Company to explain clearly the rationale for this assumption in its next filing.

The Council is also interested in energy conservation as reflected in utility forecasts. The Company stated that it included conservation by its heating customers (Tables G-1 and G-3) in its projections of heating use per average customer per DD and base use per customer. However, to the extent that these projections may be incomplete calculations as discussed earlier in this section, it is not clear how much conservation was incorporated into this forecast. The Company also did not fully explain its judgements concerning the conservation thought to be shown in heating use and base use per customer projections, nor the method by which it forecasts conservation. Although it is clear that the Company intended to include substantial conservation in its forecast, the incomplete calculations as to base use and heating use per customer and the need to explain more fully its judgements concerning conservation as well as its method for forecasting conservation reduce the reviewability of conservation's inclusion in the forecast. Nonetheless, the Council commends the Company for its efforts and hopes that with the corrections

suggested above, its efforts will be successful.

Lastly, the Council is concerned with the Company's calculation of design sendout. Sepcifically, the derivation and use of the factor 1.045 to calculate design sendout was not explained. The Council understands that this will be corrected in the next filing.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

Berkshire has a contract with Tennessee Gas Pipeline Company (hereafter Tennessee) for the purchase of gas during the forecast period. Storage contracts with Consolidated Fuel and National Gas Fuel Storage, transportation for which is provided by Tennessee, allows the Company to inject gas into storage during the non-heating season for withdrawal during the heating season.

Liquified Natural Gas

Berkshire has a contract for the purchase of imported liquified natural gas (hereafter LNG) from Distrigas Corporation. The Company has a vaporization and pipeline displacement contract with Boston Gas and a separate pipeline transportation contract with Tennessee wherein Berkshire receives the Distrigas vaporized LNG via pipeline displacement from Boston Gas. Berkshire presently has a contract with Bay State Gas for the purchase of LNG although there is no signed extension of this contract past its termination date of March 31, 1981.

Propane

Berkshire has five propane air plants which it uses to supplement its gas supply. These plants have a storage capacity of 660,000 gallons of propane and can be filled to a maximum of eighty-five (85) percent of capacity (561,000 gallons) amounting to fifty-one (51) MMCF. At this level, peak daily vaporization could be utilized for 2-1/2 days.

The Company anticipates that propane will also be available on the spot market to meet customer gas requirements during the forecast period; it does not have contracts for purchases of propane.

B. Comparison of Resources to Requirements

Normal Year

The Company expects to meet firm sendout requirements for normal conditions during the forecast period in the following manner:

Percentage Of The Heating Season and Non-Heating Season Requirements That Each Source Supplies*

Supplier	Type	Percent of NHS load supplied	Percent of HS load supplied
Tennessee	pipeline gas	91 - 80%	83 - 78%
Tennessee	storage gas		9 - 15%
Distrigas	LNG	9 - 10%	4 - 5%
Spot Market	propane	0 - 11%	2 - 3%

* The information in this table was compiled by Council Staff from the data submitted by the Company in Table G-22.

Design Year

The Company's supplies, as indicated in this supplement, are adequate to meet the additional requirements that may occur under design weather conditions during the forecast period. This is true whether all the additional DD occur in the heating season or not. The Company could, under design conditions, utilize more of the available Tennessee pipeline gas as well as gas and propane in storage.

Peak Day

Table G-23 sets out the resources available to meet forecasted peak day loads. If supplies are available as stated (i.e., maximum daily quantity of Tennessee pipeline gas, storage gas based on firm transportation committments with Tennessee, maximum sendout capacity of the five propane/air facilities and maximum daily quantity of Distrigas volumes), then the Company will potentially have 40% more supply available than needed to meet forecasted peak day requirements for 1979-80. This margin declines somewhat to 27% in 1983-84.

C. Evaluation of Forecast Resources

The Company shows adequate resources and facilities to meet forecasted loads for normal year, design year and peak day. Under normal weather conditions, the Company would not need all the pipeline gas available to it; however, the Company anticipates that such available volumes would be used for interruptible sendout where practical.

The Council does have a question concerning Berkshire's propane supply. Table G-22 indicates that late in the forecast period, the Company expects to receive and sendout propane in quantities up to 70% greater than its Department of Energy (hereafter D.O.E.) allocation. The Council requests that the Company explain whether or not it is reasonable to plan on obtaining propane in excess of its D.O.E. allocation as well as how the Company

plans to meet its requirements should propane in excess of its D.O.E. allocation be unobtainable.

IV. Order

The Council APPROVES Berkshire's 1979 Supplement subject to the following conditions to be implemented and incorporated in its next filing:

1. That the Company explain clearly: the bases for its projections concerning a) base use per customer; b) heating use per average customer per DD; c) average use per customer and the method by which these projections were derived and the manner by which they are incorporated into the forecast.
2) That the Company calculate and use the base use per customer and the heating use per customer per DD data for both the non-heating season and heating season as discussed in this decision.
3) That the Company must explain and justify its continued use of seventy (70) DD for its peak day or revise its peak day standard.
4) That the Company explain its assumption that peak day sendout will grow at 2.5% annually during each of the last four years of the forecast period.
5) That the Company explain: a) its judgements concerning conservation more thoroughly; b) the method by which it forecasts conservation; and c) how the forecast of conservation is reflected in base use per customer, heating use per customer per DD and the number of

new customers that the Company may add.

6) That the Company clearly explain the derivation and use of the factor of 1.045 in its forecast of design sendout.

7) That the Company explain why it is reasonable to plan on obtaining propane in amounts seventy (70) percent in excess of its D.O.E. allocation and how the Company plans to meet its requirements if it cannot obtain such propane.

8) That the Company explain how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG deliveries. Specifically, how would the Company meet each year's projected requirements under this circumstance?

Energy Facilities Siting Council

by Robert D. Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 9 September, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of the Petition of the Boston Gas Company et al. for Approval of an Annual Supplement (1979-83) to the Long Range Forecast of Gas Requirements	)	EFSC No. 79-25

DECISION AND ORDER

PREFACE

To put the comments contained in the following Decision and Order in a proper perspective, one must note that the review of the Boston Gas annual supplement, as with all supplements filed with the Council, is an on-going process, one never really completed in a single year. Often, as in the case here,the Council decision sets out points and comments to be addressed by the company in its next filing. In so doing, the Council does not want to give the impression that a company was unable to respond to these comments during the review and hearing process; as here, that is not necessarily so. Boston Gas filed its supplement in October, 1979; certain points noted in the decision came up during the review period leading to this decision. Rather than continue the hearings in this matter to cover those points, it was decided that these points could be better handled in the next filing. It was deemed more important in the instant case to address the proposed vaporizers in a timely fashion than to continue hearings and

discussion of forecast methodology. Thus does the Council begin this decision with thanks to the Boston Gas personnel for their cooperation and with the hope that a mutual cooperation will continue with respect to the points discussed below as the next supplement is prepared for filing.

I. Decision and Order

The Energy Facilities Siting Council APPROVES the 1979 Supplement to the Long Range Forecast of the Boston Gas Company and Massachusetts LNG, Inc. The Council also APPROVES the companies' proposal to construct two LNG vaporizers at their Salem and Dorchester facilities. Both of these Council approvals are subject to the terms and conditions of this Decision and Order as set out in the paragraphs that follow.

Given the considerations detailed in the text of this decision, the Council now ORDERS that the 1979 Annual Supplement of the Boston Gas Company to its Long Range Forecast of Gas Requirements and the construction of the company's proposed vaporizers be, and hereby are, APPROVED subject to certain conditions set out as follows:

1) That the company report to the Council in its next filing on its contingency plans to meet all projected load requirements in the event that the supply of Algerian LNG is no longer available (including efforts to secure additional resources);

2) That the company clearly explain in its next filing the bases of its evaluation of pipeline supply estimates as conservative;

3) That the company document in its next Supplement how it projects the average use per residential heating customer is affected by forecasted conservation;

4) That the company document in its next filing how its projection of the number of residential heating customers reflects forecasted conservation;

5) That the company supply the Council with final cost estimates for its proposed vaporizers as soon as those figures are available.

II. Background and History of the Proceedings

Boston Gas Company (Boston Gas) and Massachusetts LNG, Incorporated (Mass. LNG) filed its current Supplement to their Joint Long Range Forecast on October 17, 1979, pursuant to G.L. c. 164, Sec. 69I.

Boston Gas is engaged in the sale of natural gas to residential, commercial, and industrial customers in its service area, which includes the city of Boston and 73 other cities and towns in eastern Massachusetts. Boston Gas has been in business for 155 years, is the largest gas company in Massachusetts and the second oldest gas company in the United States. Since 1929, all of the capital stock of the Company has been owned by Eastern Gas and Fuel Associates.

In December, 1973, Boston Gas acquired all outstanding stock of Mass. LNG. Mass. LNG leases two liquefied natural gas (LNG) facilities on a long term basis. Since Mass. LNG has made no wholesale or retail sales of gas, the sendout data provided in the Supplement being reviewed is exclusively that of Boston Gas. Consequently, no separate forms were provided for Mass. LNG.

To augment their existing LNG vaporization capacities prior to the 1981-82 winter season, the companies propose to construct two LNG vaporizers: one at the Mass. LNG facility in Salem, and a second at the Boston Gas LNG facility in Dorchester. Each proposed facility and the Council's review thereof are discussed in more detail later in this decision.

The Council recognizes that, in preparing the present Supplement, Boston Gas has endeavored to conform to the changes in format which were prescribed by the Council in various Administrative Bulletins and other communications promulgated since the filing of Boston Gas' Joint Supplement of December 31, 1977. In this regard, the "Customer Use Study", developed by Boston Gas in response to

forecasts, input assumptions thereto as well as the econometric models. The third distinction made here by the Council is to more particularly focus on the econometric models themselves.

Given these three distinct components (overall forecast methodology, Customer Use Study, econometric models), the Council finds it has three principal concerns or points to make about the interrelationship of these components and to some extent with certain technical aspects of the econometric models.

The first concern is with the need to integrate the results of the Customer Use Study with the forecast of sendout requirements more effectively. It is important to set out clearly how the stated assumption of 2% conservation in the forecast of sendout is reflected in the average use per customer or in the forecast of number of customers which are components of the forecast of sendout requirements

The second concern is with the implications of the input assumptions to the Customer Use Study for the company's choice of a marketing posture and its need for the proposed vaporizers, again as reflected in the forecast of sendout requirements. For the Council to address its statutory mandate to ensure an adequate energy supply for the Commonwealth at the lowest possible cost with the least environmental impact, it is imperative that it understand the bases of the company's forecast as contained in its input assumptions.

The third concern focuses on the Council suggestion that the company might reexamine its choice of the <u>use</u> of an econometric approach to address the impact of conservation in its Customer Use Study. Confidence in an econometric based forecast is particularly difficult to achieve when the historical relationships

being estimated are undergoing rapid structural change. The ceteris paribus (all things being equal) of economic theory makes estimating economic relationships in the real world of tumultuous energy markets a difficult task. While not suggesting that the econometric approach recently undertaken by Boston Gas is incorrect, the Council is asking the company to consider whether the requisite resources of data, time, and personnel to continue this approach are available to it and, if so, are they most effectively employed pursuing an econometric approach. The record shows that the company conscientiously undertook and put much effort into its econometric study. However, should the company choose to pursue this approach further, the Council feels obligated to offer its technical concerns about the present models which limit the Council's confidence in forecasts derived from these models. Each of these concerns is more fully discussed below.

3) Integration: Customer Use Study and Forecast of Sendout Requirements

The company states at page B-10 of its supplement (quoted above at p. 11) that "conservation is not a specific determinant (of future sendout) but has been factored into the forecast through the consideration of price and other economic variables." This could only have been done in the Customer Use Study. If so, the Council finds that the integration of this Study and the forecast of sendout requirements is not clear and should be better explicated in the next supplement.

The Customer Use Study shows a 5.3% increase in average use per residential heating customer and a 5.4% increase in average use per non-heating customer over the 1979-1984 period. Yet, the forecast of sendout requirements in Tables G-1 and G-2 of the

supplement shows a 1.4% decline in use per residential heating customer and a 8.2% increase in use per non-heating customer. This inconsistency indicates and illustrates the need for better integration of the components of their methodology.

Also the record does not evidence how the company's assumption of two percent annual incremental conservation is reflected in the forecast of sendout requirements. While it may be that, to the extent the forecast of sendout requirements is supply-based, conservation would not be reflected in the forecasted total company or customer class sendout requirements, it nonetheless should be reflected in the forecast of the number of customers. The conserved sendout from existing customers would have to be sold to new, additional customers if the total sendout forecast is to be achieved. It is not clear if the same amount of conservation is expected to be achieved within each customer class or if the conserved sendout is to be fully marketed within the same class. The average use per customer figures in Tables G-1 and G-2 show so small a decline that to be consistent with two percent annual incremental conservation, the additional customers each year must be using significantly more than the existing customers. If this is what the company is indeed forecasting, it should certainly be so explained and documented. The ongoing company analysis of current billing data has preliminarily shown six percent conservation in this heating season alone among the least transient customers. The ability to forecast sendout accurately depends upon forecasting conservation. This has implications for the ability to forecast the number of customers that must be added to utilize the forecasted amount of available resources most efficiently. If costs are to be

minimized for Boston Gas' customers, the forecast of number of customers becomes as critical as the forecast of available resources. Without accurate forecasts of customers to be added to utilize available resources efficiently, not only are existing customers penalized, but also those potential customers who must be left using oil. To that extent the Commonwealth is also penalized as its policy to reduce oil dependence is somewhat frustrated. The Council concludes that if the energy policies of the Commonwealth are to be achieved, that the company must provide assistance by focusing its forecasting efforts on, and better explicating, the relationship between forecasted conservation and the projected number of customers.

4) Implications: Input Assumptions to Customer Use Study

The second area of concern involves the implications of the input assumptions to the Customer Use Study for the forecast of sendout requirements, especially as the oil and gas price assumptions relate to conservation and the future market for gas.

The implications of the input assumptions for oil prices are noteworthy. "Oil prices in the Boston area are projected to increase at a compound annual rate of 14% through the forecast period. This projection assumes that the trend of rapid price increases will continue through December, 1979 and that the real price will increase by 2% or 3% per year through 1985." (Supplement, Appendix A, p. 10). The recent world oil price increases have caused the early years' forecasted heating oil price to be surpassed; it remains to be seen if future increases will indeed be moderate enough not to surpass the later years' price forecasts.

The difficulty of accurate oil price forecasts, however, is not as significant as the assumption that gas prices in the Boston residential heating market will rise to equal oil prices by 1985. (Appendix A, p. 7). This results in an increase of gas heating prices at an average compound annual rate of approximately 16% through the forecast period 1979-85. (Appendix A, p. 6). The significance of this assumption lies in its implications for conservation and for the future market for gas. One need not have a precise estimate of price elasticity to expect significnat conservation with price increases averaging 16% a year for 6 years. By the company's logic this may be conservative if oil prices increase more than that projected. There is also the implication that the basis for the unprecedented present demand should be expected to be significantly diluted by the parity of gas with oil prices. This has further implications in the application of the Council's criteria of providing necessary energy supply at the lowest possible cost to the proposed vaporizers. (See discussion of proposed vaporizers below.)

5) <u>The Econometric Approach for Modeling Conservation</u>

The third area of concern focuses on the company's choice of an econometric approach to its Customer Use Study.[4] The Council's primary difficulty with the company's econometric approach to measuring and forecasting conservation lies with the company's definition of conservation. The Council considers

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[4] This study contains the company's response to the condition in the 1977 supplement decision (<u>See</u> 2 DOMSC 69, 73 (1978)). Its principal function was to measure past and forecast future conservation.

conservation to include changes in energy using equipment, its employment and technology; consumers' greater awareness of ways to save energy; and effects from the shift of more and more income going to energy expenditures as well as short and long term responses to higher prices. As the company stated and is noted above, conservation is substantially represented in its forecast by price response. However, conservation is more than just an immediate response to higher prices. The Council's concern with the choice of an econometric approach addresses the adequacy of this approach in capturing the full range of conservation-related effects.

The comments which follow should not be seen as in any way a denigration of the company's efforts in putting such a study together; the Council reiterates its appreciation for the magnitude of effort which this year's Boston Gas filing represents. However, the Council sees two major weaknesses inherent in purely econometric approaches which are present in the company's study and should be attended to if the company's forecast is to be accorded a measure of confidence in forecasting conservation. By discussing these weaknesses below, the Council is trying to correct these weaknesses. The Council is less concerned with the ground covered by the company, as there it has done exceedingly well, than with the road ahead. The foremost point is whether, at this stage, the company can or should devote sufficient resources of time and personnel to improving the confidence in an econometric model's capture of conservation effects.

This is not to say that it is impossible to develop econometric models whose forecasts can be viewed with confidence. The nature of the energy demand modelling effort makes approaches which

depend on historical relationship difficult when those relationships are undergoing rapid and frequent change. Econometric techniques applicable to this modelling problem may require data which is not easily available, dedication of much staff time, and utilization of often expensive expertise. Before continuing on this course, the company should now evaluate alternatives if only for cost effectiveness, if not feasibility. Perhaps other statistical analyses or an end-use, engineering approach would be as or more fruitful with less effort. Perhaps a combination or hybrid technique might be developed. While it is not for the Council to impose a methodology[5], it is concerned in the instant case that Boston Gas consider other approaches before committing to and pursuing a solely econometric approach.

If, upon reevaluation, the company believes that it can ultimately develop econometric models which will produce reliable forecasts, then the Coucnil would be remiss not to identify further its concerns with the company's work to date. Indeed, the effort by the company calls for an even more detailed technical discussion than is appropriate for this decision. Thus, the Council instructs its Staff to be available for such further discussion should the company so request.

As stated above, the Coucnil finds that the present econometric

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[5] In the 1977 Boston Gas supplement decision, the condition simply called for and gave guidelines for a "comprehensive analysis of customer use patterns." 2 DOMSC 69, 73 (1978) As a guide, the Council stated that the analysis should explain how historical changes in customer use patterns support management decisions about future sendout requirements and should describe the magnitudes of and reasons for predicted customer use changes in the forecast period. The study was also to include an explanation as to what factors influence customer use changes including, but not limited to, conservation, changes in the numbers of customers, advertising and marketing policies of the company, customer response to price changes, and state and federal energy policies.

models have two significant weaknesses which should be remedied if any additional work is to enjoy the Council's confidence in the results. The first weakness points to the need to represent an adequate theoretical basis while the second weakness looks to statistical properties of the estimated equations.

First, with respect to the specification of the average use models and the commercial/industrial total use model, further efforts should be made in developing the theoretical basis for these models. These models do not include variables which explicitly capture conservation and other behavioral shifts. The use of a single dummy variable in two equations only captures a one-time change as opposed to the modeling of current as well as future expected changes.

Part of the problem is that during the time period of estimation, it is likely that the nature of new customer use underwent significant changes such as increases in new house sizes, the decline in real gas prices, and the increase in real income. Because the equations rely on data as far back as 1960, the effects of income and price on consumption may not reflect present or future behavior as relative budget patterns may be shifting. This is critical to a forecast which depends upon this modeling of price effects to capture conservation.

This theoretical weakness illustrates the need for refinements in the model's representation of theories critical to accurate forecasting of shifting behavior with respect to energy use. Specifically, as the company has noted, the personal income variable may not be an adequate predictor of future gas use, as it is likely that this variable captures the effects of other important behavioral relationships (i.e., income may be acting as a surrogate

for the relationship between gas use and such variables as hosue size, leisure time, appliance ownership, and family size). If the historical relationships of these "left-out" variables to income and gas use remain the same in the future as they have in the past, then income alone is an adequate proxy. The concern is that these relationships will not remain the same, and that the present final equations are inadequate to capture these behavioral changes.

Second, the major statistical weakness is that in the residential heating use and Connercial/Industrial equations, the income variable and Gross State Product variable each account for most of the variation in the dependent variable. This dominant role raises questions concerning: a) the theoretical basis for the specification of the variable itself; and b) the possibility that these variables are "picking up" the effects of other important but omitted variables. The record shows that the company recognizes the importance of these issues and is investigating refinements of this variable.

Another symptom of statistical weakness is found in insignificant t-statistics (see, for example, the variable HDD in the Commercial/Industrial model, and RNHPG in the Use per Residential Non-Heating model). In the case of average use per residential heating customer, the final model may have a problem of autocorrelation (Tr. 24). While a coefficient which is not significant should not necessarily be stricken from an equation if its theoretical basis is sound, the reason for the statistical insignificance should be explored. The insignificant t-statistics may be due to correlation among the independent variables

(multi-colliniarity), improper variable specifications, or problems in the functional forms of the relationship. The company has indicated an awareness to these problems.

Again, the Council hopes its analysis as detailed above is not misunderstood. Undoubtedly, the company has come far in improving its forecast methodology. The Council applauds this and knows that this first effort bodes well for future efforts. However, progress often brings with it another set of questions to be addressed so more progress can be made. The Council has attempted to identify these questions, especially as to the company's future resource committment, and call them to the company's attention.

IV. Supply Plan

A. Resources

Boston Gas has many agreements with other gas companies for the purchase and sale of gas during the forecast period 1980-1984.

The company's main supplier is Algonquin Gas Transmission Company (Algonquin) from whom Boston Gas receives its pipeline supply under 2 contracts designated F-1 and WS-1. The F-1 contract provides a yearly supply of pipeline gas from September 1 to August 31; the WS-1 contract provides a firm winter supply from November 16 to April 15. To forecast its pipeline supplies from Algonquin, Boston Gas relied upon the estimates of supply contained in a letter dated January 11, 1979 from Algonquin to Boston Gas. The estimates presented by Algonquin were based on projections from its supplier, Texas Eastern Gas Pipeline Company. (Texas Eastern). Texas Eastern projected two levels of supply, one of which did, the other did not reflect the addition of any supplemental supplies from Mexico or the Gulf area. Boston Gas felt the Algonquin estimates were conservative, and accordingly adjusted its forecast to reflect the Algonquin/Texas Eastern estimates which include these supplemental sources.

Boston Gas also receives synthetic natural gas (SNG) from Algonquin under a SNG-1 contract. Assuming no shortage nor any new regulation adversely affecting the SNG plant's feedstock, Boston Gas expects no curtailments under this contract. The annual contract period is October 15 to April 15.

The final contract Boston Gas has with Algonquin is its ST-1 Contract, which provides for the storage of gas in the summer and the

withdrawal of gas in the winter. Consolidated Gas Company stores the gas while Algonquin provides the needed transportation.

Boston Gas is also a pipeline customer of Tennessee Gas Transmission Company (Tennessee). To forecast pipeline supplies from Tennessee, Boston Gas letters from Tennessee (spring 1979) which like Texas Eastern, projected two levels of supply, one of which did, the other did not reflect the addition of supplemental supplies from Mexico and Canada. Boston Gas again felt that the Tennessee estimate was conservative and thus reflected in its forecast of gas available under its CD-6 contract with Tennessee, estimate of supply which included the supplemental projects. As with Algonquin, Boston Gas has storage contracts with Tennessee which allows gas to be stored in the summer and withdrawn in the winter. The storage under these contracts provided by Honeoye Storage Corporation, National Gas Storage Corporation and Consolidated Gas Company, with needed transportation supplies by Tennessee.

Boston Gas also has contracts with Exxon Corporation to purchase firm and optional quantities of propane. The contract quantities total approximately 50% of the DOE propane allocation for Boston Gas. These take-or-pay quantities of propane are expected to be used in a normal year mainly for the manufacture of SNG in the heating season, with a miniscule amount (less than 2%) used for direct propane/air sendout for needle-peak shaving. If need be, Boston Gas could seek to purchase additional propane up to the DOE allocation limit for use at its SNG facility and/or its propane/air facilities. This contract is due to expire March,

1982. At this time the Company expects to renew the contract, pending changes in their supply situation.

Further, Boston Gas has contracts with Distrigas of Massachusetts (DOMAC) which allow the company to purchase an annual quantity of liquefied natural gas (LNG). Boston Gas states that its experience with DOMAC LNG deliveries to date suggest that contract delivery cannot be relied upon for the forecast period. Boston Gas estimated that actual amount of LNG available from DOMAC each year will approximate the following percentages of full contract amounts:

Year	% of Contract
1979-81	71%
1981-82	79%
1982-83	84%
1983-85	87%

DOMAC supplies Boston Gas with its contracted LNG partly in a vaporized state and partly in a liquid state. The amounts supplied in the different states fall the range allowed in the contract. Boston Gas expects approximately 55% of the available quantities in the first year of the forecast to be delivered as vaporized LNG, increasing to approximately 63% in the last year of the forecast. Part of the vaporized LNG is delivered in the heating season (66-82%) and the remainder in the non-heating season. The remaining available quantities, approximately 45% in the first forecast year, and approximately 37% in the last forecast year are expected to be delivered in the liquid state in the non-heating season to replenish Boston Gas' LNG storage tanks.

With respect to storage capabilities, Boston Gas has operable propane/air facilities in 10 locations, for a maximum daily sendout of propane/air of 52.8 MMCF, and a maximum storage capacity within its 64 propane tanks of 177.5 MMCF. The company maintains about a 2-3 day volume of propane storage if the facilities are run at peak daily capacities.

Boston Gas also operates 3 LNG satellite plants located in Dorchester, Lynn and Salem. The storage of these facilities is 621,000, 290,000 and 290,000 barrels, respectively. A small quantity of peak day vaporization is also available at Leominster, Webster, and Spencer by truck hook-ups. Thus, the total maximum daily LNG sendout from the 3 satellite plants and 3 truck hook-up locations is 202.9 MMCF.[6]

Liquefaction facilities are available at the Lynn and Dorchester plants. Quantities of 7.35 and 6 MMCF of LNG per day can be liquefied at these facilities. Assuming maximum operation of these facilities for 200 days (approximately the length of the non-heating season), a total of 2670 MMCF could be liquefied by Boston Gas each year. The company expects to liqueify only 138 MMCF of F-1 gas and 235 MMCF of CD gas for a total of 373 MMCF per year.

There is also an SNG plant in Everett, with a peak daily sendout of 40 MMCF per day; here the company plans to manufacture SNG during the heating season. The propane/air facility also at

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[6] It is the company's operating procedure to have 1 vaporization unit in reserve to insure system integrity and to provide for the contingency of equipment malfuntion. Therefore, there is a standby vaporizer at each of the satellite facilities which provides back-up capacity of 62.5, 28.8 and 15 MMCF, respectively. This is in addition to the maximum daily capacity of 202.9 MMCF.

Everett provides a peak day back-up for the SNG facility.

Lastly, Boston Gas has natural gas storage in Gloucester, allowing a peak day sendout of .1 MCF/day. Storage capacity at this facility is .25 BBTU.

Given these resources, the Council next reviewed how the company plans to allocate and to utilize them to meet customer sendout demands

B. Resource Utilization

Boston Gas illustrates in Table G-22 how it expects to meet sendout requirements under normal weather conditions for the forecast period. The company provided 6 years of forecast data, 1979-80 through 1984-85.

Under "Received" on that table, the company shows the quantities of gas it would expect to purchase given normal weather conditions; this includes all quantities under take-or-pay contracts. "Used in Sendout" represents the quantities it would expect to use to meet firm customer requirements in a normal year. The "Ending Balance" of the heating season shows what is available annually to meet colder than normal weather conditions and/or to send out as off system sales. In addition, there are optional quantities of propane available by contract to Boston Gas if necessary to meet colder than normal conditions. Beginning balances of stored gas (off-pipeline and LNG) are assumed to be zero at the beginning of each forecast year. This is done to avoid carry-over from one year to the next, especially since the beginning of the forecast year coincides with the end of a heating season when storage would normally be depleted.

Table G-22 shows further that for each year of the forecast

period, the company has resources available to meet sendout requirements under normal weather conditions and adequate additional resources to meet sendout requirements for design year conditions. A summary of the minimum and maximum percentage of seasonal firm sendout over the forecast period that each of the resources provides follows.

Algonquin sources (F-1, WS-1, SNG-1, ST-1) provide between 41.7 and 53.5% of the firm non-heating season load and between 44.9 and 58.1% of the firm heating season load. Tennessee sources (CD-6, Storage) provide between 35.6 and 53.5% of the firm non-heating season load and between 26.4 and 29.1% of the firm heating season load. LNG vaporized by Boston Gas is not sent out in the non-heating season and provides between .2 and 8.9% of the firm heating season load. SNG is expected to be manufactured by Boston Gas only in the heating season and will provide between 4.2 and 4.8% of the firm heating season load. Propane/air sendouts, expected only in the heating season will provide approximately .1% of the firm heating season load.

Future sources, which include 3 off-pipeline underground storage projects, are expected to provide between .2 and 6.1% of the firm heating season load in the later years of the forecast period.

On Table G-23, Boston Gas illustrates the resources it expects to be available on a peak day to meet firm sendout requirements. The company assumes that its maximum daily contract entitlement from Algonquin and Tennessee will be available on a peak day with no daily curtailment. Pipeline storage gas is not included as a resource expected to be available on a peak day as it is delivered

only on a best-efforts basis by the pipeline companies.

Propane/air, LNG caporization and SNG manufacturing facilities are expected to be available at maximum daily sendout capacities, with standby units not included. DOMAC is also expected to provide the maximum daily quantity of vaporized LNG on a peak day.

If pipeline sources are available at uncurtailed maximum daily quantities and existing non-pipeline company facilities operate at maximum daily capacities, Boston Gas will have a 3.8% contingency above firm requirements in the first year of the forecast, 1979-80. But, under the same circumstances, in the next 4 years of the forecast, the company shows resource deficiency of .5% in 1980-81 increasing to 9% deficiency in 1983-84. The company proposes to offset this deficiency by installing the 2 proposed LNG vaporizers by the 1980-81 winter period. The additional daily capacity of the Salem and Dorchester facilities will then provide an 11% contingency above peak day load in 1980-81 and a 2% contingency in 1983-84.

In 1979-80, before adding the proposed additional vaporization capacity, Algonquin supply sources represent 29% of total Peak Day resources; Tennessee supply sources represent 14.9%; propane/air vaporization, 8.2%; SNG manufacture, 6.2%; imported LNG, 39.3%; and LNG liquefied by Boston Gas, 2.4%. In 1980-84, after adding the additional vaporization capacity, Algonquin supply sources represent 25.9% of total Peak Day resources; Tennessee, 13.3%; propane/air, 7.3%; SNG manufacture, 5.5%; imported LNG, 45.0%; and LNG liquefied by Boston Gas, 3%. The following table illustrates the percent of total available Peak Day resources each resource represents, both before and after adding the proposed additional vaporization capacity.

Resources	1979-80 Before Vaporizers	1980-84 After Vaporizers
Algonquin (F-1, SNG-1, WS-1)	29.0%	25.9%
Tennessee (CD)	14.9%	13.3%
Propane/air vaporization	8.2%	7.3%
SNG manufacture	6.2%	5.5%
Imported LNG vaporization	39.3%	45.0%
Pipeline gas liquefied and revaporized	2.4%	3.0%

Further discussion and analysis of the proposed vaporizers is contained in Section V below.

C. Analysis of Forecast of Resources

The record shows that Boston Gas has provided an excellent description of its supply planning process. Given the company's assumptions, the forecasted normal year, design year and peak day firm load requirements can be met. The Council is concerned about the possible cut-off of Algerian LNG and its impact on the company's supply situation. This issue is intrinsically related to the proposed LNG vaporizers and the Company's marketing posture. See Section V for further discussion.

The company has left a question unanswered in its supply planning. The company's previous forecast approval was conditioned on supplying a comprehensive estimate of pipeline supplies including source data in this year's filing. This was done. However, the company did not clearly explain in the filing its judgement(s) regarding its evaluation of that data. The unanswered question is simply why does Boston Gas find the pipeline companies estimates of supply conservative? Although this point was not pursued this year,

the Council asks that it be documented in the next forecast.

The Council now turns to its consideration of the company's proposal to construct 2 additional vaporizers at its LNG facilities in Salem and Dorchester.

V. Proposed Vaporization Facilities

Boston Gas has proposed to add a 15 MMCF per day vaporizer at its Salem LNG Facility and a 62.5 MMCF per day vaporizer at its Dorchester LNG facility. The record is quite clear that without these facilities, the company cannot add firm load after the projected increases for the coming winter. The record also shows that, given the company's assumptions about the availability of Algerian LNG, these facilities are the best type of peak day capacity to add and are located in the best location within the Boston Gas system for optimum flexibility for utilizing its various supply sources.

The issue raised by these vaporizers is the prudence of committing the company to significant firm load additions when a major resource has become uncertain. If firm load is to be added, the proposed LNG vaporizers are needed. However, a major source of LNG - Algeria - is considering stopping all LNG exports to the United States. Thus is the relationship between the additional vaporization capacity and increased dependence on Algerian LNG is complex. The company's position is that without these facilities it could not serve the demand for gas to the extent projected in the forecast (Tr. Supp. 19). The company testified that in response to a long term cut-off of Algerian LNG, it believes it could meet present load requirements with existing sources and with other strategies such as spot purchases of propane.

(Tr. Supp. 15). The company further agreed that the implication could be that it would be difficult to add firm load without additional sources to make up for a cutoff in Algerian LNG. (Tr. Supp. 16).

The company's testimony also makes clear that its ability to meet peak day requirements with LNG is not directly dependent on Algerian LNG. Peak day requirements are not extensive volumes and, the additional forecast peak day requirements themselves do not require additional volumes to be put into storage. Without Algerian LNG, the company could fill its own LNG storage facilities with other sources by the start of the heating season. Thus, the issue of adding peak day LNG vaporization capacity is not so much peak day dependence on Algerian LNG as it is the indirect effect of increasing firm load requirements on an annual basis as a result of increased peak day capabilities. The question posed by the vaporizers is whether their addition to meet projected firm load increases will increase the Boston Gas customers' vulnerability to an Algerian LNG cutoff. The company has testified that they do not think so. (Tr. Supp. 25).

However, based on the information contained in Table G-22 of the forecast, the company does not show sufficient annual resources in the years which include the firm load additions made possible by the vaporizers' peak day capacities, to withstand a complete cessation of Algerian LNG in the Distrigas contract. For example, in 1981-82, the company shows resources of 7919 MMCF above firm normal requirements and, with notice, could contract for an additional 3608 MMCF of its DOE propane allocation for a total of 11527 MMCF. This would cover the loss of the expected

Distrigas delivery of 10,862 MMCF of Algerian LNG. However, the firm design year requirements could not be met as they are 4154 MMCF greater than the normal year requirements.

While the Council recognizes that the resource picture is not static, it can only base decisions on what is in the record. Yet the record also shows that the company does have flexibility by reassessing its marketing policy and by attempting to add resources. (Tr. Supp. 14-16). Thus, the Council finds that the vaporizers are needed, but advise that it would be prudent for the company to explore securing reserve resources to cover the contingency of an Algerian LNG cutoff.

Additionally, an approval of the vaporizers permits and thus implicitly gives Council sanction to the company's expansion of its gas heating market. The Council must be cognizant that this, by the company's own forecasting logic, could result in higher gas prices for existing customers. Following the company's logic for future gas prices, the expansion of the heating market will require greater quantities of the relatively more expensive replacement gas thus raising average prices to all. In the present case before it, the Council takes the position that as long as the proposed vaporization facilities are not likely to raise gas prices above oil prices then such facilities can be found to be necessary for the Commonwealth as a whole. The Council realizes that these additional vaporizers may indeed mean an increase in gas prices. As long as any such increase in gas prices caused by adding customers is offset by decreases in energy costs to the former oil customers who are switching to gas, the Commonwealth as a whole has achieved a more reliable energy supply by reducing its dependence on foreign oil without a net increase in energy costs.

Thus, the Council finds that the proposed additional vaporizers discussed above are needed to insure an adequate supply of energy for the Commonwealth at the lowest possible cost and the least possible environmental impact.[7] The Council approves construction of these vaporizers with an in-service date of early November, 1981.

Energy Facilities Siting Council

by Dennis J. LaCroix

Dennis J. LaCroix, Esq.
Hearing Officer

Approved by a unanimous vote of Council members present and voting at its meeting on July 21, 1980.

Joseph S. Fitzpatrick
Chairman

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[7] The estimated cost for the Dorchester vaporizer is $800,000; for the Salem vaporizer, the estimated cost is $400,000. These estimates reflect the best information available to Boston Gas as of June, 1980. The vaporizers being contemplated are substantially similar to the vaporizers presently in use at the facilities. Since existing facilities are being further developed, the criterion of least possible environmental impact is certainly being met.

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Cape Cod Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-19

DECISION and ORDER

I. Introduction

This decision concerns the Cape Cod Gas Company's (hereafter Cape Cod or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the staff to document the Company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

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1 The EFSC Staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 2, 1980. See Docket #79-17.

This decision includes a discussion of Cape Cod's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Company. Therefore, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council's approval of the present Cape Cod supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b), and (c) as applied on a case-by-case base by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Cape Cod's Methodology

Normal Year Sendout

The Company uses a normal year consisting of 6653 degree days (hereafter DD). This is defined as the average number of effective DD in the past fifteen (15) years.

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

[4] The word "effective" as used here indicates that the wind chill factor is accounted for in the DD figure.

The Company discussed the following significant determinants[5] in its forecast: population, price of fuel, market demand, income, government policies, company advertising, policy and conservation. Population grew rapidly during the years 1970-75, and continues to experience a steady but slower rate of growth. It is assumed that the price of gas will remain relatively competitive and that gas will be a desirable commodity in the energy market. The median income for Cape Cod residents was studied without any conclusive results affecting the sendout forecast. No assumptions were made regarding the effect of any government energy policies. No assumptions were made regarding external restraints other than that involving natural gas pipeline curtailments. The Company has not actively advertised to promote gas sales in past years. Conservation accessories have been promoted in gas appliance sales. Customers have occasionally been advised as to methods to conserve gas. The Company stated that adjustments for the conservation habits of the consumer were included in the forecasted sendout but did not explain how these adjustments affected the forecast.

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5 See footnote #2 for identification of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2

The Company forecasts normal year sendout on a customer class level.[6] First, the number of future customers in a class is estimated for each year of the forecast period. This estimate is based upon historic sales statistics, anticipated area population growth, capital available for construction, and company sales policy.[7] After the number of future customers in each class is estimated, the Company projects the sendout for the heating and non-heating customers. The future sendout for heating customers is a summation of the base use[8] and the heating use.[9] The Company projects annual base use and heating use factors based upon historic load characteristics adjusted for consumer conservation factors.[10] The base use is projected by multiplying the estimated number of future customers each year by the annual historical base use per customer. The heating use is projected by multiplying the estimated number of future customers by an estimated heating use per

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6 A forecast of normal requirements is usually prepared on one of two levels: the Customer Class Sendout level, Tables G-1 through G-4 or the Total Company Sendout level, Table G-5. In the former a company calculates the projections for each class and combines them to produce a forecast of total company sendout. In the latter a company calculates the projection for total company sendout and disaggregates it to derive the customer class sendout.

7 The Company does not actively encourage consumers using other sources of energy to switch to gas.

8 Base Use or Load is use which is not temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

9 Heating Increment of Use is use which is temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

10 Eighty (80) percent of the increase expected in residential heating sendout is due to new starts and twenty (20) percent is due to conversion of oil heating customers.

average customer per degree day and then by the number of degree days in a normal year. These projected base use per customer and heating use per degree day per customer factors for Residential Heating customers are given on Table G-1. The future sendouts for non-heating customers are derived from the product of the estimated future number of customers and a projected average annual base use per customer. These projected annual base use per customer factors are given on Table G-2. The Company did not explain how it derived the forecast of normal year sendout for its commercial class customer, Table G-3A.

Design Year Sendout

The Company uses a design year consisting of 7318 DD. This is defined as a year with ten (10) percent more DD than a normal year. The additional DD are allocated between the heating and non-heating season by assuming that the number of DD in both seasons will be ten (10) percent greater than normal. The Company determines design year sendout requirements by multiplying the normal year sendout forecast for each year by ten (10) percent.

Peak Day Sendout

The Company uses a peak day consisting of seventy (70) DD. This is based on the coldest day experienced in the past fifteen (15) years. The peak day sendout is calculated by multiplying the estimated future number of customers in each class by an average consumption factor for a 70 DD for that class. The average consumption factors are not stated nor is their derivation explained.

C. The Review Criteria Applied to Cape Cod's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are reserved for a later Council decision so that both the Council and the Company can focus on the element of reviewability at this time.

The Council notes that the Company provided complete data on all the tables and commends it for this.

Normal Year, Design Year and Peak Day

When a Company exercises judgement, makes estimates or uses mathematical factors in the development of a forecast these judgements, estimates and factors must be stated. Also, their bases and the manners by which they are incorporated into the forecast must be explained in order to determine whether the forecast is reviewable as discussed in section II.A. By focusing on the issue of reviewability in this filing the Council will be better prepared to review subsequent forecasts and supplements for appropriateness and reliability.

In the present case the Company did not explain the bases for the base use, heating use, and average use factors. Nor did it explain how it derived the forecast of normal year sendout for its commercial class customers, Table G-3A. Although the Company states that conservation was incorporated into the forecast, it does not appear to be reflected in areas where one might expect it to be manifest such as: base use per residential heating customer, the heating use per average customer per DD and average use per residential non-heating customer. For instance, the base use per customer for residential heating customers is shown to be constant from 1974-1984, and the heating use per average customer per DD shows no decreasing trend (Table G-1). While the average annual use per residential non-heating customer, Table G-2, declines in historic years, it is forecasted to remain constant over the forecast period. In light of the fact that the Company expects eighty (80) percent of the increase in Residential Heating Customers to be new, possibly more energy efficient homes, it is particularly important for the Company to explain how it incorporates conservation into the forecast.

The Company assumes that a design year will have ten (10) percent more DD than a normal year. The Company then derives its forecast of design year sendout by multiplying the forecast of normal year sendout by ten (10) percent for each year. By multiplying the forecast of normal sendout by the ten (10) percent increase attributed to the design year increment in DD , the Company has incorporated

the assumption that both base use and heating increment will increase by ten (10) percent over normal for each year of the design forecast period.

In its next filing, the Council expects the Company to explain: the basis for each estimate of base use, heating increment, and average use factors used in the forecast requirements and each method by which these estimates are incorporated into the forecast, how conservation is incorporated into the forecast, any judgements made concerning conservation, the basis for each judgement and the method by which it is incorporated into the forecast; and to state the average consumption factors used for each class to forecast peak day sendout and to explain their basis. The Council also expects the Company to explain how it derived the forecast of normal year sendout for its commercial class customers. Furthermore, the Council expects the Company to explain why the ten (10) percent increase attributed to the design year increment in DD was implicitly applied to base use.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Company has contracts with Algonquin Gas Transmission Company (hereafter AGT) for F-1, WS-1, and SNG-1 service during the forecast period. The Company has also signed an agreement with AGT for storage transportation (ST-1) which is awaiting FERC approval.

To meet forecasted normal firm requirements for 1980-84, the Company plans to obtain gas from other sources in the non-heating season of each year and inject them into storage for use in the following heating season. The Company is of the opinion that AGT will have interruptible gas available for this purpose. In addition, the Company is working with AGT, in conjunction with the New England States Pipeline, for additional gas supply from Canada. Table G-22 illustrates that gas sources in addition to those already under firm contract account for approximately 11% of the firm sendout requirements in the heating seasons of the forecast period.

Liquified Natural Gas

The Company has a contract with Bay State for the purchase of liquified natural gas (hereafter LNG) for the forecast period, with full contract amounts of firm and optional quantities expected to be available according to Table G-22. LNG vaporization and storage facilities are

located in Wareham and South Yarmouth; the maximum daily sendout capacity from these facilities is 21.9 MMCF with storage capacity of 190 MMCR.[11]

Propane

The Company purchases propane on the open market, and expects to use up to its DOE propane allocation of 4 million gallons in 1984 for normal firm requirements.

The Company has propane/air sendout and storage facilities in Catumet, South Yarmouth and Chatham. The maximum daily sendout capacity from these facilities, assuming feedstock availability, is 9.74 MMCF/day with storage capacity of 39 MMCF (see footnote #10).

B. Comparison of Resources to Requirements

Normal Year

Table G-22 shows how the Company expects to meet normal year firm sendout requirements. Within the forecast period AGT is expected to provide between 91% and 98% of the non-heating season load and 75% - 82% of the heating season load.

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[11] The Company has smaller standby facilities for propane/air vaporization at Catumet and Chatham and LNG vaporization at South Yarmouth. These facilities cannot operate when the primary facility at the location is on line.

The sum of pipeline sources deliverable at maximum daily contract quantities and non-pipeline facilities operable at maximum daily capacities allows a potentially available supply of 36% more than is needed on a peak day in the first year of the forecast period. This margin declines to 20% in the last year of the forecast period. In addition, the standby facilities previously mentioned are available. If propane and LNG storage tanks are full the Company could operate their vaporizers at the maximum daily sendout capacities for approximately four (4) and eight and one half (8-1/2) days, respectively.

C. Evaluation of Forecast Resources

While the record indicates that the Company has adequate supply for a peak day, there appears to be deficiencies in the Company's seasonal supply. Specifically, there are no contracts for approximately 11% of the firm load in some heating seasons under both normal and design weather conditions as well as its propane supply. The Council is aware that a portion of the supply necessary to meet requirements may not be under contract at the time of a forecast's filing. It is also aware that it is customary for gas companies to anticipate purchases on the spot market. However, forecasts of resources based in part on uncontracted-for resources or spot market purchases are not as reliable as forecasts based on firm committments. Therefore, one cause of the Council's conditional approval is the extent to which the forecast of resources is based

LNG from Bay State is expected to provide between 2% - 7% of the non-heating season load and 13% - 16% of the heating season load. Propane is expected to provide less than 6% of the non-heating season load and between 4% - 9% of the heating season load.

Design Year

Because the Company shows AGT sources as annual quantities on Table G-22, it is difficult to figure out how much pipeline supply is available on a seasonal basis to meet design conditions. However, Table G-22 does show that the Company will only be able to meet design year conditions on an annual basis if the anticipated additional sources are available.

Peak Day

The Company shows how it expects to meet peak day requirements on Table G-23. Maximum daily contract quantities from AGT, under F-1, WS-1, and SNG-1 rates, would be utilized. The delivery of storage gas can be used to cover a deficiency in the delivery of these quantities of up to 25%. Otherwise the delivery of storage gas is on a best efforts basis. The remaining peak day load, approximately 50%, is expected to be met by propane/air and LNG vaporization.

on uncontracted-for supplies and purchases on the spot market. (See Conditions 5 and 6 in Section IV.)

The Council also needs information documenting the assumption that AGT will have interruptible gas available and that there will be additional gas supply from Canada.

IV. Order

The Council APPROVES Cape Cod's Supplement subject to the following conditions:

1) That the Company explain in its next filing how the base use, heating increment, and average use factors used to prepare its forecast were derived, and the manner in which these factors are used to forecast sendout.

2) That the Company explain any judgements made concerning conservation, the basis for said judgements and the manner by which such judgements are incorporated into the forecast in the next filing.

3) That the Company state, and give the bases for, the average consumption factors used for each class to forecast peak day sendout in its next filing.

4) That the Company explain in the next filing why the ten (10) percent increase attributed to the design year increment in DD was implicitly applied to base use.

5) That the Company explain in the next filing the bases for its judgement that AGT will have interruptible gas available and that there will be additional gas supply from Canada.

6) That the Company discuss in its next filing the reliability of obtaining its DOE/FEA allocation of propane in the open market.

7) That the Company explain in its next filing what effect an immediate cessation of Algerian LNG deliveries will have on its LNG contract with the Bay State Gas Company. Specifically, how does the Company plan to meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

By Robert D. Wilmot (BMG)

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 11 August, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Commonwealth Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-5

DECISION and ORDER

I. Introduction

This decision concerns Commonwealth Gas Company's (hereafter Commonwealth or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and additional information requested by the Staff to document the Company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

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1 The EFSC Staff's information request in contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 1, 1980. See EFSC Docket No. 79-20.

This decision includes a discussion of Commonwealth's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Company. Therefore, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that the companies may submit more thoroughly documented forecasts in the future.

The Council's approval of the present Commonwealth supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section will include a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for

a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For a methodology to be duplicated and evaluated, it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Commonwealth's Methodology

Normal Year Sendout

The Company uses a normal year consisting of 6485 degree days (hereafter DD). This figure is an average of historical DD data accumulated during the last twenty-five (25) years.

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2 Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

3 The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), and judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

The Company discussed the following significant determinants[4] in its forecast: supply, government conservation programs, efficiency of appliances, price levels, behavior patterns, and alternative technologies. The prime determinant of the forecast of Commonwealth's sendout is the availability of gas from the Company's pipeline suppliers. The forecast assumes that full curtailed annual contract quantities will be available and fully utilized. The Company estimates that federal and state conservation programs, improvements in the efficiency of appliances, price levels and behavior patterns will result in a one percent (1%) reduction in consumption by then existing customers for each year of the forecast period. The Company does not expect alternative energy technologies to have an appreciable impact during the forecast period.

The Company forecasts firm sendout on a customer class level.[5] First, annual base use[6] for each class in the last actual year, 1979, was derived from actual August and September sales. The annual base use was then subtracted

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4 See footnote #2 for a brief illustration of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2.

5 A forecast of normal requirements is usually prepared on one of two levels; the Customer Class Sendout level, Tables G-1 through G-4 or the Total Company Sendout level, Table G-5. In the former, a company calculates the projections for each class and combines them to produce a forecast of total company sendout. In the latter, a company calculates the projection for total company sendout and disaggregates it to derive the customer class sendout.

6 Base Use or Load is use which is not temperature or weather sensitive, i.e., that amount of gas use such as cooking which customers would use throughout a year separate from space heating or temperature related uses.

from the actual annual sales to determine the annual heating use[7] for each class during the last actual year. The annual heating use was normalized[8] and combined with the base use to produce a normalized actual year. The normalized data was split into the non-heating and heating seasons (hereafter NHS and HS, respectively). The method by which this was accomplished was not explained.

The Company then prepared its projections for the five year forecast period on the basis of this seasonal historical normalized data modified by the Marketing Department's forecasts of additional sales.

The forecast for Company Use & Losses shows the difference between gas billed and gas sent out. The Company did not explain the derivation of this forecast which is shown as increasing in the first year of the forecast fifty (50) percent above the last actual year and remaining constant thereafter.

Finally, the Company uses the difference between "actual" and "normal" to indicate the firm sale of gas to New Bedford Gas and Edison Light Company in Table G-5. However, this agreement was not reported on Table G-24.

Design Year Sendout

The Company uses a design year consisting of 7304 DD.

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7 Heating Increment or Use is use which is temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

8 While other normalization procedures were described, this one was not described.

The Company defines its design year as the coldest year experienced during the past twenty-five (25) years.

The design year sendout forecast was based on the additional effective[9] DD over normal expected in a design year. The additional DD were multiplied by an estimated heating increment for each year of the forecast period. The product was then added to the normal sendout forecast to produce the projections for design year sendout. The heating increments used in these calculations and manner by which they were estimated were not stated in the filing.

Peak Day Sendout

The Company uses a peak day consisting of sixty-eight (68) DD. This is defined as the coldest day experienced during the past twenty-five (25) years.

The peak day sendout forecast was based on the number of DD expected on a peak day multiplied by the estimated heating increment for each year of the forecast period. This product was added to the estimated base use per day. The estimated factors used in these calculations were not stated nor explained.

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9 The word "effective" as used here indicates that the wind chill factor is accounted for in the DD figure. However, it is not clear that "effective" was used for both normal and design year calculations.

C. The Review Criteria Applied to Commonwealth's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast will be reserved for a later Council decision so that both the Council and the Company can focus now on the element of reviewability.

Normal Year, Design Year and Peak Day Sendout

When a company exercises judgement, makes estimates or uses mathematical factors in the development of a forecast, these judgements, estimates and factors must be stated in the filing. Also their bases and the manner by which they are incorporated into the forecast must be explained in order to determine whether the forecast is capable of duplication and evaluation, i.e., reviewable as discussed in section II.A. By focusing on the issue of reviewability in this filing the Council will be better prepared to look at subsequent forecasts and supplements for appropriateness and reliability.

In the present case, the Company made judgements concerning conservation and additional sales during the forecast period. The bases for these judgements and the manner by which they were incorporated into the forecast were not explained. The Council also notes that for the third largest gas company in the Commonwealth, judgement

alone may be an insufficient basis upon which to reflect future conservation in a forecast. If the Company has not already done so, it should investigate methods to analyze and systematically project the impacts of conservation on sendout.

The Company also made judgements concerning estimated heating increment and base use per day when calculating normal year, design year and peak day sendout projections. The bases for these judgements and the manner by which they were incorporated into the forecast were not explained in the present filing. In its next filing the Council expects the Company to explain the basis for the judgements concerning conservation and additional sales and how this data is incorporated into the forecast, particularly in the forecast of number of customers; explain the judgements concerning estimated heating increment and base use and the manner in which they were incorporated into the forecast; and, explain how judgements about conservation are reflected in forecasts of number of customers and average use per customer. As concerns Company Use & Losses, the Council expects the Company to explain in the next filing why this class is forecast as increasing 50% in the first year and remaining constant over the next 4 years. This documentation is necessary so that the filing can be reviewed for appropriateness and reliability.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); comparison of the

resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

The Company has contracts with the Algonquin Gas Transmission Company (hereafter AGT) and the Tennessee Gas Pipeline Company (hereafter TGT) for the purchase of natural gas (hereafter NG) during the forecast period. The contract with AGT includes F-1, WS-1, SNG-1 and storage service while that with TGT includes CD and storage service. The Company has elected to take the option of reducing its purchases of SNG from AGT. The storage service contracts with AGT and TGT will be renewed and continued through the forecast period.

It is the Company's judgement that there will be no curtailment from volumetric annual contract quantities during the forecast period. This judgement was made after discussions with suppliers and on the basis of many informal contacts within the industry.

Liquefied Natural Gas

The Company has a twenty-five (25) year contract with the Hopkinton LNG Corp. for liquefaction, storage and vaporization services. Liquified Natural Gas (hereafter LNG) will be produced from pipeline deliveries during April 1 - November 1, and 3,000 MMCF will be stored for revaporization during the winter months.

Propane

The Company owns two (2) propane air facilities, located in Worcester and Cambridge which are used for peak-

shaving. Three (3) other manufacturing facilities were retired in 1979. The Company does not list any storage capacity for this resource on Table G-14.

B. Comparison of Resources to Requirements

Normal Year

The Company expects to meet normal year firm sendout requirements over the forecast period as described in the following table.

TABLE - 1

Percentage Range That Each Source Supplies Of The Heating Season And Non-Heating Season Requirements*

Supplier	Type	% of NHS load supplied	% of HS load supplied
Algonquin	F-1	45 - 46%	33 - 35%
Algonquin	WS-1	2 - 3%	6 - 7%
Algonquin	SNG-1	---	7 - 8%
Algonquin	Storage	---	2%
Tennessee	CD	49 - 50%	40 - 43%
Tennessee	Storage	---	2%
Hopkinton	LNG	2 - 3%	5 - 8%

*The information in this table was compiled by Council Staff from the data submitted by the Company in Table G-22.

Design Year

The resources shown as available in the record indicate that the Company has adequate supply to meet sendout requirements for a design year by taking some, but not necessarily all, of the following steps: cut back interruptible sales, utilize gas in storage, utilize LNG in storage and take the daily maximum of Algonquin F-1 during the design year.

Peak Day

Data on peak day sendout and requirements is shown on Table G-23. The record indicates that the Company has adequate supplies to meet peak day sendout requirements if full contract quantities are available from pipeline suppliers, propane facilities are operable at maximum daily output and thirty-six percent (36%) of the daily contract maximum of LNG is vaporized. Under these conditions the Company has thirteen percent (13%) more supply potentially available than is necessary to meet requirements as forecast for 1979-80. This margin declines to four percent (4%) by 1983-84.

C. Evaluation of Forecast Resources

The Company does not have a contract for propane; nor does it list any storage capacity in the supplement. Yet in each of the last four years of the forecast period the record indicates that if the Company did not have propane available it would be unable to meet the full peak day load. Even if there is adequate supply of propane available, it is unclear how long the Company could supply the maximum daily output from its propane facilities. The Company should

therefore document its propane storage capacity, back-up capacity and the availability of propane for a series of Peak Days.

It is also unclear why Hopkinton vaporization was listed as supplying only thirty-six percent (36%) of its maximum daily contract output on a peak day.

This expectation should be explained.

IV. Order

The supplement is APPROVED subject to the following conditions:

1) That the Company explain the bases of their judgements concerning the effects of significant determinants, especially conservation, in the next filing and provide their analysis of conservation in the 1979-80 split year relative to that forecast contained in this supplement.
2) That the Company include an explanation on how additional sales are forecast and how this data is incorporated into the projections and is reflected in the forecast of number of customers and the base use and heating use in the next filing.
3) That the Company explain how the Company Uses & Losses are forecast in the next filing.
4) That the Company state in the next filing the factors and explain the bases of the judgements concerning estimated heating increment and base use per day and how these were incorporated into the forecast of normal year, design year, and peak day sendout.

5) That the Company explain why three (3) propane manufacturing facilities were retired in 1979.

6) That the Company document its propane storage capacity, back-up vaporization facilities, and the availability of propane for a series of peak like days in the next filing.

7) That the Company report any agreements with New Bedford on Table G-24 in the next filing.

Energy Facilities Siting Council

by Robert D. Wilmot (BMS)

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 11 August, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Fall River Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)))))))	EFSC Docket No. 79-20

DECISION and ORDER

I. Introduction

This decision concerns the Fall River Gas Company's (hereafter Fall River or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's staff has reviewed the docket which consists of the supplement and further information requested by the staff to document the company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision includes a discussion of Fall River's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other

[1] The EFSC staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 1, 1980. See EFSC Docket No. 79-20.

gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Company. Therefore, the Council has paid particularly attention to the documentation in each forecast and will comment thereon so that the companies may submit more thoroughly documented forecasts in the future.

The Council's approval of the present Fall River supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a),(b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Fall River's Methodology

Normal Year Sendout

The Company uses a normal year consisting of 6000 Degree Days (hereafter DD). This figure is a ten (10) year average of historical DD data.

The Company discussed the following significant determinants[4] in its forecast: availability and price of fuels, availability of equipment, new construction and conservation. The Company states that the shortage and high price of oil

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

[4] See footnote #2 for identification of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2

has led to an increasing demand for gas. in contrast, a gas burner supply shortage, the depressed state of new construction and the razing of older sections of Fall River will limit new gas customers and cause a loss of previous customers. The Company expects that this will not have a significant effect on the total number of customers over the forecast period, but will result in a different distribution of customers among the classes. For instance, the company expects almost ninety-five percent (95%) of the increase in the number of residential heating customers to be caused by a transfer of customers from a non-heating to a heating rate with a concomitant decrease in the number of customers on a non-heating rate.

As concerns conservation, the Company is promoting pilotless appliances and its home insulation program, as well as advocating the lowering of thermostats and the closing off of unused rooms to conserve energy. Consequently, the Company has assumed a slight drop in residential heating use per customer due to conservation. This is evidenced in Table G-1, "Residential with Gas Heat" where the heating use per average customer per DD decreases about two percent (2%) between the last actual split year of 1978-79 and the last year of the forecast period.

The Company prepared the forecast of normal year sendout

on a customer class level.[5] The projected increase or decrease in the number of customers for each class was supplied by the Company's sales and service department. A temperature-versus-sendout curve based on the last historical year was used to derive a base use[6] and heating increment[7] for each class for the first year of the forecast 1979-80. The base use and heating increment were then applied to the projected number od customers and the normal year DD to drive a forecast of normal sendout for each customer class for the first year (i.e., 1979-80) of the forecast period. Normal sendout for the least four (4) years of the forecast period was estimated by adjusting the sendout projected for 1979-80, taking into account the projected increase or decrease in the number of customers.

Design Year Sendout

The Company uses a design year consisting of 6500 DD. This figure is based on the coldest twelve month period in

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5 A forecast of normal requirements is usually prepared on one of two levels; the Customer Class Sendout level, Tables G-1 through G-4 or the Total Company Sendout level, Table G-5. In the former a company calculates the projections for each class and combines them to produce a forecast of total company sendout. In the latter a company calculates the projection for total company sendout and disaggregates it to derive the customer class sendout.

6 Base Use or Load is use which is not temperature or weather sensitive, i.e., that anount of gas use such as cooking which customers use throughout a year separate from space heating or temperature related uses.

7 Heating Increment or Use is use which is temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

the past ten (10) years. The Company did not specify the twelve (12) month or ten (10) year periods it used. The heating increment derived from the historical temperature curve discussed under normal year sendout was multiplied by the number of DD expected in a design year. This product was added to an estimated base use for design year to derive a forecast of design year sendout for the first year (i.e., 1979-80) of the forecast period. The Company did not explain the basis for this estimated base use. Design year forecasts for the last four (4) years of the forecast period were estimated by increasing the design sendout forecasted for 1979-80. The Company also did not explain the bases behind these judgements concerning expected increases in design year sendout.

Peak Day Sendout

The Company did not provide peak day DD in Table G-7. In subsequent communications they stated that a peak day is defined as seventy (70) DD.[8] The basis for this figure was not explained.

The peak day sendout for 1979-80 was forecasted by multiplying the peak day DD by the heating increment derived from the historical temperature curve mentioned under Normal Year Sendout. This product was added to an estimated base

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[8] See Company's letter to Marc Hoffman, EFSC Chief Economist, dated May 1, 1980, in EFSC Docket No. 79-20.

use on a peak day. The Company did not explain the basis for this estimated base use. Peak day sendouts for the next four (4) years of the forecast period were estimated by increasing the peak day sendout forecasted for 1979-80. The basis for these increases in peak day sendout was not provided.

C. The Review Criteria Applied to Fall River's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the following comments is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are reserved for a later Council decision so that both the Council and the Company can focus on the element of reviewability here.

Normal Year, Design Year & Peak Day Sendout

When a company exercises judgement, makes estimates or uses mathematical factors in the development of a forecast these judgements, estimates, and factors must be stated. Also, their bases and the manner by which they are incorporated into the forecast must be explained in order to determine whether the forecast is reviewable as discussed in section II.A. By focusing on the issue of reviewability in this filing the Council will be better prepared to review subsequent forecasts and supplements for appropriateness and reliability.

In the present case the Company did not explain the bases for: the temperature versus sendout curve, the

estimated base use used to forecast design year and peak day, the peak day DD and the factors by which normal year, design year and peak day sendouts were increased to project the last four years of the forecast period. Nor were the factors stated in the forecast.

In order to meet the requirement of reliability in its next filing the Council expects the Company to explain the basis for: its choice of peak day DD, the temperature versus sendout curve (including what data it uses to generate the curve and what data can be reliably generated by the curve), the estimated base use and the method of estimation, and the factors by which the various types of sendout were increased for each of the last four years of the forecast period.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Company has contracts with Algonquin Gas Transmission Company (hereafter AGT) for the supply of natural gas (hereafter NG) under F-1, WS-1, and SNG-1 rates. Pipeline

supplies are based on present contract quantities, as the Company does not expect any of its supply to be curtailed. The Company's contract with Consolidated Gas Company for natural gas storage with "best-efforts" transportation by AGT expired in April, 1980. The renewed contract increases the storage quantity.

Liquefied Natural Gas

The Company has a twenty (20) year contract with Distrigas of Massachusetts expiring in 1991 for an annual supply of approximately 435 MMCF of liquefied natural gas (hereafter LNG). The Company, based on information from Distrigas, does not anticipate that more than 250 MMCF will be available in the 1979-80, 1980-81 and 1981-82 seasons with possibly greater supply available in 1982-84. The Company expects to purchase additional LNG on the open marked. A LNG liquefaction, vaporization and storage facility is operated at Charles Street, Fall Fiver with a storage capacity of 157 MMCF.

Propane

The Company operates a propane/air facility at Charles Street, Fall River, with a storage capacity of 37 MMCF. The DOE/F.E.A. propane allocation for the Company is the eqivalent of 562 MMCF. The Company expects to purchase propane on the open market.

B. Comparison of Resources to Requirements

Normal Year

Table G-22 shows how the Company expects to meet normal year firm sendout requirements. The Company anticipates the share of sendout supplied by AGT to range between 85 and 94% of its firm customer requirements for gas during a non-heating season and between 93 and 94% of its heating season requirements within the forecast period. The share of sendout supplied by Distrigas deliveries and open market purchases of LNG is expected to range between 3 and 11% of the non-heating season requirements and between 4.5 and 5% of the heating season requirements. Propane purchases on the open market are expected to supply between 3.5 and 4.5% of the non-heating season requirements and between 1 and 2% of heating season requirements.

Design Year

In order to meet the additional sendout requirements of a design year, the Company will have to purchase additional propane or LNG on the spot market.

Peak Day

Table G-23 shows that if pipeline sources are available at the maximum daily contract quantities and existing non-pipeline sources are operable at maximum daily capacities, the Company appears to have sufficienty capability and supply to meet the peak day requirements that are forecasted. The

Company would in this case have 47% more supply potentially available than is necessary to meet requirements as forecast for 1979-80. This margin will decline to 37% in 1983-84.

The full capacity of propane and LNG storage facilities provides at the maximum daily vaporization rate, approximately 3 and 8 days worth of storage, respectively.

C. Evaluation of Forecast Resources

The Company appears to have adequate resources and facilities available to meet forecasted sendout requirements during the forecast period, if LNG and propane can be purchased on the open market. Thus, the Company's forecast of supply is based on a combination of purchases in the open market and firm contracts. The Council is aware that it is customary within the gas industry to anticipate purchases on the spot market. However, resources based on spot market purchases are not as reliable as those based on firm commitments. Therefore, one cause of the Council's conditional approval of this forecast is the extent to which the forecast of resources is based on such spot purchases.

The Company should be more detailed in documenting the types of resources and quantities shown to be available on Table G-22 and G-23. The Staff encountered difficulty in this area of review.

IV. Order

The supplement is APPROVED subject to the following conditions:

1) That bases for the temperature versus sendout curve for each class is described and explained in the next filing;

2) That the bases for all estimated sendout factors is explained in the next filing;

3) That method and factors used to project the last four (4) years of the forecast period are documented and explained in the next filing;

4) That the bases for the number of DD in a peak day is explained in the next filing;

5) That quantities of resources shown to be available on Tables G-23 and G-22 be clearly detailed on Tables G-24 and G-14 in the next filing.

6) That the Company explain in its next filing how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG deliveries. Specifically, how would the Company meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

by Robert D. Wilmot (JMS)

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 11 August, 1980.

Joseph S. Fitzpatrick
Chairman

In the Matter of the Fitchburg Gas & Electric Light Company

DECISION and ORDER

Petition of the Fitchburg Gas & Electric Light Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast (Docket #79-11A)

I. Introduction

This decision concerns Fitchburg Gas & Electric Light Company's ("Fitchburg" or "Company") third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The supplement was reviewed by the Council's staff.

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision will discuss Fitchburg's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Company. Therefore, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that the companies may submit more thoroughly documented forecasts in the future.

The Council's approval of the present Fitchburg supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[1] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For a methodology to be capable of duplication it must be thoroughly and clearly described in the forecast documentation.[2] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

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1 Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

2 The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

B. Fitchburg's Methodology

This section will describe the Company's forecast methodology, its assumptions and the historical information which drive it, to the extent documented.[3] Degree days will be discussed first as they are the foundation upon which sendout is forecast. The significant determinants, judgements and projection method used to forecast sendout will then be discussed by type of sendout, i.e., normal year, design year and peak day.

Degree Days

The Company uses 6530 degree days (hereafter DD) for its normal year; 5028 DD during the heating season[4] and 1502 DD during the non-heating season.[5] It uses 7180 DD for its design year[6] on the assumption that a design year is ten percent (10%) colder than a normal year. The Company uses 66 DD for its peak day, a day on which it is assumed, based on historical data, that the lowest average temperature experienced for a 24 hour period will be -1°F.

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3 The company did not provide a forecast of the Commercial and Industrial sendouts. The Company did not provide seasonal data for the separate customer classes, the base use per customer on Table G-1 and did not disaggregate Table G-4. They anticipate being able to provide this information in future supplements. See pages 2, 3 and 4 of the Company's answers to the Staff's questions on the 1979 forecast. The answers are contained in a letter from Michael A. Minkos, Manager - Energy Production, dated May 20, 1980, in Docket #79-11A at the Energy Facilities Siting Council offices. The Staff questions are contained in a letter dated April 25, 1980 in the same docket.

4 The heating season is defined as November 1 through March 31 and the non-heating season is defined as April 1 through October 31.

5 The Company uses 6530 DD to calculate "normal" on page 2 of the letter mentioned in footnote #3. However, on page 2, #1 of the same letter, the Company states that there are 6711 DD in a "normal" year. This is discussed in section II.C.

6 The Company uses 7180 DD to calculate "design" on page 2 of the letter mentioned in footnote #3. However, on Table G-7 of the supplement, the Company lists 7382 DD for a design year. This is discussed in section II.C.

Normal Year Sendout

The Company informed the Council Staff that conservation as a "significant determinant" was accounted for in the following manner.[7] Load growth attributed to new customers for the 1979-80 heating season was approximately 17%. When normalized 1978-79 and 1979-80 sendouts were compared, the data showed Fitchburg's sendout grew approximately 15%; it was therefore inferred that conservation amounted to 2%. Since Fitchburg's growth is controlled by balancing the expected market demand and anticipated gas supply available, the Company increased the subsequent year's net allowable growth by two (2) percent to incorporate the previous year's conservation.

The Company prepared its forecast for normalized sendout in Table G-5 (Total Firm Company Sendout) by first normalizing the last actual sendout data (1978-79). The normalized data was derived using a linear regression analysis to establish the base use and heating increment as a function of monthly sendout and average degree days per month for the latest twelve month period, in 1978-79. The Company assumed that it would experience a ten percent (10%) growth during the 1979-80 heating season. The normalized data for base use and heating increment were increased by ten percent (10%) for 1979-80 sendout. The Company did not state the amount by which base use and heating increment for the normal year sendout for the period 1980-81 through 1983-84 was increased. The projected normal sendout for the first year of the forecast period, 1979-80, was derived by multiplying the heating increment

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7 Significant determinant is defined in section II.A., footnote #2.

by the normal year degree days and adding the base use multiplied by three hundred and sixty-five days (365).

The growth percentages were determined by Fitchburg's expected supply. The Company stated that the most significant limitation on its growth during the next five years will be its gas supply and not the number of new customers available.

The customer class sendouts forecasted on Tables G-1 through G-4 were based on historical data and projected changes through 1984.

Design Year and Peak Day Sendout

The Company forecasts the design year and peak day sendouts in the following manner. The company used the linear regression analysis described above to establish the current base use and the heating increments. The heating increment was then multiplied by the relevant degree days and added to the base use for the relevant period to derive the projected design year and peak day sendout for the first year of the forecast period. The projections for each subsequent year were derived by this method with the base use and heating increment increased due to the growth expected during each year. Therefore, base use and heating increment for peak day sendout were increased by ten percent (10%) for the 1979-80 and 1980-81 periods and six percent (6%) for the 1981-82 period. The base use and heating increment for design year were increased by ten percent (10%) for the 1979-80 period. The company did not state the amount by which base use and heating increment for the peak day were increased for the 1982-83 and 1983-84 periods. The increase in base use and heating increment for the design year for the 1980-81 through 1983-84 period also was not stated.

C. The Review Criteria Applied to Fitchburg's Forecast

This section will apply the review criteria, discussed in section II.A., to the Company's forecast. Degree Days will be discussed first. The review criteria will then be applied to normal year, design year and peak day sendouts.

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecast supplement. The purpose of the comments that follow is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable.

Degree Days

As mentioned in footnote number three, the Company offers two different figures of DD. In order for the supplement to be reviewable, the Council must be informed as to what figures are used in which tables. The Company established the design year DD by assuming that the temperature will be ten percent (10%) colder than normal. However, it is not clear what this judgement is based on. The judgements that influenced the Company's decision to use sixty-six (66) DD for the peak day also were not elaborated. It is unclear whether -1°F is the lowest average temperature "actually" experienced or the lowest average temperature "expected." If it is "expected," then the basis for the assumption should be explained, and if it is "actual" data, then the period from which it is derived should be given. In order to fully satisfy the requirement of reviewability, the Council advises the Company to be consistent in its use of degree days when calculating sendout and to state the judgements and assumptions which influence the forecast of sendout.

Normal Year, Design Year & Peak Day Sendout

The Company should discuss the significant determinants and judgements in the narrative accompanying its filings. The narrative should explain how the significant determinants and any judgements affect and are incorporated into the forecast of number of customers, base use and heating increment. This should include a description of the assumptions upon which judgements concerning growth are based and the rate(s) of growth anticipated during the forecast period.

The Company's approach to assessing the impact of conservation as described on page two of its response to the Council Staff's questions (see footnote number three) does not appear to address long-term planning implications. The Company states that it has experienced conservation and derives it by subtracting the actual load growth experienced in a heating season from the projected load growth for the same heating season. The percentage difference is the amount of gas conserved. This figure is added to the forthcoming year's new load growth, thereby, enabling the Company to accept more new customers. However, it is not clear where conservation is reflected in the current Supplement. Conservation could be evidenced in the forecast of the number of customers and/or the forecast of average use per customer. In its next filing the Company is expected to state specifically where and how the impact of conservation is manifest.

III Forecast Of Resources

A. Supply Contracts and Facilities

This section will describe the supply contracts, facilities and the Company's assumptions as to the availability of resources.

Natural Gas Supply & Facilities

The Company has a contract with the Tennessee Gas Pipeline Company for the purchase of Natural Gas (hereafter NG) during the forecast period. The Company has also contracted with Consolidated Gas and National Fuel Gas for the storage of NG commencing in the 1980-81 and 1982-83 heating seasons, respectively. Transportation for the Consolidated and National contracts will be provided by the Tennessee Gas Pipeline Company. The Company expects to use its entire curtailed purchase entitlement of NG for firm customer needs during the heating season. The Company also anticipates that there will be surplus pipeline NG during the non-heating season. A portion of this surplus NG will be available for off-system sales and the remainder will be injected into storage under the contracts mentioned above for use in the heating season.

In response to the Company's LNG storage limitations discussed below, it is seeking additional firm pipeline supply of 200 MMCF in conjunction with the development of a long-term storage service and transportation contract. No further information was provided on this matter.

Fitchburg Gas and Electric Light Company has formed a wholly-owned subsidiary, Fitchburg Energy Development Company (hereafter FEDCO). FEDCO is presently engaged in the drilling

and exploration for natural gas. Fitchburg expects to receive additional pipeline gas from this project in the last 3 years of the forecast period. Tentative agreements have been reached with East Ohio Gas Company and Tennessee Gas Pipeline Company for transportation.

LNG Supply & Facilities

The Company has a contract with the Bay State Gas Company for the purchase of liquefied natural gas (hereafter LNG) during the forecast period. They also have a tentative agreement with Bay State for the purchase of additional LNG during 1980-81 with the possibility of renewal for 1981-82, 1982-83 and 1983-84. The Company leases facilities in Westminister for the storage and vaporization of LNG. The storage capacity at this site is 4.17 MMCF and the maximum daily vaporization capacity is 7.2 MMCF. The Company is of the opinion that this small storage capacity will preclude it from utilizing more than 400 MMCF annually. The contract and tentative agreement bring the Company's annual LNG purchases to 370 MMCF.

Propane Supply & Facilities

The Company owns a propane/air peak shaving facility in Lunenburg which has a maximum daily sendout capacity of 6 MMCF and a storage capacity of 25.4 MMCF. A contract to purchase the Company's full FEA allocation of propane has been made pending FERC approval.

B. Comparison of Resources & Requirements

This section compares the resources available for the annual/seasonal and peak day sendouts to the requirements for the same periods.

Normal Year Resources & Requirements Compared

Firm customer requirements under normal conditions, as forecast on Table G-5, will be met in all but the last year of the forecast assuming that all the gas anticipated under firm and tentative supply agreements is available. In the last heating season of the forecast period (1983-84) the sum of the resources shown in the record is less than the firm normal requirements forecast.

Design Year Resources & Requirements Compared

The quantity of resources shown as available by the record indicate that the supply for the heating season is insufficient to meet design requirements during the forecast period assuming as Fitchburg does the additional DD occuring under design weather conditions occur during the heating season. The Company was asked to explain how it intended to meet design conditions. The company said that Brooklyn Union Gas Company has agreed, as of March 27, 1980, to provide Fitchburg with 70 MMCF of temporary storage, but that is not a large enough quantity nor is it clear that the storage is available for more than the 1979-80 year. The Company's reply did not allay the Council's concern.

Peak Day Resources & Requirements Compared

Data on peak day sendout and requirements is shown in Table G-23. The Company expects 8 MMCF of pipeline gas, but a letter from the Tennessee Gas Pipeline Co. states that 7.5 MMCF will be delivered on a peak day. This discrepancy was not explained. In addition, the Company has .5 MMCF of gas delivered on a firm basis from consolidated storage by Tennessee, and starting in 1983, an additional .5 MMCF will be delivered

on a best efforts basis from National Fuel Gas by Tennessee. The Company's propane/air peak shaving facility has a maximum daily sendout capacity of 6 MMCF. The Company's LNG facility has a maximum daily sendout capacity of 7.2 MMCF on a peak day.

If the LNG and propane facilities are operable at maximum daily capacities and the pipeline gas is delivered at the stated 8.0 MMCF per day with an additional .5 MMCF of storage gas then Fitchburg appears to have sufficient supply to meet the peak day requirements forecast. The company has twenty-two percent (22%) more supply than is necessary to meet requirements as Forecast for 1979-80. This margin narrows to four percent (4%) by 1983-84.

C. Evaluation of Forecast Resources

The Company depends on its maximum daily contract quantity from Tennessee, maximum daily delivery of firm storage gas, and nearly the maximum daily sendout capacities of its propane/air & LNG facilities to meet peak day requirements. The Council is concerned that the Company may not withstand a disruption of pipeline supply, or a malfunctioning of the propane or LNG facilities and supply. In addition, the limited LNG storage capacity requires that trucks refill the tank at least once during the course of the peak day in order to achieve the maximum daily vaporization.

The supply that the Company expects to receive from the Tennessee Gas Pipeline Company is based on information given them by Tennessee and is, therefore, a reasonable way to forecast pipeline supply. The Company's forecast of supply is also based in part on tentative agreements such as

those with the East Ohio Gas Company and the Tennessee Gas Pipeline Company for transportation and the Bay State Gas Company for LNG. The Council is aware that tentative agreements are customary within the gas industry. However, resources based on tentative agreements are not as reliable as resources based on firm committments. Therefore the Council's approval of this forecast is conditional to the extent that the forecast of resources is based on tentative agreements.

The Council is very concerned that the record does not show adequate resources, even with the addition of the tentative agreements, to meet all normal and design year requirement', specifically the normal requirements for the 1983-84 heating season and the design requirements for every heating season during the forecast period.

IV. Order

The Supplement is APPROVED subject to the following conditions:

1) That the 1980 Supplement contain a forecast of Commercial & Industrial Use for the forecast period.

2) That the 1980 Supplement contain a seasonal breakdown of sendout for all customer classes during the forecast period.

3) That the 1980 Supplement contain the Base Use Per Customer and the Heating Use Per Average Customer Per DD as required in Table G-1 and that the means by which they were derived be described and documented.

4) That Table G-4, Other Sales & Uses, be disaggregated into separate sendout quantities for Interruptible, Sales For Resale and Company Use and Unaccounted for in the 1980 Supplement.

5) That the Company state whether the forecast is prepared on a total company level, Table G-5, and disaggregated into the various customer classes, Tables G-1 through G-4, or prepared separately on a customer class level and added to produce the total Company level.

6) That the Company's description of its forecast methodology state the expected growth percentages used in the forecast and describe how these percentages were affected by the significant determinants (see Rules 66.5 and 69.2) in the 1980 filing.

7) That the 1980 filing contain a complete description of the method used to derive customer class sendout.

8) That the Company explicitly state its expectations for conservation and show how average use per customer and the number of customers is impacted.

9) That the Council's approval of this forecast is conditional to the extent that the forecast of resources is based on tentative agreements.

10) That the Company explain how it will meet the normal year heating season requirements and the design year heating season requirements for 1980-81, 1981-82 and 1983-84.

11) That the Company explain how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG. Specifically, how would the compnay meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

By Robert D. Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 21 July, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Haverhill Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-15

DECISION and ORDER

I. Introduction

This decision concerns the Haverhill Gas Company's (hereafter Haverhill or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the Staff to document the Company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of the tentative decision and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

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[1] The EFSC Staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 12, 1980. The Company responded to subsequent oral questions in a letter dated June 6, 1980. See Docket #79-15.

This decision includes a discussion of Haverhill's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council's APPROVAL of the present Haverhill supplement is subject to the conditions stated in the Order set out in Section IV, below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Haverhill's Methodology

Normal Year

A "normal year" is defined as a year that is not warmer or colder than average. The Company used a normal year consisting

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

of 6944 effective[4] degree days (hereafter EDD) based on a sixteen (16) year average. The Company did not discuss any "significant determinants"[5] in this supplement.

The Company disaggregates a forecast of total Company sendout into a forecast of each customer class by using customer class percentages derived from a sales forecast. First the Company's total sendout requirements were forecast on a monthly basis by applying total Company projected sendout base use[6] per day and heating increment[7] per DD to effective calendar DD. Then the Company applied customer class sales percentages to these firm monthly sendout requirements in order to disaggregate the monthly forecast of total Company sendout into a monthly forecast of customer class sendout. These customer class percentages were derived from a forecast of monthly customer class sales. Then monthly data was summed to produce the appropriate seasonal sendout forecast. It was not clear whether the "unaccounted

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4 The word "effective" as used here indicates that the wind chill factor is accounted for in the DD figure.

5 See footnote #3 for a brief illustration of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2

6 Base Use or Load is a figure representing non-temperature or non-weather sensitive uses for which a company or department will supply gas to a customer throughout the year, i.e., gas used for cooking as opposed to space heating and temperature related uses.

7 Heating Use or Increment is a figure representing those uses which are temperature or weather sensitive, i.e., that amount of gas used for space heating and other temperature sensitive uses.

for" gas figure was adjusted before or after the sales-based class percentages were applied.

Design Year

A "design year" is defined as the coldest year for which a Company plans to meet its firm customer requirements. The Company used a design year consisting of 7362 EDD, based on April 1967 through March 1968 data, which is the coldest year experienced in the last 19 years. The Company made a judgement to reduce by 200 EDD the actual EDD for the September - March heating season when deciding what EDD to use for the design year heating season. This was done since the coldest year occurred 12 years ago and the Company believes that there has been an overall trend towards warmer years since then. The Company derived the forecast of design year sendout in the following manner. A projected total Company annual base use was subtracted from the forecasted total normal year sendout for the two hundred and twelve (212) day heating period (September 1 - March 31). The remaining heating use was increased by 3.3%, recombined with base use and then added to the normalized non-heating season sendout to arrive at the design forecast of sendout. The Company did not increase the non-heating season sendout because it did not feel it would be a significant increase. The 3.3% factor was used because the number of EDD expected in a design heating season is 3.3% greater than the EDD expected in a normal heating season. The Company provided the projected base use factors it used for each year of the forecast period.

Peak Day

A "peak day" is the coldest day that is likely to occur during a twelve month period. The Company used a peak day consisting of sixty-eight (68) EDD. This is a change from the previous year's peak day of seventy-two (72) EDD. The prevoius year's EDD was based on the actual peak day occurence of January 8, 1968. The Company states that the revised peak day figure is based on more recent historical experience.

To calculate the peak day load, a projected heat factor for each year was multiplied by the peak day EDD. This product was added to a projected base use per day to arrive at the peak day load. The projected heat factors and base use factors used for each year of the forecast were given.

C. The Review Criteria Applied to Haverhill's Forecast:

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to aid the Company in its continuing efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are reserved for a later Council decision so that both the Council and the Company can focus on the element of reviewability at this time.

Normal Year

As discussed in the section on methodology, the Company disaggregates a normal forecast of total Company sendout into a normal forecast of each customer class by using customer class percentages derived from a forecast of customer class sales. The forecast was developed in this manner because the Company felt that it was necessary to differentiate between sendout and sales data. This judgement was based on the belief that sendout could not be accurately forecast at the customer class level as it contains unaccounted-for losses and is based on a different time frame and DD effect than that of the class sales records. Thus the sales-based forecast disaggregation developed by the Company is adjusted for unaccounted-for gas, monthly changes in customer numbers and differences between billing period DD and calendar period DD. The Council is impressed by the Company's refinement of the forecast of sendout which accounts for the difference between sendout and sales.

A suggested improvement for the reviewability of this methodology is for the Company to discuss the impact of significant determinants on the forecast, state the period upon which normal year DD are based, state the projections of base use and heating increment used in the normal year forecast, explain the bases for these projections and state whether "unaccounted for" is adjusted before or after the sales-based class percentages are applied.

Design Year and Peak Day

The Company explained the projected base use and heating factors used in the forecast of design year and peak day sendout. The Company also provided a clear explanation of the method by which these sendouts were forecast. This certainly contributes to a reviewable forecast. However, there are some areas where documentation and explanation can be improved.

With respect to further documentation, the Council requests that the Company explain the method by which it derived the projected factors used to forecast design year and peak day sendout.

The Company should also document and explain its judgements pertaining to the increase in DD from the normal to the design year in both the non-heating and heating seasons. The Company indicates in Table G-7 that it expects the number of DD in a design year non-heating season to increase by twenty-four (24) percent over a normal year non-heating season and the number of DD in a design year heating season to increase by 3.3% over a normal year heating season. In spite of the larger increase in non-heating season design year DD, the Company assumes that additional requirements only occur in the heating season of a design year, stating that the additional load due to a design year non-heating season would be an insignificant contribution. The Council is concerned that the design year non-heating season as forecast by the Company is not an insignificant contribution to sendout and that the number

of DD in the design year heating season is too low. These judgements affect the reliability of the design year forecast of sendout as well as the forecast of resources needed to supply design year requirements. The Council asks that the Company re-evaluate the judgements for design year degree days upon which its forecast of design year is based and clearly explain such judgements as are used therein.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Company is a customer of the Tennessee Gas Transmission Company and plans to receive 100% of the total curtailed amount from Tennessee on an annual basis with the exception of an estimated twenty (20) MMCF left unused during the winter season.

The Company has one storage contract with Consolidated Fuel. Additional storage under a contract with National Gas Fuel Storage will be available starting in 1981-82. Both contracts will run through the forecast period. Tennessee will transport the gas under both contracts.

Liquified Natural Gas

The Company purchases liquified natural gas (hereafter LNG) from Distrigas of Massachusetts under a contract which runs until 1998. The Company expects less than the contract quantities to be delivered, based on the past experience with deliveries from Algeria. The Company has a contract for the purchase of LNG from Bay State Gas Company which runs through 1988. The Company also has a contract with Boston Gas for the purchase of LNG terminating on September 1, 1981. However, this contract may be extended from year to year by mutual consent after 1981. Both the Bay State and Boston Gas contracts provide for firm and optional amounts. The purchase of the optional amounts is determined by Haverhill based on its need.

The Company owns LNG storage (400 MMCF) and vaporization facilities (24 MMCF/day) in Haverhill.

Propane

The Company expects to send out only a small amount of propane in the heating season. The Company has no contracts for the purchase of propane, but makes spot purchases when necessary. It owns propane storage (43.9 MMCF) and vaporization 8 MMCF/day) facilities in Haverhill.

B. Comparison of Resources to Requirements

Normal Year

The Company expects to meet total sendout requirements during the forecast period under normal weather conditions

in the following manner (See Table G-22[8]). Pipeline gas from Tennessee is expected to provide in the range of 96 to 97% of the non-heating season load and 90 to 92% of the heating season load. LNG provides between 3 and 4% of the non-heating season load and between 7 and 9% of the heating season load. Propane is expected to be used for less than 1% of the heating season sendout.

Design Year

The record indicates that the Company should have sufficient supply to meet the additional requirements expected to occur in a design year by utilizing gas, LNG and propane in storage. (See Table G-22.)

Peak Day

The record also indicates that Haverhill should have adequate resources to meet forecasted Peak Day sendout requirements during the forecast period. (See Table G-23.) If the maximum daily quantity of pipeline gas and firm storage gas is available and the propane air and LNG facilities are operable at maximum daily capacity, the Company potentially has 67% more supply available than is necessary to meet the peak day load in 1979-80. This margin declines to 49% in 1983-84.

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8 In Table G-22, the column labelled "Used in Sendout" is meant to reflect resources used for firm Company sendout which does not include interruptible sendout. The company included interruptible sendout in the G-22 tables which changes the tables to reflect resources used for more than firm company sendout.

C. Evaluation of Forecast Resources

As discussed in footnote #8, the Company included interruptible sales in Table G-22. For the appropriate reporting of interruptible sales, the Council refers the Company to Administrative Bulletin 80-2.

The reviewability of its resource forecasts would be improved if the Company submitted better documentation of resources which it expects to be available. The Council again refers the Company to Administrative Bulletin 80-2.

IV. Order

The Council APPROVES the Haverhill Gas Company's Supplement subject to the following conditions to be implemented and incorporated in the next filing:

1) That the Company discuss the impacts of significant determinants (specifically conservation), in the forecast; state the period upon which normal year DD are based; state the projections of base use and heating increment used in the normal year forecast and explain the bases for these projections; state whether sendout is adjusted for "unaccounted for" gas before or after the sales-based class percentages are applied in the forecast of normal year sendout;

2. That the Company explain the method by which it derived the projected base use and heating use factors used to forecast design year and peak day sendout.

3. That the Company re-evaluate the judgements, concerning choice of degree days, upon which its forecast of design year is based, discuss the basis for the assumption that the additional load occurring in the design year non-heating season is insignificant and explain the basis for its assumption that design year heating season DD will only increase 3.3% over normal year heating season DD.

4. That the Company explain how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG deliveries to its supplier, Distrigas of Massachusetts. Specifically, please detail how the Company would meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

by Robert D. Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 9 September, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Holyoke Gas and Electric Department for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC Docket No. 79-23

DECISION and ORDER

I. Introduction

This decision concerns Holyoke Gas and Electric Department's (hereafter Holyoke or Department) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, Sec. 69I and Chapter G of the EFSC Regulations. The Council's staff has reviewed the docket which consists of the supplement and further information requested by the staff to document the company's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Department or an interested party as no new facilities within Council jurisdiction were proposed. The Department was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to pose said notice in the Town Hall.

This decision will include a discussion of Holyoke's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Department. Therefore, the Council has paid particular attention to the docu-

[1] The EFSC staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 9, 1980. See EFSC Docket No. 79-23.

mentation in each forecast and will be comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council's approval of Holyoke's present supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Department's forecast methodology (subsection B); and the application of the review criteria to the Department's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Holyoke's Methodology

Normal Year Sendout

The Department uses 6500 degree days (hereafter DD) for its normal year. This figure is selected from a range of annual DD which occurred most frequently during the last thirty (30) years.

The Department did not disucss significant determinants[4] of the forecast except for supply availability and resultant marketing assumptions. A sales campaign was initiated in 1979 when the Department found itself in a strong gas supply situation.

The forecast of firm sendout is done for each non-heating and heating season in the forecast period at the total Department sendout level. The actual 1979 historical seasonal sendout is the basis for the 1980-1984 forecasts.

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5 (b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

[4] See footnote #2 for a brief illustration of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2.

Each seasonal forecast is derived by increasing the non heating season sendout by an average of 2% and the heating season sendout by an average of 3%. (Table G-5). This forecast of total Department sendout was then disaggregated into the various cusotmer classes[5] on the basis of the percentage of total Department sendout that each customer class represented in 1975 and some annual variations in seasonal loads, which was not explained.

The total annual Department sendout was normalized from the forecasted seasonal totals in the following way. First, the heating season sendout was divided by the total number of DD for the year. These DD and their basis were neither stated nor explained. Then, the resultant MCF per DD was multiplied by the 6500 DD assumed for a normal year. This product was added to the non-heating season forecast to obtain the annual normalized total Department sendout.

Design Year Sendout

The Department uses a design year consisting of 6900 DD. This is based on the greatest annual accumulation of DD during the last thirty (30) years. The Department assumes that the additional DD that occur in a design year will occur in the heating season. This assumption is based on past experience and the fact that the conservative design requires one to use the "worst case" scenario.

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[5] The Department does not differentiate between non-heating and heating customers due to the structure of the rate schedule. The Department is installing a computerized billing system which it plans to have in oepration by 1981. Presently there are no plans to use this system to differentiate between heating and non-heating customers. However, the Department states they will look into the feasibility of doing this with the computer system.

To calculate the forecasted design year sendout shown on Table G-5, the Department first used the MCF per DD figure for the heating season (mentioned above) and multiplied it by the design year DD of 6900. This design heating season component was then added to the forecasted non-heating season sendout.

Peak Day Sendout

The Department uses a peak day consisting of 65 DD. This figure is defined as the coldest 24 hour period in the last 20 years.

The peak day forecast was obtained by multiplying a projected daily MCF per DD figure by 65 DD and adding this heating component to the base load. The projected daily MCF per DD and the base use factors used in each of the years of the forecast period were not stated.

C. The Review Criteria Applied to Holyoke's Forecast

The Council realizes that the Department endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to aid the Department in its efforts to submit a forecast that is reviewable and reliable. The issue of appropriateness will be addressed in a later Council decision.

The Council review criteria of reviewability and reliability are at issue in the present case. The Department's forecast of normal requirements was not derived from reliable normalization methods. Instead it appears as though the Department forecast "actual" sendout as opposed to "normal" sendout. This adversely affected the Department's calculations with

respect to the normalized data required in Tables G-1 through G-3 and G-22, i.e., the customer class forecast data on Tables G-1 through G-3 was not normalized nor was the seasonal data on Table G-22. If a normal year forecast is not based on reliable normalization methods, it is prima facie an unreliable forecast of normal year sendout. Nor does the normal forecast meet the criteria of reviewability as certain judgements were either unstated, unexplained or both. For instance, the bases for judgements concerning percentage increase in sendout were not explained. The Department also did not explain its reason for disaggregating the total department sendout into the customer classes based on the percentage of total department sendout that each customer class represented in 1975. Finally, some DD used in the calculations were neither stated nor explained. Since the attempt to forecast "actual" sendout may be the result of confusion of the Council's requirements, the Department is advised that the Council does not require forecasts of "actual" sendout. The Council suggests that an approach to normalization, whereby the Department normalizes the last actual historical data before developing the forecast, can obviate many of the problems with normalization found in this filing. The issue of reliability also arises with respect to the Department's forecast of design year sendout. Design year sendout is by definition the sendout which a department anticipates sending out in the coldest year expected. In the present case the forecast of "actual" sendout developed by the Department is greater than the forecast of design year sendout. It is prima facie unreliable for forecasted design year requirements to

be exceeded by a forecast of any other sendout.

Lastly the heating increments and base use factors used to forecast peak day sendout should be stated and their bases explained.

III. Forecast of Resources

This section includes a description of the Department's supply contracts and facilities (subsection A); a comparison of the resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Department's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Department purchases natural gas (hereafter NG) from the Tennessee Gas Pipeline Company (hereafter TGP). After reviewing current gas supply information, conservation programs, the loss of industrial accounts by TGP and TGP's new sources of supply, the Department decided that there were sufficient bases for the assumption that TGP would deliver 100% of contract volumes to the Department.

Liquified Natural Gas

The Department purchases liquified natural gas (hereafter LNG) from the Bay State Gas Company under a 10 year contract exceeding the forecast period. Some of this LNG is delivered in the vaporized state and some in the liquid state.

The Department has four 55,000 gallon LNG tanks at Mueller Road, with a total storage space of 18.2 MMCF. A

fifth 55,000 gallon tank is planned.[6] The fifth tank was scheduled to be in-service as of December 1, 1979. The Company states that this tank may not be installed in the near future due to financial reasons. The maximum daily vaporization capacity of this location is 12.5 MMCF/day.

Propane

Three 67,000 gallon propane tanks are also at Mueller Road, with a total storage space of 18.4 MMCF. The maximum daily vaporization at this location is 4.8 MMCF/day.

B. Comparison of Resources to Requirements

Normal Year

Table G-22 illustrates how the Department expects to meet its forecasted firm requirements during the forecast period. The forecast of requirements used by the Department for this table is the "actual" rather than a normalized forecast as discussed in the previous critiques(Section II. C.) Approximately 98% of the non-heating season load is to be met with pipeline gas from TGP and the remainder by LNG sent out by the Department's vaporization facilities. Approximately 84-86% of the heating season load is expected to be met with pipeline gas from TGP, about 3% LNG vaporized by Bay State Gas Company, about 3% LNG vaporized by the Department and about 12-13% by LNG purchased from and vaporized by Bay State Gas Co.

The Department is not expecting to take all the pipeline gas available to it. Most new load additions during

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[6] In its review of Holyoke's first forecast the Council found this storage tank to be exempt from Council jurisdiction. See EFSC Docket No. 76-23 or 1 DOMSC 79 (January 19, 1977).

the forecast period will be handled by taking more of this available pipeline gas. In the 1979-80 split-year, 774 and 143 MMCF of available pipeline gas is not taken in the NHS and HS, respectively. By the 1983-84 split-year, the Company expects to take a larger portion of the available pipeline gas in each season. In addition, the Department is looking into other ways of utilizing this gas, such as storage and liquefaction by other companies.

Design Year

As previously discussed in the critique of the Department's methodology, the Department has prepared a forecast where design sendout requirements are shown as less than the "actual" sendout requirements. Due to this confusion the Council cannot compare with any confidence, design requirements and resources.

Peak Day

The Department indicates on Table G-23 that peak day requirements are expected to be met by a combination of pipeline gas from Tennessee, propane and LNG vaporized by the Department's facilities and purchased LNG vaporized by Bay State.

If the maximum daily quantity of pipeline gas is available and the non-pipeline facilities are operable at maximum daily capacities, the Department would have a potentially available supply of 116% more than is required to meet a peak day load in 1979-80. This margin declines to 101% in 1983-84.

If the pipeline gas supply were unavailable on a peak day, the entire peak day load could be met by the Depart-

ment's facilities for 1 day. The Department's propane and LNG storage capacities are 3 and 1-1/2 times greater than the maximum daily vaporization capacities of the respective facilities. The Department has approximately 5 MMCF, or one day's maximum propane vaporization capacity, in storage.

C. Evaluation of Forecast Resources

The Department appears to have adequate resources to meet the sendout forecast for peak day. However, the Council is unable to evaluate the sufficiency of the Company's resources for annual and seasonal requirements for normal and design years because the Department's forecast of these requirements is not clear. Therefore, one reason for the Council's conditional approval of this forecast is the lack of clarity surrounding the Department's forecast of normal and design requirements and the concomitant effect on a evaluation of the adequacy of the resources available to meet requirements.

IV. Order

The Supplement is APPROVED subject to the following conditions:

1) That the Department prepare its next forecast of seasonal and annual normal and design requirements from normalized data.

2) That the Department explain its normalization technique in the next filing.

3) That all heating increment and base use factors used in the forecast of normal year, design year, and peak day sendout requirements are stated and their bases

explained in the next filing.

4) That the Department discuss how the significant determinants effected the forecast, especially conservation, in the next filing.

5) That the Department explain in its next filing what effect an immediate cessation of Algerian LNG deliveries will have on its LNG contract with the Bay State Gas Company. Specifically, how does the Department plan to meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

by: Robert D. Wilmot (BMS)

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meetin of 11 August, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the Lowell Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-16

FINAL DECISION

I. Introduction

This decision concerns the Lowell Gas Company's (hereafter Lowell or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EPSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the Staff to document the Company's forecasting methodology.[1] It was suggested that no hearing be held unless so requested by the Company or an interested party as no new facilities need to be adjudicated.

The Company has been advised that no hearing will be held on the Supplement unless one is requested by the Company or an interested party. It has been asked to publish notice of the tentative APPROVAL and of the right to a public hearing in the Lowell Sun and the Billerica Minuteman, and to post said notice in the service area's City and Town Halls.

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[1] The EFSC Staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 20, 1980. See Docket #79-16.

The proposed LNG Satellite facility (Table G-17) to be located in Lowell was withdrawn by the Company from adjudication by a letter dated August 8, 1980. This facility was the subject of a request for advisory rulings and of a report to the Council by a consultant, Paul Johnson, Inc. Another LNG Satellite facility proposed to be located in Pepperell does not show an in-service date, has not been described in the supplement, and apparently has not been designed by the Company. Accordingly, the Council assumes that the Company does not wish to have it adjudicated this year, and has not done so.

This decision includes a discussion of Lowell's forecast methodology, conservation, sendout requirements, and adequacy of resources. The Council's approval of the present Lowell Supplement is subject to the conditions stated in the Order set out in Section IV, below.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria and documentation requirements stated in the Council's regulations and Administrative Bulletins 76-1, 79-1 and 79-2. The most important of the Council's review criteria is listed in Rule 62.9(2), which states that forecasts of

sendout must be based upon historically accurate information and reasonable statistical projection methods.[2] Forecast documentation must include a description of any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation - see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast, and the statistical projection method used. The requirements of EFSC Rules 62.9(1) and (3)-(5), and EFSC Rules 66 - 69 must also be met.

B. Lowell's Methodology

Normal Year Sendout

Lowell defines its normal year as one containing 6140 degree days, based on an average of 20 years' degree day data. It does not specify whether the last 20 years were used. Lowell states in the forecast that it has

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2 A statistical projection method will be found reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation. A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

considered price of energy, shortage of oil, deregulation and growth of housing and business in the service area - all "significant determinants" to be considered in developing the forecast. See EFSC Rule 66.5(b).

The Company states that the effects of conservation have been reflected in the forecast's estimated annual use per customer for new residential business. The Company has not indicated whether conservation was considered in annual use per customer projections in the industrial, commercial and existing residential classes.

The Company prepares the forecast of firm sendout separately for each customer class level and then totals them to derive a total Company forecast. Monthly for each class, the Company determines the use per customer, number of customers, a year-to-date average number of customers and use per customer; as well as a most recent twelve month's analysis of the number of customers and use per customer. The Company normalizes the most recent actual year's sales for each class. An example of this process is provided in the next paragraph.

For gas heating customers, the Summer load is used to determine the base load[3] per customer and the remainder of the load is assumed to be heating.[4] By dividing the heating load by the number of actual degree days that occurred in the previous year, Lowell determines the Heating Use Per Average Customer Per Degree Day for the most recent historical year. For this Supplement, since the number of degree days that occurred in the last actual split-year 1978-79 was only .2% different than a normal year, the Company used the actual sales (rather than normalized[5] actual sales) of 1978-79 as the starting point for the 1979-80 through 1983-84 forecast period.

Using this last actual split-year data (1978-79) as the starting point, the Company then derives the forecast by projecting the number of customers expected to be added or subtracted in each customer class, and then multiplying this number by the projected annual use per customer. For instance, the Company estimated that 1200 central heating residential customers would be added in 1979-80, 1000 in 1980-81, 600 per year during 1981-82, 1982-83 and 1983-84 with an average annual use per new customer of 160 MCF.

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[3] Base Use or Load is use which is not temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

[4] Heating Increment or Use is use which is temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

[5] Normalized annual heating use per customer is derived by multiplying heating load dividend by number of actual degree days in the previous year times degree days in a normal year. This is then added to the base load to determine annual sendout on a normalized basis.

Projected annual customer use factors for other customer classes were not given.

Design Year Sendout

The Company defines its design year as one containing 6808 degree days based on historial data for 1962-63 - the coldest year in the past 20.

The design year requirements are based on the difference of 668 degree days between a normal and a design year. The additional heating requirements occurring during a Design Year are equal to 668 degree days multiplied by the heating component per degree day for the year under normal weather conditions. The heating component is the difference between the total Company firm load for the year and an estimated total Company base load for the year.

Peak Day Sendout

The Company plans for a peak day of 65 degree days based on the fact that for the past 20 years, the coldest day experienced was one of 64 degree days.

The peak day load is composed of an estimated base load added to an estimated heating component per degree day multiplied by the number of degree days expected on a peak day.

C. The Review Criteria Applied to Lowell's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and relations pertaining to forecasting. The purpose of the comments that follow is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast are reserved for a later Coucil decision so that both the Coucil and the Company can focus on the element or reviewability in this time. (See fn. 2 above.)

When a company exercises judgement, makes estimates or uses mathematical factors in the development of a forecast, these judgements, estimates and factors must be stated. Also, the bases and the manner in which each is incorporated into the forecast must be explained in order to determine whether the forecast is reviewable. Lowell Gas is asked to provide more explanation of its forecast elements in its next filing as discussed below.

In this forecast the Company assumes some conservation by new residential central heating customers. It assumes no customer conservation by existing residential heating customers, despite a recommendation in the Memorandum and Order on its 1978 Supplement, (EFSC No. 78-16) that it do so. Potential additional conservation from these existing customers should be considered and documented in the next forecast.

Since the Company apparently forecasts annual sendout for each class by estimating an annual use per customer, the Company should also document all projected annual use per customer factors used to prepare the forecast for each customer class during the 5 year forecast period.

The manner by which the Heating Use Per Average Customer Per Degree Day, and the Base Use Per Customer shown for the forecast years on Table G-1 were derived should be explained.

The Company did explain how design year and peak day loads are calculated. However, the Company should also provide all estimated total Company base loads, and heating components per degree day used for the 5 year forecast period.

In addition, the Company should explain why in the present forecast the heating component per degree day used for peak day load calculation is apprently 18 - 20% greater than the design year load calculation.

Attention to further detail and explanation of the above points will serve to make the Company's future filings much more reviewable.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Company is a pipeline customer of Tennessee Gas Transmission Company (Tennessee) and has a contract for supply terminating in 1988. Lowell also has an annual storage contract with National Fuel, under which pipeline gas injected into underground storage in the non-heating season can be withdrawn during the heating season. Delivery of this stored gas is provided through an annual contract Lowell holds with Tennessee, under which Tennessee provides transportation on a best-efforts basis. The Company is seeking approval from FERC for a long-term storage and transportation contract.

The Company anticipates the need to purchase an outside source of natural gas in the year 1981-82 to fill its storage. It feels these additional volumes will be available based on gas supply conditions at the present time and the change in attitude towards the use of gas as a source of energy. If the volumes are not available, Lowell has the option of reducing non-firm sales in order to have enough gas for injection into storage.

Liquified Natural Gas

The Company does not have firm contracts for supply of LNG for the entire forecast period. The Company expects quantities of purchased LNG to be available to them during the forecast period, escalating from 900 MMCF in 1979-80 to 1550 MMCF in 1983-84.

The Company negotiates a contract each year for its LNG supply for the following year. Lowell is currently receiving its LNG supply for the 1980-81 heating season. No contracts have been signed, but Lowell is still discussing a longer term contract with at least two possible suppliers.

Lowell Gas has an Operating and a Processing agreement with Aerojet General Corporation for LNG storage, vaporization and liquefaction facilities in Tewksbury. In addition, Lowell owns LNG storage and vaporization facilities in Westford and Wilmington. In total the Company has about 1100 MMCF of storage and 74.2 MMCF of daily vaporization.

Propane

Lowell operates three propane/air facilities, located in Lowell, Tewksbury, and Pepperell, with combined maximum daily vaporization of 30 MMCF. It has propane storage capacity of approximately 193 MMCF. Lowell does not hold contracts for supply of propane. But it states that it has several propane suppliers, including one Canadian source, and that it expects no difficulty in obtaining additional volumes of propane if needed. Lowell believes that its DOE allocation of 1284 MMCF is a good indicator of the upper limit of propane it could receive annually.

B. Comparison of Resources to Requirements

Normal Year

Table G-22 indicates how the Company plans to meet total[6] sendout requirements during the forecast period. Approximately 91-96% of the total Company sendout requirements in the non-heating season under normal weather conditions is provided by Tennessee, 1% by propane/air vaporization, and 3-8 by LNG vaporixation. Approximately 65-71% of the heating season total sendout is provided by Tennessee, with an additional 17-20% from underground storage facilities, 2% by propane/air vaporization, and 10-13% by LNG vaporization. Though the Company has a liquefaction facility, the Company does not show gas as being liquefied in the years 1980-81 through 1983-84.

Design Year

The Company shows in Table G-22 that stored gas, LNG and propane could be utilized to meet design year conditions in each of the forecast years.

Peak Day

In Table G-23 the Company shows resources available to meet a peak day load. If pipeline gas is available at maximum daily quantity, and propane/air and LNG facilities

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6 The Company included interruptible sendout on this Table's "Used in Sendout" column. In the future, interruptibles should not included in this column, which concerns only firm sendout.

are operable at maximum daily capacity the Company will have a potentially available supply of 57% more than is needed to meet the forecasted peak day load in 1979-80. This margin drops to 36% in 1983-84.

C. Evaluation of Forecast Resources

It is noted that the Company depends on presently uncontracted-for supplies of gas, LNG and propane to meet its normal year requirements. The Council is aware that a portion of the supply necessary to meet requirements may not be under contract at the time of a forecast's filing. It is also aware that it is customary for gas companies to anticipate purchases on the spot market. However, forecasts of resources based in part on uncontracted-for resources or spot market purchases are not as reliable as forcasts based on firm committments. Long term supply agreements are encouraged for a reliable firm supply. See Condition 8 in Section IV.

The Company contributed to the reviewability of its supply situation by including explanatory notes and is urged to continue this practice. Also the Company is asked to put all gas data (natural gas, propane, LNG) on Tables G-1 - G - 6, G - 14, G - 22, G -23, G - 24 in units of MMCF at 1000 BTU per cubic foot at 14.73 per day to provide consistency and better reviewability.

IV. Order

The Council APPROVES Lowell's Supplement subject to the following conditions:

1) That potential additional conservation from existing residential customers be considered in the future Forecasts and Supplements.

2) That conservation projections for both new and existing residential customers be documented in future Forecasts and Supplements.

3) That the Company explain any judgements made concerning conservation, the basis for said judgements and the manner by which such judgements are incorporated into the forecast in the next filing.

4) That all projected annual use per customer factors used to prepare the forecast for normal sendout be documented in the next Forecast or Supplement.

5) That the manner by which the Heating Use Per Average Customer Per Degree Day, and the Base Use Per Customer (Table G-1) for the forecast years were derived be explained in the next Forecast or Supplement.

6) That all estimated total Company base loads and heating components per degree day used to calculate design year and peak day sendout for each of the 5 forecast years be stated and the basis for them given in the next filing.

7) That the Company in its next filing, if it uses the same methodology as it did in this year's filing, explain why the hearing component per degree day used to calculate the peak day load is 18-20% greater than that used for the design year load.

8) That the Company, in its next filing, report on its efforts to secure long-term committments for delivery of storage gas and on its evaluation of the reliability of obtaining sufficient propane on the spot market.

9) That the Company explain in its next filing how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG deliveries. Specifically, the Company should explain how it would meet each year's projected requirements under this circumstance.

Energy Facilities Siting Council

by Robert T. Smart Jr.

Robert T. Smart Jr., Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 9 September, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the New Bedford Gas and Edison Light Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC Docket No. 79-7

DECISION and ORDER

I. Introduction

This decision concerns New Bedford Gas and Edison Light Company's (hereafter New Bedford or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's staff has reviewed the docket which consists of the supplement and further information requested by the staff to document the Company's forecasting methodclogy.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative APPROVAL and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision includes a discussion of New Bedford's forecast methodology, snedout requirements, adequacy of sendout

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[1] The EFSC staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated May 14, 1980. See EFSC Docket No. 79-7.

resources and conservation. In its review of this and other gas forecasts, the Council is aware that the newness of the revised reporting forms may have caused some confusion for the Company. Therefore, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that the companies may submit more thoroughly documented forecasts in the future.

The Council's approval of the present New Bedford supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated, it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. New Bedford's Methodology

Normal Year Sendout

The Company uses a normal year consisting of 5351 degree days (hereafter DD). This figure is an average of the historical DD data accumulated during the last twenty-five (25) years.

The Company discussed the folliwng significant determinants[4] in its forecast: supply, government conservation programs, efficiency of appliances, price levels, behavior patterns and alternative technologies. The prime determinant of the forecast

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

[4] See footnote #3 for identification of significant determinants. For a more detailed explanation see EFSC Regulations Rules 66.5 and 69.2.

of sendout is the availabilty of gas from the Company's pipeline supplier. The Company assumes that the full volumetric contract quantities will be available and fully utilized. The Company estimates that federal and state conservation programs, improvements in the efficiency of appliances, price levels and behavior patterns will result in a one percent (1%) reduction in consumption by then existing customers for each year of the forecast period. The Company does not expect alternative energy technologies to have an appreciable impact during the forecast period.

The Company forecasts firm sendout on a customer class level.[5] First, annual base use [6] for each class in the last actual year, 1979, was derived from actual August and September sales. The annual base use was then subtracted from the actual annual sales to determine the annual heating use[7] for each class during the last acutal year. The annual heating use was normalized[8] and combined with the base use to produce a normalized actual year.

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[5] A forecast of normal requirements is usually prepared on one of two levels: the Customer Class Sendout level, Tables G-1 through G-4 or the Total Company Sendout level, Table G-5. In the former a company calculates the projections for each class and combines them to produce a forecast of total company sendout. In the latter a company calculates the projection for total company sendout and disaggregates it to derive the customer class sendout.

[6] Base Use or Load is use which is not temperature or weather sensitive, i.e., that amount of gas use such as cooking which customers would use throughout a year separate from space heating and temperature related uses.

[7] Heating increment of Use is use which is temperature or weather sensitive, i.e., that amount of gas which customers use for space heating and temperature related uses.

[8] While other normalization procedures were described, this one was not described.

The normalized data was split ~~into the~~ non-heating and heating seasons (hearafter NHS and HS, respectively). The method by which this was accomplished was not explained.

The Company then prepared its projections for the five year forecast period on the basis of this historical seasonal normalized data modified by the Marketing Department's forecasts of additional sales. The Company did not explain the bases for its judgements concerning forecasts of additional sales, heating use and base use nor did it explain the manner by which they were incorporated into the forecast.

The forecast for Company Use & Losses shows the difference between gas billed and gas sent out. The Company was asked to explain the derivation of this forecast, but only gave a description of what the Company Use & Losses included.

Design Year Sendout

The Company uses a design year consisting of 6084 DD and defines it as the coldest year experienced during the past twenty-five (25) years.

The design year sendout forecast was based on the additional effective[9] DD over normal expected in a design year. The additional DD were multiplied by an estimated heating increment for each year of the forecast period. The product was then added to the normal sendout forecast to produce the projections for design year sendout.

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[9] The word "effective" as used here indicates that the wind chill factor is accounted for in the DD figure. However, it is not clear that "effective was used for both normal and design year calculations.

The heating increments used in these calculations and manner by which they were estimated were not stated in the filing.

Peak Day Sendout

The Company uses a peak day consisting of sixty-three (63) DD. This is defined as the coldest day experienced during the past twenty-five (25) years.

The peak day sendout forecast was based on the number of DD expected on a peak day multiplied by the estimated heating increment for each year of the forecast period. This product was added to the estimated base use per day. The estimated factors used in these calculations were not stated or explained.

C. The Review Criteria Applied to New Bedford's Forecast

The Council realizes that the Company endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to aid the Company in its efforts to submit a forecast that is sufficiently documented and reviewable. Comments concerning the appropriateness and reliability of the forecast will be reserved for later Council decisions so that both The Council and the Company can focus now on the element of reviewability.

Normal Year, Design Year and Peak Day Sendout

When a company exercises judgement, makes estimates or uses mathematical factors in the development of a forecast these judgements, estimates and factors must be stated in

the filing. Also their bases and the manners by which they are incorporated into the forecast must be explained in order to determine whether it would be possible for the forecast to be duplicated and evaluated, i.e., reviewable, as discussed in section II. A. By focusing on the issue of reviewability in this filing, the Council will be better prepared to look at subsequent forecasts and supplements for appropriateness and reliability.

In the present case, the Company made judgements concerning conservation and additional sales during the forecast period. The bases for these judgements and the manner by which they were incorporated into the forecast were not explained.

The Company also made judgements concerning estimated heating increment and base use per day when calculating normal year, design year, and peak day sendout projections. The bases for these judgements and the manner by which they were incorporated into the forecast were not explained in the present filing. In its next filing the Council expects the Company to: explain the basis for the judgements concerning conservation and additional sales and how this data is incorporated into the forecast and explain the basis for the judgements concerning estimated heating increment and base use and the manner in which they were incorporated into the forecast.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); comparison of the

resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Company has contracts with the Algonquin Gas Transmission Company (hereafter AGT) for the purchase of natural gas (Herafter NG) during the forecast period. The contracts with AGT include F-1, WS-1, and SNG-1 service. The Company has elected to take the option of reducing its annual purchases of SNG from AGT.

It is the Company's judgement that there will be no curtailment from annual volumetric contract quantities of pipeline supply during the forecast period. This judgement was made after discussions with suppliers and on the basis of many informal contacts with the industry.

Liquified Natural Gas

The Company pruchases NG from the Commonwealth Gas Company. However, this agreement was not reported on G-24. The NG is liquified and stored by Hopkinton LNG Corp. pursuant to a twenty-five (25) year contract. Liquified Natural Gas (hereafter LNG) will be produced from April 1 - November 1, and 500 MMCF will be stored for revaporization during the winter months. The revaporization is done at Hopkinton's facility although the Company did not include this service in the description of its contract with Hopkinton LNG Corp.

Propane

The Company owns one (1) propane air facility located in Plymouth which it uses for emergency standby. Table G-14 shows no propane storage capacity, yet Tables G-22 and G-23 indicate that the Company carries over propane from year to year in its inventory and has it available for peak day use.

B. Comparison of Resources to Requirements

Normal Year

The Company expects to meet normal year firm sendout requirements over the forecast period as described in the following table.

TABLE 1

Percentage Range That Each Source Supplies of the Heating Season and Non-Heating Season Requirements*

Supplier	Type	% of NHS load supplied	% of HS load supplied
Algonquin	F-1	94%	62 - 63%
Algonquin	WS-1	2 - 3%	11 - 12%
Algonquin	SNG-1	---	20 - 22%
Commonwealth	LNG	4%	3 - 7%
	Propane	0%	0%

* The information in this table was appoximated by Council Staff from the data submitted by the Company in Table G-22.

Design Year

The record indicates that the Company has adequate supply to meet sendout requirements for a design year on an annual level, as opposed to a seasonal level, if gas sold to interruptible customers is used to meet firm customer requirements. However, if fifty-two (52) percent or more of the additional sendout needed in a design year is required during the heating season, the Company would have to purchase and utilize additional supplies such as propane to meet heating season requirements. This additional supply appears necessary even assuming all other resources are fully utilized.

Peak Day

Data on peak day sendout and requirements is shown on Table G-23. The record indicates that the Company expects ninety-seven (97) percent of the daily maximum contract quantity of AGT F-1 and the full contract amounts of AGT WS-1 and SNG-1 to be available on a peak day. It also assumes that the propane and LNG vaporization facilities are operable at their maximum daily quantities. Under these conditions the Company has twenty-four percent (24%) more supply potentially available than is necessary to meet requirements as forecast for 1979-80. This margin declines to eleven point five percent (11.5%) by 1983-84.

C. Evaluation of Forecast Resources

The record indicates that the Company may need supplies in addition to those already under contract to meet heating season requirements in a design year. The Council is aware

that a portion of the supply necessary to meet requirements may not be under contract at the time of a forecast's filing. It is also aware that it is customary for gas companies to anticipate purchases on the spot market. However, forecasts of resources based in part on uncontracted-for resources or spot market purchases are not as reliable as forecasts based on firm commitments. Therefore, one reason for the Council's conditional approval of this forecast is the extent to which the forecast of supply is based on uncontracted-for resources and purchases on the spot market. (See Conditions 5-8 in Section IV below).

Also, it is unclear whether or not the Company has propane storage. If so, it should be listed on Table G-14. If not, the availability of the propane listed on Tables G-22 and G-23 should be explained. Lastly, the agreements by which New Bedford receives gas from the Commonwealth Gas Company and vaporization service from Hopkinton LNG Corp. should be documented on Table G-24. If these measures are taken, the reviewability of New Bedford's forecast of resources will be significantly improved.

IV. Order

The supplement is APPROVED subject to the following conditions:

1) That the Company explain the bases of its judgements concerning the significant determinants, especially conservation, in the next filing. In this regard the Company should provide an analyses of the effects of conservation in the actual 1979-80 data.
2) That the Company include an explanation on how additional sales are forecast and how this data is incorporated into the projections and is reflected in the forecasts of number of customers and average base and heating use per heating customer in the next filing.
3) That the Company state the factors themselves and explain the basis of the estimated heating increments and base use per day and how they were incorporated into the forecast of the normal year design year and peak day sendout, in the next filing.
4) That the Company explain in its next filing how it would meet design year requirements if fifty-two (52) percent or more of the additional sendout needed is required during the heating season.
5) That the Company explain the propane listed on Tables G-22 and G-23 and list any propane storage capacity in Table G-14 in its next filing.
6) That the Company document the agreements, written or oral, by which it receives gas from the Commonwealth Gas Company and vaporization service from Hopkinton LNG Corp. on Table G-24 in its next filing.

Energy Facilities Siting Council

by: Robert D. Wilmot (BMS)

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 11 August, 1980.

Joseph S. Fitzpatrick
Chairman

DECISION and ORDER

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the North Attleboro Gas Company for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-22

I. Introduction

This decision concerns the North Attleboro Gas Company's (hereafter North Attleboro or Company) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §691 and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the Staff to document the Company's forecast methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Company or an interested party as no new facilities within Council jurisdiction were proposed. The Company was so advised and was asked to publish notice of tentative decision and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

This decision includes a discussion of North Attleboro's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council has paid particular attention to the documentation

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1 The EFSC Staff's information request is contained in a letter dated April 25, 1980. The Company's reply is contained in a letter dated April 29, 1980. See EFSC Docket No. 79-22.

in each forecast and will comment thereon so that the companies may submit more thoroughly documented forecasts in the future.

The Council's APPROVAL of the present North Attleboro supplement is subject to the conditions stated in the Order set out in Section IV below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Company's forecast methodology (subsection B); and the application of the review criteria to the Company's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2) (a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated, it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. North Attleboro's Methodology

North Attleboro was exempted from filing historical and forecast seasonal sendout due to the Company's small size and a lack of data.[4] The Company was expected to file a forecast of sendout on a split-year based on the Algonquin Gas Transmission year, September through August. The Company said that it would attempt to report the last historical year before the forecast period on a split-year basis also. This data was reported in the Company's 1979 Supplement.

Normal Year Sendout

The Company stated that the firm sendout forecast is based on estimates done on the customer class level and that it

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

[4] See memo dated September 4, 1979, from Marc Hoffman, Chief Economist at the EFSC to Docket #70-22.

does not differentiate between heating season and non-heating season.[5]

Design Year Sendout

The Company stated that it does not have a design year. Therefore, it did not include data on design year sendout (Table G- 5)

Peak Day Sendout

The Company uses sixty-five (65) DD for its peak day and states that the forecast of peak day sendouts are estimates.

C. The Review Criteria Applied to North Attleboro's Forecast

The Council forecast review criteria of appropriateness, reviewability and reliability are all at issue in the present case. The Company did not include a description of its forecast methodology in the 1979 Supplement, making it practically impossible to review the methodology or to determine whether the methodology is appropriate and reliable. The following comments are concerned with specific areas of the forecast which the Council was able to review and are intended to aid the Company in its endeavor to submit a forecast that is sufficiently documented and thus reviewable. When this is done, the Council will be in a better position to offer more detailed comments on the methodology's appropriateness and reliability.

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5 See Company's letter dated April 29, 1980, from Mr. Underhill, President, North Attleboro Gas Company, in Docket #79-22.

In this North Attleboro Supplement it appears that Table G-5 (Total Firm Company Sendout) is not a summation of Tables G-1 through G-4 as the amounts on Table G-5 are greater than the total of the preceding tables. The Council urges the Company to explain the use and contents of Table G-5 in its next forecast if it is not a summation of Tables G-1 through G-4.

Also, it does not appear that the Company based its forecast of sendout in Tables G-1 through G-4 and in the pertinent parts of Table G-5 on normalized data as required. Such an omission effects both the reviewability and reliability of the forecast. If the normal year forecast is not based on normalized data, it is prima facie an unreliable forecast of a normal year. In the next filing, the Council expects the Company to describe its forecast methodology in full, stating the basic equations used, explaining the basis for any estimates or judgements it makes when developing the forecast and explaining the methods by which said estimates or judgements are incorporated into the forecast projections in the next filing. (See Rule 66.5 for information on what constitutes an adequate description.) The Council expects the Company to base its forecast of sendout on normalized data where so required in the next filing.

III. Forecast of Resources

This section includes a description of the Company's supply contracts and facilities (subsection A); a comparison of the resources available for the annual/seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Company's assumptions and judgements concerning the forecast of resources (subsection C).

A. Contracts for Supply and Facilities[7]

Pipeline Gas

The Company has firm contracts with Algonquin Gas Transmission Company (hereafter Algonquin) under the F-1, WS-1, and SNG-1 rates.

Liquified Natural Gas

The Company has a firm contract with Bay State Gas Company (hereafter Bay State) for the purchase of liquified natural gas (hereafter LNG). Although there is no designation in the Supplement of any LNG storage capacity, the Company has an option to purchase additional LNG from Bay State during the heating season. Under this contract, the Company has a maximum amount of one hundred fifty-seven (157) MCF of gas available to it on a peak day.

Propane

The Company states that it has sendout capacity of four hundred (400) MCF per day from a propane/air facility with such facilities for propane sendout available. However, there is no description or designation in the Supplement of any storage capacity or of the location of the propane/air facility. The Company does not have a propane supply contract.

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7 Information on the Company's resources is from their letter to the EFSC dated April 25, 1979, as the Company did not submit Tables G-14 and G-24. See Docket #79-22.

B. Comparison of Resources to Requirements

The Company did not fill out Tables G-22 and G-23 in a manner to show clearly how resources will be utilized to meet sendout requirements on a yearly, seasonal and peak day level.

Normal Year

The pipeline gas and LNG expected under firm contract from Algonquin and Bay State on an annual level is approximately twenty-eight (28) percent greater than the Company's estimated annual total firm sendout. Therefore, the supply appears to be adequate on an annual level. Yet, it is not clear that the supply is adequate to meet colder than expected conditions on a seasonal basis.

Peak Day

Contracted daily deliveries of natural gas and vaporized LNG from Algonquin and Bay State provide 1321 MCF per day. In order to meet the expected peak day sendout of 1500 MCF per day, the Company will utilize its propane facility which has a capacity of 400 MCF per day. However, there is insufficient information to determine whether enough propane will be available to meet peak day sendout requirements.

C. Evaluation of Forecast Resources

While it is clear that the Company has an adequate supply on the annual level, there is insufficient information concerning the resources required and available to meet seasonal requirements. Nor does the record indicate what the Company does with any excess firm contract gas. Lastly, the record indicates that

the Company intends to use propane to meet peak day requirements, but it does not evidence a firm contract for propane supply, and neither the propane facility nor propane storage is sufficiently documented.

In its next filing the Council expects the Company to: fill out Tables G-14, G-22, G-23 and G-24; explain what it does with any excess gas, where its propane supply comes from and how reliable the source is.

IV. Order

The Supplement is APPROVED subject to the following conditions to be implemented/incorporated in the next filing:

1) That the Company base its forecast of sendout on normalized data where so required.
2) That the Company base Table G-5 on Tables G-1 through G-4 if forecasting on a customer class level.
3) That the Company describe its forecast methodology in full stating the basic equations used and explaining the basis for each estimate or judgement it makes when developing the forecast and the method by which each estimate or judgement is incorporated into the forecast projections. (See Rule 66.5 for information on what constitutes an adequate description.)
4) That the Company provide the data on the base use per customer in Table G-1 and the heating use per customer per DD in Table G-1.
5) That the Company fill out Tables G-14, G-22, G-23 and G-24.

6) That the Company explain what it does with any excess firm contract gas or LNG.

7) That the Company explain and document the source of its propane supply and whether it has any storage capacity.

8) That the Company explain what effect an immediate cessation of Algerian LNG deliveries will have on its LNG contract with the Bay State Gas Company. Specifically how does the Company plan to meet each year's projected requirements under this circumstance.

The above conditions reflect the Council's concern for sufficiently documented forecast filings. Specific filing instructions that related to the new gas reporting forms are also contained in EFSC Administrative Bulletin 80-2. The Council, in bringing its concerns to the Company's attention, is aware of the size of the Company and its service requirements. Thus, the Council advises the Company to review the points made herein and in EFSC Administrative Bulletin 80-2 so that it may consult with the EFSC Staff as to possible exemptions from the detailed filing requirements.

Energy Facilities Siting Council

By Robert D. Wilmot

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meering 9 September, 1980.

Joseph S. Fitzpatrick
Chairman

DECISION and ORDER

In the Matter of Wakefield Municipal Light Department, et al.

EFSC Nos. 79-2, 79-42

Petitions for Approval of Annual Supplements to Long Range Forecasts

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This decision concerns the most recent annual supplements to long-range forecasts submitted by the following gas utilities pursuant to M.G.L. c. 164, sec, 69I: 1) Wakefield Municipal Light Department ("Wakefield"), and 2) Blackstone Gas Company ("Blackstone").

Each supplement was reviewed by the Council staff and in each case it was suggested that no adjudicatory hearing need be held unless so requested by the utility or an interested party as no new facilities within Council jurisdiction were proposed in any of the supplements. The utilities were so advised and were asked to publish in local newspapers a notice of the tentative decision and of the right to request a public hearing on the supplements.

It is to be noted that the two companies considered in this decision present a somewhat unique situation to the Council. Wakefield's uniqueness is in its being an all-requirements customer of Boston Gas Company. This means it has no direct pipeline supplier nor any storage or peak shaving facilities and its total company sendout is part of the Boston Gas forecast. Thus there is a certain redundancy to a review of both the Wakefield and the Boston Gas filings. That is addressed below.

Blackstone's uniqueness is in its status as the smallest of the Commonwealth's gas utilities in number of customers and service area. Thus there are certain documentation and data problems, given Blackstone's size, which are addressed below.

The individual decisions and orders are as follows.

Wakefield Municipal Light Department (Gas Division)
EFSC No. 79-2

As pointed out above, Wakefield is an all requirements customer of Boston Gas. As such, Wakefield has no direct pipeline supply nor does it own and/or maintain any storage or peaking facilities. Wakefield's forecast for total company sendout is part of the Boston Gas filing (Table G-3, p.I-6, EFSC No. 79-25) which has been reviewed and approved by the Council this year. To this extent, Wakefield is unlike other Commonwealth gas utilities and requires a certain accommodation in its filing requirements to avoid the redundancy of a double review of its demand forecast. Such accommodation can also be made given the limited source of that company's supply, i.e., Boston Gas. Adjusting Wakefield's filing requirements may also serve to relieve some burden on its personnel who have had a difficult time responding to the Council Staff's questions about the current filing.

Thus the Council now advises Wakefield that it need not fill out the prescribed forms for future gas supplements. Rather the Council will require Wakefield to review and comment on Boston Gas' Table G-3 which details Wakefield's total company sendout. These comments should be filed with the

Council on an annual basis in lieu of the forms and should be done in a narrative fashion (e.g., in a lengthy letter). This narrative should include, but is not limited to the following items and topics.

1. Wakefield should comment on the accuracy and the adequacy of the supply figures set out by Boston Gas in Tables G-3 and G-24 and detail any pertinent local information which may affect these figures. This is especially important since the Council notes a discrepancy between the amounts of gas Wakefield expects to receive from Boston Gas and the amount Boston Gas expects to provide. (Compare Table G-24 in 1979 Wakefield supplement with Table G-24 in 1979 Boston Gas supplement.)

2. Along the same lines Wakefield should explain how it plans for and meets its peak day requirements within the parameters of the Boston Gas supply figures. The same should be done for design year requirements. The Council is here as always concerned with the adequacy of supply for customers needs at peak times. Such explanation will, by necessity, include a description of the company's calculations of design year and peak day sendout.

3. Wakefield should discuss its expectations for continuation of the Boston Gas contract beyond the termination date of August 31, 1983. Also a copy of that contract would be very helpful for the record herein; please attach to the narrative.

4. The Council is also concerned with conservation. Thus, Wakefield should discuss the role and effect of conservation in and on its system and how conservation affects

its planning. Any conservation programs utilized by the company should be detailed along with its method for quantifying conservation effects on its supply planning.

Therefore, it is ORDERED that the 1979 gas supplement for the Wakefield Municipal Light Department be APPROVED and that the filing requirements for this company as to its gas division be modified as set out in the paragraphs above. It is further ORDERED that a copy of the next Wakefield filing (in narrative fashion) be sent to Boston Gas as well as the Council. It is expected that these companies can make arrangements to exchange data and tables so that the Wakefield comments will be timely filed (by October 1, 1980) and up-to-date (based on current Boston Gas supply figures).

Blackstone Gas Company
EFSC No. 79-42

In the past two decisions on filings made by the Blackstone Gas Company, the Council has expressed concern about the sufficiency of the data provided by this company. See 1 DOMSC 299 (July 20, 1977) and 3 DOMSC ___ (November 15, 1978). Although the company has worked with the Council Staff in an effort to upgrade the level of information in the filing, the Council finds itself with similar concerns about the present filing. The Council remains mindful of the size of this company; it is the smallest gas utility in the state. As stated earlier, this prompts the Council to make some accommodation in Blackstone's filing requirements. After a brief analysis of this year's filing, the Council will set out with some exactness what will be expected of this company in future filings.

In its current supplement, the company provided customer class sendout data (Tables G-1 through G-3) for 1977 and 1978; total company sendout (Table G-5) for 1974-78; a summation of available resources; and a statement (responding to a Staff question) that it has no record of daily sendout but at no time has the company exceeded its contractual (with Tennessee) limitations. The company did not provide any forecast data (Tables G-1 through G-6); any peak day requirements data (Table G-5); any comparison of resources to requirements (Tables G-22, G-23); any data on Tables G-14 and G-24; and any degree day data (Table G-7).

Consequently the only solid evaluation the Council is able to make is that since Blackstone's annual supply expected to be available from Tennessee (61,186 mcf) is 31% greater than Blackstone's 1978 total company requirements (46,869 mcf), the company apparently has adequate resources to meet existing customer requirements. Also since Blackstone is not presently under seasonal curtailment of its pipeline supply, it does not face the problem of having enough resources available at the right time. Not being seasonally curtailed means that the company can vary its monthly "take" from the pipeline as long as such variations do not result in the annual limitation being exceeded. This admittedly gives the company some flexibility in meeting customer needs but does not sufficiently address Council concern with the adequacy of supply over a forecast period.

The same concern exists with respect to the sufficiency of Blackstone's peak day resources (505 mcf/day); this concern is a repeat from last decision as well. See 3 DOMSC ___

(November 15, 1978). Since no peak day historical or forecast data was provided, the Council is unable to evaluate this sufficiency or lack of peak day resources. In past years the company has said that should it need more gas, it would simply take more from the pipeline. That statement was supplemented this year by the statement that the company has never had to do this. While the Council may believe the statements, it still needs firmer documentation than those statements for the adequacy of peak day resources.

Thus the recurring problem of a sufficient level of data in this company's filing remains unresolved this year. The Council does realize that Blackstone is the smallest gas utility in Massachusetts and cannot be expected to meet the same filing requirements as the larger companies. Yet the Council must be assured, through an adequate level of data and documentation, that the company has sufficient supply to meet firm customer needs on both an annual and peak day level. Thus there follows in the Order below a precise delineation as to what information is required from this company in future filings. These requirements are the conditions upon which the approval of this year's supplement is based. This conditional approval is given, despite the dearth of data in the current filing, to encourage the company to make its best effort to meet the adjusted filing requirements set out below. Not to meet these adjusted requirements without good reason in the next filing will most likely result in an opposite decision next year. The Council directs its Staff to be prepared to answer any questions the company might have about this Decision and Order.

Thus, it is ORDERED that the Blackstone Gas Company's annual supplement be APPROVED on the condition that, in future filings, the company provide an adequate level of data and documentation for Council review in accordance with the above decision and the details set out in the following paragraphs.

1. The company is exempt from customer class filing, i.e., Tables G-1; G-2; G-3; (A & B); and G-4 (A & B & C).
2. The company shall provide data concerning total company requirements in Table G-5. This data will include:
   a. actual annual sendout for the 12 month period ending March 31, 1980;
   b. forecast of annual sendout requirements with documentation of the basis for such forecast for the next 5 split-years (ending March 31);
   c. 5 year forecast of peak day sendout requirements.
3. The company shall provide documentation of the resources in Table G-24. For example, the agreement the company has with Tennessee Gas Transmission (TGT) should be reported on Table G-24, along with contract, entitlement and expected delivery quantities covering the forecast period. The company's most recent and relevant correspondence with TGT may be included as documentation for the basis for the expected deliveries. Questions on this Decision and Order may be addressed by company personnel to the EFSC Staff.
4. The company shall provide documentation which comfirms its position that TGT would permit and/or consider it legal for the company to exceed its MDQ of 505 mcf if its customers required such a measure.

Energy Facilities Siting Council

by Dennis J. LaCroix

Dennis J. LaCroix, Esq.
Chief Counsel

Unanimously approved by the Energy Facilities Siting Council on September 9, 1980.

Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

Petition of the City of Westfield Gas & Electric Light Department for Approval of the Third Annual Supplement to its Long Range Gas Forecast	)	EFSC No. 79-26

DECISION and ORDER

I. Introduction

This decision concerns the City of Westfield Gas & Electric Light Department's (hereafter Westfield or Department) third annual supplement to its long range gas forecast submitted pursuant to M.G.L. c. 164, §69I and Chapter G of the EFSC Regulations. The Council's Staff has reviewed the docket which consists of the supplement and further information requested by the Staff to document the Department's forecasting methodology.[1]

It was suggested that no adjudicatory hearing be held unless so requested by the Department or an interested party as no new facilities within Council jurisdiction were proposed. The Department was so advised and was asked to publish notice of the tentative decision and of the right to a public hearing in local newspapers as well as to post said notice in the Town Hall.

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[1] The EFSC Staff's information request is contained in a letter dated April 9, 1980. The Department's reply is contained in a letter dated April 24, 1980. See Docket #79-26.

This decision includes a discussion of Westfield's forecast methodology, sendout requirements, adequacy of resources and conservation. In its review of this and other gas forecasts, the Council has paid particular attention to the documentation in each forecast and will comment thereon so that more thoroughly documented forecasts will be submitted in the future.

The Council's APPROVAL of the present Westfield supplement is subject to the conditions stated in the Order set out in Section IV, below. The decision is as follows.

II. Methodology

This section includes a description of the review criteria which the Council applies in its review of forecasts and supplements (subsection A); a description of the Department's forecast methodology (subsection B); and the application of the review criteria to the Department's forecast (subsection C).

A. The Council's Review Criteria

A forecast must satisfy the review criteria stated in Rule 62.9(2)(a), (b) and (c) as applied on a case-by-case basis by the Council. These criteria call for the use of accurate and complete historical data as a base for a reasonable statistical projection method.[2] A

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[2] Review criteria for all forecast methodologies and methodologies specializing in requirements forecasting are stated in Rules 69.2 and 66.5, respectively.

statistical projection method will be found to be reasonable if it is appropriate, reviewable and reliable.

A methodology is appropriate when it is technically suitable for the size and nature of the particular system. A methodology is reviewable when it has been presented in a manner such that the results can be evaluated and duplicated by another person given the same information. For it to be possible for a methodology to be duplicated and evaluated it must be thoroughly and clearly described in the forecast documentation.[3] A methodology is reliable when it provides a measure of confidence that the assumptions, judgements and data which comprise it will forecast what is most likely to occur.

B. Westfield's Methodology

Normal Year

Westfield used a normal year consisting of 6797 degree days (hereafter DD), based on an average of the DD for the last ten (10) years.

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[3] The documentation must include a description of: any historical data used and its source, the significant determinants (e.g., population, government policies, availability of resources, conservation, see Rule 66.5(b)) and their effect on projected customer use factors (e.g., number of customers, base use), any judgement incorporated into the decision, the assumption(s) upon which a judgement is based and the means by which it is incorporated into the forecast and the statistical projection method used.

The forecast of firm sendout was prepared separately on a customer class level and then summed to derive a total company sendout. Base load[4] and heating use[5] factors were projected for each customer class.

The number of customers for each class was also projected. The increase forecasted in residential heating customers was based on an actual 2.5% increase from 1978 to 1979; a 2.5% increase was subsequently assumed for each year of the forecast period. With respect to its residential non-heating customers, the Department expects a decrease of thirty-four customers in the first year of the forecast period. Then the number of customers in this class remains constant for the next four years of the forecast period.

Design Year

The Department's design year consists of 7979 DD which standard was derived in a somewhat unorthodox manner. Instead of choosing the coldest year for the ten year period it uses, the Department chooses the coldest January

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4 Base Use or Load is a figure representing non-temperature or non-weather sensitive uses for which a company or department will supply gas to a customer throughout the year, i.e., gas used for cooking as opposed to space heating or other temperature related uses.

5 Heating Use or Increment is a figure representing those uses which are temperature or weather sensitive, i.e., that amount of gas used for space heating and other temperature sensitive uses.

of those ten years, the coldest February, the coldest March and so on. Then it takes the total of the DD in these months (which may be January of 1970, February of 1973, March of 1971, etc.) to arrive at its design year DD figure. Design year sendout was calculated by applying projected base load and heating increment factors to the design year DD.

Peak Day

The Department used a peak day consisting of sixty-five (65) DD. The rationale advanced for this figure was that the Department had not yet experienced such a day.

The forecast of peak day sendout was derived by projecting base load and heating increment loads for each class from historical data and applying it to peak day DD. The class peak loads were summed to calculate the total Department peak.

C. The Review Criteria Applied to Westfield's Forecast

The Council realizes that the Department endeavored to satisfy the Council's rules and regulations pertaining to forecasting. The purpose of the comments that follow is to provide guidance as to what the Council expects in the next forecast. The comments that follow will point out data that was omitted from the filing or inadequately explained therein, in order to aid the Department in its efforts to submit a forecast that is sufficiently documented and thus reviewable. Comments concerning the appropriateness and reliability of the forecast are reserved

for a later Council decision so that both the Council and the Department can focus on the element of reviewability at this time.

The comments made in this section, and in section III-C (Evaluation of Forecast Resources) are the source of the conditions in section IV (Order). Again, the Council suggests that the Department examine these conditions as well as EFSC Administrative Bulletin 80-2 (which contains updated instructions concerning revised forms) to determine whether certain exemptions from the filing requirements are warranted and needed due to the Department's size. The Department should then discuss potential filing exemptions with Council Staff as soon as it determines its needs in this area. The Council's comments on the present filing follow.

The Department's method for deriving its design year DD, as noted above, is unorthodox and results in a design year which is 17% colder than a normal year. This is certainly more conservative than design years used by any other gas utility in Massachusetts and raises a question as to whether it might be too conservative. The Council is concerned that the cost of keeping supply available to meet such design year criteria may be too high, especially if it is not likely to be needed. Thus, the Council asks that the Department re-evaluate its design year criteria in its next filing and to explain clearly its choice of that criteria. To facilitate this process, the Council will extend the filing date for Westfield's next supplement to November 3, 1980.

The Council is also concerned about what significant determinants were considered in the forecast as none were discussed therein (See EFSC Rule 66.5(b)). In addition, the projected base use and heating increment factors used to forecast normal year, design year and peak day were neither stated nor explained. Similarly, the bases for the Department's judgements concerning customer projections were not explained. It is to be noted that the reviewability of a forecast in which significant determinants are not discussed and projected factors are neither stated nor explained is severely hindered. Therefore, the Council asks that the Department: a) state which significant determinants are considered in developing its forecast; b) explain the bases for any judgements made concerning the significant determinants; c) explain the method by which these judgements are incorporated into the forecast; and d) explain the bases for its judgements concerning customer projections. The Council also requests that the Department to state the projected base use and heating use factors, and explain how they were derived and the method by which they are incorporated into the forecast.

In the present supplement, Westfield's forecast data in Tables G-1 through G-7, G-22 and G-23 was reported on a calendar year basis, i.e., January through December. EFSC Administrative Bulletin 80-2 now requires that both historical and forecast data be stated on a split year basis. The Council realizes that it may be difficult for a Department of Westfield's size to recompile the

historical data on a split year basis. Therefore, the Council urges the Department to discuss with the EFSC Staff the possibility of an exemption from filing historical data on a split year basis up to and including 1978-79. However, the Council expects the Department to state historical data after 1978-79 and all forecast data on a split year basis where so indicated in Administrative Bulletin 80-2.

One final point: the Department did not explain the method by which it derives its peak day DD, an omission which hampered the review of the peak day forecast. Thus, the Council asks that the Department explain the method by which it derives its peak day DD in the next forecast. By attending to this and the other points made in the above comments, the Department will significantly improve the reviewability of its forecast; the Council appreciates the Department's efforts to this end.

III. Forecast of Resources

This section includes a description of the Department's supply contracts and facilities (subsection A); a comparison of the resources available for the annual seasonal and peak day sendouts to the requirements (subsection B); and an evaluation of the Department's assumptions and judgements concerning the forecast of resources (subsection C).

A. Supply Contracts and Facilities

Pipeline Gas

The Department is a customer of Tennessee Gas Pipeline Company (Tennessee). The information concerning expected pipeline supply in Table G-22 is based on information from Tennessee. According to the Department, this information indicated that Tennessee does not expect new gas supplies to be available for the first year of the forecast, 1979-80, but does expect new supplies to be available during the later years of the forecast.

Liquified Natural Gas

Westfield has contracted for the purchase of Liquified Natural Gas (hereafter LNG) throughout the forecast period from Bay State Gas Company. Part of the LNG is received as vapor through a pipeline interconnection with Bay State. The remainder is delivered by truck to Westfield's LNG satellite facility. The LNG satellite facility located at Vine Street has a storage capacity of approximately 9 MMCF, with maximum daily vaporization of 12 MMCF/day.

Propane

The Department has no contracts for propane, and expects to use propane for emergency standby only. The Department owns a propane air plant with storage capacity of 8.2 MMCF and a maximum daily vaporization of 1.2 MMCF/day.

B. Comparison of Resources & Requirements

Normal Year

Table G-22 illustrates the manner by which the total Department's sendout requirements are met during the forecast period. Tennessee Pipeline Company provides approximately 99% of the non-heating season load and 95% of the heating season load. LNG from Bay State supplies the remaining 1% and 5% of the non-heating season and heating season loads, respectively.

Table G-22 shows that a small portion of the Tennessee pipeline gas available each season is not needed by the Department to meet its sendout requirements and thus is not taken. The Department is investigating contracts for storage of this gas as well as the possibility of having the surplus gas liquified.

Design Year

Table G-22 shows that the Department does not have enough supply to meet the forecasted design year firm sendout requirements as stated on Table G-6.[6] Assuming all available pipeline gas can be utilized, the Department has enough supply to provide approximately 95% of the

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[6] This includes the State College as a firm customer. While the Department identified the State College as an interruptible customer in this supplement, subsequent communication with the EFSC Staff clarified that the college is a firm customer and will be so reported in future filings.

design conditions in 1980 and 92% in 1984. The Department is considering negotiating for higher optional purchases of LNG from Bay State to handle this apparent supply deficiency.

Peak Day

Table G-23 illustrates the resources available to meet a peak day load. The Company expects the majority of a peak day load to be met with its maximum daily quantity (hereafter MDQ) from Tennessee. The remaining load is to be met in part by the maximum daily delivery of vaporized LNG through the pipeline interconnect with Bay State and LNG vaporized at the Department's satellite facility. To use the plant's maximum daily vaporization capacity, it is necessary to truck LNG to this facility on a daily basis. Thus, approximately 70% of the peak day load in 1979 can be met by the MDQ from Tennessee, and 62% in 1984. LNG supply would then meet 30% in 1979 and 38% in 1984, but could supply the entire peak day load if pipeline gas were unavailable.

Propane presently (80% in capacity) could provide about 15% of the peak day load for 5-1/2 days, if necessary, at the maximum daily capacity of the facility.

C. Evaluation of Forecast Resources

The record indicates that the Department has adequate resources to meet normal year and peak day conditions as forecast. However, the Council is concerned about the Department's resources for the design year and also the pipeline gas available, but not taken by the Department.

With respect to design year requirements, the apparent deficiency of resources may be the result of the Department's method of calculating design year DD. The Council recommends that the Department not seek additional LNG purchase options until it has re-evaluated this method.

The Council, as a rule, encourages all Departments and Companies to use available supplies of domestic gas in order to reduce the Commonwealth's dependance on foreign oil. Thus, the Council now encourages the Department to take all the pipeline gas available to it under contract and to obtain the storage contracts appropriate to this end. The Council asks that in the next filing, it be informed of any results from the Department's efforts to utilize all the pipeline gas available to it.

IV. Order

The Council APPROVES the City of Westfield's Supplement subject to the following conditions to be implemented/ incorporated in its next filing:

1) That the Department state which significant determinants are considered in the forecast; explain the bases for any judgements made concerning these determinants; and explain the method by which these judgements are incorporated into the forecast as detailed in EFSC Administrative Bulletin 80-2.
2) That the Department state the projected base use and heating use factors as well as projections for number of customers used to forecast normal year, design year and peak day sendout; explain the methods by

which they were derived and the manner in which they are incorporated into the forecast.

3) That the Department re-evaluate its method of deriving/calculating design year DD before filing the next forecast. In order to facilitate this process, the Council extends the filing date for Westfield's 1980 Supplement to November 3, 1980.

4) That the Department explain the method by which it derives its peak day DD.

5) That the Department state the forecast and historical data required in Tables G-1 through G-7, G-22 and G-23 on a split year basis.

6) That the Department continue its efforts to utilize pipeline gas available to it and inform the Council of its efforts and results, therefrom.

7) That the Department explain how it plans to address the short-term and long-term impacts of an immediate cessation of Algerian LNG deliveries to its supplier, Bay State Gas Company. Specifically, how would the Department meet each year's projected requirements under this circumstance.

The Council has stated the conditions which are concerned with documentation in some detail above in order to facilitate the Department's efforts to satisfy the filing requirements of the next forecast. These requirements are explained in Administrative Bulletin 80-2. The Council also reminds the Department that it may discuss possible exemptions from certain of these filing requirements with

the Council Staff.

Energy Facilities Siting Council

by _____

Robert D. Wilmot, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 9 September, 1981.

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Joseph S. Fitzpatrick
Chairman

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Council

In the Matter of A Petition of the Municipal Gas and Electric Department of Middleborough for Approval of A Proposal To Rebuild Its Existing Propane-Air Facility	)	EFSC No. 79-18

DECISION and ORDER

For the reasons detailed below, the Council hereby APPROVES the proposal of the Municipal Gas and Electric Department of Middleborough.

I. Introduction

A. The Proposal

On or about August 21, 1980, the Municipal Gas and Electric Department of Middleborough ("Department") notified the Council through its Staff of the Department's desire to rebuild its propane-air peak shaving facility located at Vine Street in Middleborough. The Department proposed to do this rebuilding by purchasing a used propane-air plant formerly operated by Commonwealth Gas Company and installing this used plant inside its existing propane-LNG tank farm. Some modification to the used plant's discharge orifice would be done to limit the maximum sendout capacity in order to avoid a gas interchangeability problem. More details on this proposal follow in later paragraphs.

The Department's gas superintendent, James L. Peschong, discussed this proposal with the Staff to determine whether it might qualify for an exclusion from Council construction jurisdiction under EFSC Rule 67.8. It was decided that the

proposed rebuilding was not so excludable and that adjudicatory proceedings would be appropriate in this case. Thereupon, the Department through its counsel filed an Occasional Supplement to its 1979 Annual Supplement[1] requesting Council approval of the proposal. (EX. M-1)

B. The Proceedings

A hearing on the Department's proposal was scheduled for September 22, 1980, at the Town Hall in Middleborough. Public notice of this hearing was published once a week for three consecutive weeks in the Middleborough Gazette (EX. M-2). The Hearing Officer received written indication of interest in this case from Mr. Howard Marshall of West Street, Middleborough, a neighbor to the existing facility.

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[1] It should be noted that in a Hearing Officer's Memorandum and Order dated May 19, 1980, the Department's request for suspension of further Council review on its 1979 Annual Supplement was granted for reasons set out therein and upon certain conditions. While construction approvals are usually not given unless the proposed facility is consistent with the most recently approved forecast or supplement (G.L. c. 164, sec. 69I), there is Council precedent for such approvals where a current forecast is not approved or is not yet fully reviewed. See In the Matter of Boston Edison Company's Walpole to Needham 345 Kv Transmission Line, 3 DOMSC _____ (9/18/79). In such cases, the Council looks to criteria other than load growth (e.g., system reliability) to justify the construction, always mindful of its statutory duty to ensure an adequate energy supply for the Commonwealth. G.L. c. 164, sec. 69H.

At the hearing itself in the Town Hall as scheduled, Mr. and Mrs. Marshall, other Middleborough residents, a member of the Town Finance Committee and a local newspaper reporter were in attendance. Each participated in the hearing by asking questions of Mr. Peschong and by giving their individual statements for the record in this matter. Mr. Peschong testified on behalf of the Department.

C. The Department

As a final introductory point, some background on the Department itself will provide further perspective to this decision. The Department is a municipally owned public utility distributing gas to approximately 2200 customers in the town of Middleborough. As of April, 1979, approximately 44% of these were residential customers with gas heat, 46% residential customers without gas heat, and 10% commercial and industrial customers. Residential customers with gas heat accounted for 25% of the gas sent out in 1978-79; residential customers without gas heat for 16% of the sendout; commercial, 29%; industrial, 3 %; company and municipal use, 15%; and interruptible, 12%.

The Department's offices and facilities are located at 2 Vine Street in Middleborough in an area zoned for general use. The Department's property is partly bordered by and traversed by Vine Street. On the northeast side of Vine Street is the Department's office building, a Hortensphere (206 MCF

storage and daily sendout capacity[2] and the existing propane-air mixer and vaporizer (403 MCF/day capacity). On the southwest side of Vine Street there is a small tank farm consisting of one LNG storage tank (28,500 gallons); two propane storage tanks (30,000 gallons each) and one LNG vaporization plant (780 MCF/day). Last year, only the LNG facilities and Hortensphere were utilized; the propane-air were not.

The Department purchases natural gas and SNG from Algonquin Gas Transmission Company ("Algonquin") and LNG from Bay State Gas Company. As a small customer of Algonquin, Middleborough is exempt from daily curtailment and can take 843 MCF/day of F-1 gas as long as the yearly limit of 228,995 MCF is not exceeded. The Department's SNG contract with Algonquin is for 201 MCF/day for the winter period for a total winter quantity of 30,940 MCF. During last winter (1979-80) and for this coming winter (1980-81), the Department elected to take the option of reducing the total contract amount by 50 percent, thus effectively reducing the SNG take to 17,287 MCF. The Department also has a storage service contract with Algonquin for a "best efforts" delivery of 33 MCF/day with a storage capacity of 2,030 MCF.

The Department's contract with Bay State Gas Company runs through March, 1988, and allows for increasing amounts of LNG to be purchased each year. Approximately 24% of Middleborough's last winter supplies consisted of LNG from Bay State.

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[2] All capacities were converted to an equivalent of 1000 BTU per CF.

II. The Facility

As indicated briefly above, the Department proposes to rebuild its propane-air peak shaving facility by purchasing and installing a used propane-air plant inside its existing tank farm located at its Vine Street offices. The used plant would be located a short distance southeast of the area between the propane and LNG tanks across Vine Street from the existing propane plant as can be visualized in the series of 8 photographs attached to EX. M-3, 4 of the existing propane plant and 4 of the tank farm where the used plant would be installed.[3]

This used plant consists of three major components:

1) One Black, Sivalls & Bryson 115 MCF/hr water bath vaporizer
2) One complete set of Apco propane-air blending equipment rated at 71.4 MCF per hour
3) One Ingersoll-Rand air compressor (Waukesha engine) rated at a capacity of 546 CF per minute allowing a production of propane-air at 51.4 MCF/hour.

The Department plans to modify the discharge orifice plate of this plant to reduce the maximum sendout to 35 MCF/hour. This reduced capacity is based on an industry standard mix of 45% propane and 55% natural gas; 35 MCF/hour would be the maximum propane-air sendout advisable with the present contractual maximum daily quantities of F-1 and SNG-1 from Algonquin so that

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[3] Effectively, what the Department proposed to do is move its propane plant across Vine Street to its tank farm except that a newer plant will be installed. This newer, albeit used, plant is safer and more efficient than the existing, as is discussed infra.

interchangeability problems are prevented. See EX. M-3 at 9.

The price of purchasing and installing this used propane-air plant is $78,600 with an additional estimated cost of $10,000 for other necessary installation and relocation work summing to an estimated total cost of $88,620. See EX. M-3 at 6.

In the Department's Occasional Supplement (EX. M-1) and in Mr. Peschong's testimony (EX. M-3), four arguments are presented to support the construction proposal under review here.

First, the Department states it is concerned that a disruption of Algerian LNG shipments could directly affect the quantity of winter gas which could be obtained from Bay State Gas Company. The Department considers this to be a definite concern since the Department currently obtains approximately 24% of its winter supply in LNG from Bay State; Bay State, in turn, obtains 25-35% of its LNG supply from Algeria through Distrigas. The Department feels that an LNG supply disruption could generate a gas supply shortage for its customers which the proposed rebuilt propane-air facility would alleviate by providing for a greater flexibility in the use of fuels; propane could be substituted for the curtailed and/or costly LNG.

Fuel use flexibility is also a factor in the second argument set forth in the Occasional Supplement and accompanying testimony. The Department claims that with the capacity of the proposed rebuilt propane-air facility, it would have the latitude to reduce the purchase of expensive SNG by reducing SNG volumes in non-critical supply periods and could take advantage

of price differences between the two fuels. For example, the Department states that Algonquin has projected the price of SNG for the 1980-81 heating season to be between $9 and $12 per MCF while the Department has projected the cost of propane-air for that time to be about $7.15 to $7.50 per MCF. Having the means to take advantage of this cost difference could mean a direct savings to customers of between $1.85 to $4.85 per MCF of SNG displaced by propane. Based on the Department's current contracted volume of SNG at 30,400 MCF per year, the Department states that a 50% contract reduction would amount to a customer cost savings of between $28,120 and $73,720 per heating season.

But the Department is of the opinion that it cannot presently be flexible in its use of fuels given the problems posed by the existing facility. Thus the third argument presented in support of the rebuilt facility is that it solves these problems.

Mr. Peschong testified that he would not recommend operating the existing propane-air plant based on customer safety considerations. (Tr. 49-52). At the hearing he stated and explained that the existing plant and its discharge piping are so designed that the flow of natural gas which will be mixed with the propane-air is not metered. This situation creates an unknown variable when mixing the propane-air and natural gas. which could cause an interchangeability problem for gas appliances and thus for customer safety. Additionally, plant maintenance and operational dependability are factors that require a great deal of time and money for the existing facility.

The jet type mixer assembly on the existing plant is very difficult to adjust and is no longer being manufactured. In the proposed rebuilt facility, interchangeability of the gas going into the system can definitely be monitored, thus reducing appliance problems. The newer vintage of the rebuilt plant also provides a cure for the operation and maintenance woes as well.

On the operation side, Mr. Peschong further testified that the present plant design is only capable of delivering propane-air into a small section of the low pressure distribution system. The Department anticipates that due to the age of the present distribution system, substantial rebuilding and replacement will be required in the next several years. The new distribution system would provide for intermediate pressure, thus rendering the existing propane-air plant valueless because of its delivery limitations. The proposed rebuilt plant is designed to inject into the intermediate pressure system and therefore allows for greater sendout capabilities to an estimated 70% of the intermediate and low pressure systems.

After presenting its fuel use flexibility problems as well as the operation and maintenance problems inherent in the existing facility, the Department sets forth a final argument for the rebuilt facility. Quite simply it is that the used plant to be employed to rebuild the facility is available now at a savings of approximately $26,000 vis à vis a new plant, provided the purchase is completed by November 1, 1980.

All of these arguments were considered by the Council in its analysis of the Department's proposal. That analysis follows.

III. Analysis

A. Introduction

Essentially the Department's decision to rebuild its propane-air facility is a way of insuring its customers against the effects of a cut-off in the shipment of Algerian LNG to the United States and against adverse price fluctuations in both LNG and SNG vis a vis propane. This is prima facie a reasonable and prudent decision made even more so in the instant case when that rebuilding also serves to better the operational, maintenance and safety factors of the plant as well as to upgrade the potential distribution capability of the system itself. Finally, the decision to rebuild now is dictated by the present availability of a used but nonetheless desirable propane-air plant at a considerable savings over a new one. This, in a nutshell, is the Department's case.

In analyzing this case, the Council sought to examine what might happen if the Department chose to delay purchasing this "insurance". Thus, the Council looked to what might be the case if the Department assumed the risk at this time and waited to rebuild until Algerian LNG actually became unavailable or the fuel price changes became adverse. Such a "wait and see" position is feasible since the Department has not needed to run the existing plant since 1977 (EX. M-3 at 2) nor is the upgrading of the distribution system an immediate

need (EX. M-3 at 4).

After such an analysis as detailed in the following pages, the Council finds that rebuilding the existing propane-air plant is justified at this time and approves of the Department's proposal. The Council agrees with the Department that having a safe, reliable and significant fuel alternative to LNG and SNG is in the best interests of its customers and the Commonwealth. As is pointed out below, there is a distinct benefit to be gained in rebuilding the existing facility now when the used plant is available rather than waiting until conditions are such that rebuilding the facility is an imminent need, if not an emergency. This conclusion is based on the economics of the situation as well as on the advisability of having an "insurance policy" of sorts against the cessation of Algerian LNG importation and adverse price changes in both LNG and SNG. The added benefits of upgrading the distribution system and making the propane-air plant safer gives a cumulative effect to the Department's arguments, thereby warranting Council approval of the rebuilding proposal.

The Analyses of these arguments follows.

B. Impacts of A Cut-off of LNG

As noted, one of the Department's arguments in support of the need for its propane-air plant proposal is its concern over the effects of a disruption in the delivery of LNG from Algeria. The Department has testified that should there occur an interruption in Bay State's Algerian supply of LNG the

Department could experience a short fall in its gas supply requirements. (Tr. 38-46). To analyze the extent of a shortfall in the Department's gas supply caused by an LNG cutoff from Algeria, the timing of the cutoff must be examined in two possible cases. In both cases, it is assumed that the Department has waited and has not rebuilt its propane-air plant.

In the first case, the cutoff occurs at the end of a heating season when the Bay State LNG reserves are assumed to be relatively depleted. In this case, the Department would likely have only a 5-8 month lead time to react to the cutoff before the coming heating season when the effects of the cutoff would be most significant.

In the second case, the cutoff occurs at the beginning of a heating season when the Bay State LNG reserves are assumed to be full. In this case, the Department would have a relatively long lead time of approximately one year in which to react as the effects of the cutoff would not be significant until the next heating season.

As background to each of these cases, the Department's peak day and winter resources and requirements need to be set out. Without the proposed rebuilt propane-air facility, the Department can send out 3427 MCF on a peak day. This figure is based on the following resources expected to be available to the Department: from Bay State, peak day deliveries of 1200 MCF/day of vaporized gas, in addition to a replenishment of the Department's on-site LNG storage tank if necessary;

from Algonquin, maximum daily deliveries of 843 MCF of F-1 and 201 MCF of SNG-1. The Department has testified that it "currently obtains approximately 24% of its winter gas volumes from Bay State." This figure of 24% is substantiated by the record on the Department's 1979-80 heating season purcahses. Of the 180,204 MCF purchased, 136,666 MCF was natural gas and SNG from Algonquin and the remaining 43,538 MCF was LNG and vaporized gas from Bay State. (EX. M-3).

In addition to those delivered sources, the Department's facilities can also contribute to peak day sendout. The LNG facility could produce 780 MCF/day and the existing propane-air facility, although considered unsafe and unreliable by the Department (EX. M-3 at 2), could produce 403 MCF/day.

As to peak day requirements, the Department's sendout for the coldest day in 1979 was 2021 MCF. In the absence of an approved peak day forecast (see fn. 1, above), the Council assumes, for the purposes of this analysis, that the design peak day load will be approximately 2200 MCF.

It is also to be noted that the Bay State contract with the Department for the purchase of LNG and vaporized gas contains a "force majeure" clause. It is entirely possible that a disruption in delivery of LNG to Distrigas from Algeria could cause Bay State to invoke that clause and halt LNG deliveries to the Department. The Department has stated that although Bay State has assured the Department that its LNG supply for 1980-81 is reasonably secure, it cannot give the Department the same assurance on a long range basis. (EX. M-1, para. 1).

With this background, the two cases will be examined assuming the Department has not rebuilt the existing facility. In the first case, the cutoff occurs after the end of a heating season and thus allows a lead time of only 5-8 months before the next heating season when the effects of the cutoff would be most significant. This short lead time would most likely not allow the Department enough time to complete the necessary cycle of bidding, approval and installation needed to bring a new propane-air facility on line. In that instance, the Department would have to meet its winter requirements with its existing facilities. This would be difficult for the following reasons.

Given this first case scenario, the Department could no longer rely on Bay State for the peak day capacity of 1200 MCF of vaporized gas, nor for the LNG to replenish its LNG storage tank for the approaching winter. The Department would have to look to another supplier to fill its LNG storage facility. If a disruption in supply from Algeria had occurred, the Department would be one of many of the state's gas companies immediately in the market for LNG to fill their tanks before the heating season.

Assuming the Department could fill its LNG tank by the beginning of the heating season, and the existing sources of F-1, SNG-1 and on-site vaporization of LNG and propane were being delivered and produced at maximum daily capacities, a total of 2227 MCF on a peak day could be available for sendout. However, this barely meets the assumed peak day load of 2200 MCF. Furthermore, if a series of cold days occurred, such as three consecutive peak days, the Department's LNG storage would

be depleted. Until that LNG storage was replenished (a task even more difficult in the middle of the heating season than it is before a heating season), the Department would be vulnerable to an approximate shortfall of 780 MCF/day supply on a peak day.

Besides peak day requirements, one must look at the Department's total winter volumes. In some months of the heating season, the Department relies on up to 21,000 MCF from Bay State. To make up for this lost volume with on-site vaporization of LNG, the Department would encounter the same problem as a series of peak days would cause, i.e., the necessity of finding LNG to replenish its storage in the midst of a heating season and further hampered by a cutoff of Algerian LNG. To produce 21,000 MCF in a month, the Department's LNG facility would have to produce at nearly design capacity every day, with a depletion of storage every 3-4 days. It is imprudent to assume that this facility could be relied upon under these conditions.

It is also clear that the 403 MCF/day of propane-air from the existing propane-air facility is not adequate to make up for the lost volumes of LNG in the peak winter months. For example, the maximum volume of propane-air that could be produced in a month with the existing facility is 12,500 MCF, whereas the Department currently expects and relies on receiving 13,000-21,000 MCF of LNG from Bay State in the months of December and January in 1981-82.

In the second case, with the LNG cutoff occurring at the beginning of the heating season, there is a relatively long lead time of at least one year before the effects of the cutoff would be experienced in the following heating season. (Since LNG storage facilities are usually full going into a heating season, the present heating season supply would not be affected.) The Department could conceivably be given a year's notice that it could not depend on LNG and vaporized gas from Bay State. Given this year, the Department might have an easier time in filling its LNG storage tank but, as in the first case, a series of three peak days would still leave the Department vulnerable to a 780 MCF/day shortfall of supply on a peak day. And realistically, in a cutoff situation, the Department could have trouble refilling its LNG tank often enough to meet winter requirements. Thus, the benefit of having a long lead time, and the real difference between this case and the first case, is that the Department would have more time to find alternatives to the Bay State contract volumes in such forms as increased propane-air capacity or Canadian LNG. Most likely, the Department would immediately try to upgrade its existing propane-air plant in much the same way as it proposes to do now. If the bidding, approval and installation cycle was completed before the next heating season begins, the Department would then be in the same position it seeks to be in now, i.e., with a rebuilt propane-air facility ready to handle the LNG cutoff. However, there is the risk that the Department would be unable to get the rebuilt plant on line that quickly.

Certainly the used unit that is available now would not be available then, thus risking an increase in the facility cost. While not as pressing a scenario as the first case, the second case nonetheless is a risky situation that could be avoided by implementing the Department's proposal and getting the rebuilt facility on line now.

With the proposed propane-air plant in operation, propane becomes not only a reliable but a significant alternative fuel to LNG for the Department. The burden of continually replenishing the Department's LNG tank in the midst of an LNG shortage is considerably alleviated. The Department would also be able to send out 2664 MCF/day on a peak day, even with the loss of the 1200 MCF/day from Bay State; this easily meets an assumed peak day of 2200 MCF. Additionally, the facility's propane storage allows 6-1/2 days of maximum daily sendout of propane-air before it is depleted. By sending out the maximum daily quantity of propane, the Department's LNG facility only needs to be operated at one-half of its design capacity on a series of peak days; thus, the LNG storage would last twice as long and not have to be replenished as often.

Again considering total winter supplies, it is conceivable that, with the rebuilt facility, the volume of sendout now being provided by Bay State LNG could be handled by propane-air, given the increase in capacity from 403 MCF/day to 840 MCF/day at the facility. For example, the maximum volume of propane-air the proposed plant could produce in a month is 26,040 MCF, a volume greater than any of the monthly firm plus optional

quantities reported in the contract with Bay State up through the year 1987.

In summary, an examination of the alternatives of confronting an Algerian LNG cutoff with or without the proposed facility shows a significant amount of risk involved in delaying the facility until the cutoff has actually occurred. In this situation, the timing of the cutoff could be crucial. If the cutoff allows only a short lead time, there may not be enough time to install the necessary additional propane capacity and the Department and its customers could suffer fuel shortages as well as possible job lay-offs, income losses, revenue losses for the Department, and public inconvenience. If the timing of the cutoff allows for a long lead time, the Department might very well have enough time to get a new propane-air plant on line, although there is a certain degree of risk involved here. However, if the proposed rebuilt propane-air plant is already in operation when the cutoff occurs, whenever it occurs, it will play a significant role in making up for lost volumes of LNG.

C. Effects of Fuel Price Changes

The Department also bases the need for the proposed propane-air plant on its concern about the effects of a rise in the prices of SNG and LNG. The Department testified that with a reliable propane-air facility on line, it would have more flexibility to alternate the use of SNG, LNG, and propane according to their comparative market prices, and thus save on fuel expenses. (EX. M-3 at 7-8). The Council looked at

the cost savings to the Department (a) with existing facilities and (b) with the rebuilding of the propane-air plant.

If the Department does not rebuild the propane-air plant, the price of propane relative to the price of SNG and LNG would probably not matter in fuel purchases. The Department would likely buy SNG and LNG for its optional supplies and not risk operating the existing propane-air plant, even if propane were less expensive than SNG and LNG. Mr. Peschong testified that he would not recommend operating the existing propane-air plant. (EX. M-3 at 2).

If the Department were to rebuild the proposed propane-air plant, fuel cost savings would depend on relative prices of SNG, LNG, and propane. Two cases illustrate the Department's position in using alternate fuels.

In the first case, the price of SNG is higher than either the price of LNG or propane, and the price of LNG is below that of propane. This has been the actual case in recent years. Under these conditions, the Department could minimize fuel costs by purchasing available LNG and buying as little SNG as their contract allows. Then propane need not be used except on the coldest days when there may not be enough LNG available to meet peak needs. Thus, in this case, the propane-air plant would not save significant amounts of money in fuel purchases.

In the second case, the prices of SNG and LNG both exceed the price of propane. This is a distinct possibility, especially if Algeria, the chief source of supply for LNG, is allowed

to increase LNG prices to keep up with the rising prices of oil and other substitute fuels.

If propane, then, was available and relatively less expensive than SNG or LNG, the Department could reduce its SNG purchases as much as possible under the current contract, reduce its optional, but not the firm[4] purchases of LNG, and instead, use propane-air produced in the proposed plant. For example, the rebuilt propane-air plant could replace all 14,100 MCF of the optional LNG and all 17,287 MCF of the optional SNG to be used during 1980-81 heating season. If the price of propane were $1.00 per MCF less than the prices of LNG and SNG, then the proposed plant could save $31,387 over that heating season, thus recouping more than one-third of the cost of the used plant. However, this year the proposed plant would not save money because additional LNG (below the price of propane) was contracted for in order to reduce the use of more expensive SNG.

Presently, propane costs at least one dollar per MCF more than LNG, and SNG costs at least two dollars more than propane. During the next few years, though, the relative prices could change according to market conditions and the proposed plant provides some insurance against the Department having to pay for rapid increases in the price of LNG during the 1981-82 heating season and thereafter.

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[4] The Council will not presume that the take or pay provisions of the contract for the firm quantities of LNG will be waived.

D. System Upgrading

This section analyzes the operational aspects of the "wait and see" alternative, where the rebuilding of the existing propane-air facility is delayed, and the "build now" alternative.

If the proposed rebuilding was delayed, the Department would have to address the safety, reliability, and long term effects of continued reliance on the existing propane-air plant. As stated previously, it is the Department's opinion that the existing plant is poorly equipped to provide a safe, reliable and long term alternative fuel to SNG and LNG.

First, the existing propane-air plant was last utilized for production over 3 years ago, in February 1977. The Department has testified that it is concerned about the safety of using the facility primarily because the natural gas which is mixed with the propane-air is not metered and thus could lead to a mixture of gas being sent to customers that is higher in propane-air than the industry standard of 45%. This causes a slag to build up in gas appliances and constitutes a safety hazard. But, the Department has also testified that a gas metering device, costing approximately $3,000, could be installed in the existing system so that the mixture of propane-air and natural gas could be controlled. (EX. M-3 at 2; Tr. 50-52).

Second, a significant difficulty with the existing propane-air plant is that it is a low pressure facility and injects only into part of the low pressure system. Since the Department sees an upgrading of the existing low pressure portions of

the distribution system to intermediate pressure as required in the next few years, once done, the existing propane-air facility will be rendered useless. (EX. M-3 at 4).

Therefore, the Department would not solve the long term, systemwide problems created by continued reliance on this facility even if a metering device controlling the mixture of propane-air - natural gas was installed and necessary time and money were invested into the maintenance and operation of the existing facility.

On the other hand, if the existing propane-air plant were replaced now with the proposed facility the Department could resolve its specific concerns of safety, reliability and a concomitant upgrading of the system. The design of the proposed plant allows the Department to control the mixture of natural gas and propane-air going into the system more accurately. Also, since the proposed plant is of a newer, more modern design than the existing facility, it is not as likely to require as much time and money to maintain and operate as the existing facility. Similarly, it will permit injection of vapor directly into an intermediate pressure system, thus providing greater sendout capabilities to an estimated 70% of the system.

In conclusion, it seems that the existing plant could be improved for use now by installing a metering device and by investing the necessary time and money into its operation and maintenance. However, after a while, when the low pressure distribution system is upgraded to intermediate pressure as planned, the existing plant becomes useless. By rebuilding the

existing plant now as proposed, certain operational problems will be addressed in an efficient manner consistent with long term system plans.

Given the cumulative benefits of the Department's arguments for its proposal as analyzed in Sections II-B, II-C and II-D above, the Council finds adequate support for the need for a rebuilt propane-air facility. And given the economics of the situations, predicated on the present availability of the used plant, now appears to be the time to effect such a proposal. These economics are discussed in the following section.

E. Cost of the Proposal

The total cost of the proposal is $86,820. The used plant will cost $76,800 installed (EX. M-3, attachment C); cost of installation of a gas service line for the water bath vaporizer and the compressor engine is estimated at $10,000; and cost of an orifice plate change will be about $20 (EX. M-3 at 6-7). A completely new facility could cost upwards of $103,000[5] installed at present and quite possibly more, if

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[5] This estimate comes from Attachment C to EX. M-3, a letter from the seller of the used plant to Mr. Peschong. In that letter, the cost of components for a new plant are itemized; when totaled and added to about $9,000 installation costs, the price for a new plant is about $103,000. Another estimate given by Mr. Peschong was based on a December, 1969 bid from Applied Engineering Company for a similar installation. (EX. M-3 at 7). The 1969 cost was $137,485 which Mr. Peschong guessed might be doubled in today's figures. (Tr. 53).

built later rather than now. Thus the Department is looking to save approximately $26,000 by availing itself of the availability of this used plant. It should also be noted that the Department is also in the position at present to cover the entire cost of its proposal from its depreciation fund which means there need be no bond issue for the project. (Tr. 86-87). Of course, as has been discussed earlier, the Department could take a wait-and-see attitude.

If this were done, however, the economics of the proposal in one or more years would not be the same as they are now. First of all, and most important, the used plant would certainly no longer be available at the current cost, if available at all. Also, should the Department wait until Algerian LNG is cut off or until fuel prices change drastically, then it will not be the only gas utility looking to propane-air as a solution to those problems; an increased demand for propane-air capability will also change the economics of the proposal. Furthermore, the Department might not have the money available in its depreciation account at some future time, thereby necessitating a bond issue which would add to overall project costs as well as force the proposal to compete for funding with other municipal projects. Even should the Department dedicate its depreciation account to the proposal in the future and have those funds accumulate interest while waiting, it is unlikely that the amount would keep pace with escalating const4uction project costs. Thus it is appropriate to conclude that a wait-and-see attitude as to

this proposal would not improve the economics thereof.

Another measure of the sound economics of the Department's proposal is to examine the alternatives (other than a no-build alternative). Two such alternatives in the instant case are (a) establishing a pipeline interconnect with another gas company to increase natural gas supply, and (b) to build the plant on another site.

The interconnect alternative is not available at this time.[6]

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[6] An interconnect with another company would allow for additional direct injection of vapor into the Department's system, thus increasing the flexibility to inject various sources of supply into the Department's system and giving rise to an overall greater reliability. An interconnect could also provide one way to maximize the use of available F-1 volumes that the Department presently is unable to utilize. Further, it could open up market advantages to having an alternative LNG supplier other than Bay State and make additional storage and vaporization available for other sources of LNG such as spot market or Canadian purchases. Since the Council encourages the full utilization of F-1 volumes as well as the flexibility and reliability to be derived from alternative sources of supply, the Department is urged to continue exploring the possibility of a pipeline interconnect as part of its supply planning.

The Department has considered and discussed an interconnect with New Bedford Gas Company and with Cape Cod Gas Company. Because of system pressure problems (New Bedford) and lack of interest (Cape Cod), an interconnect cannot be implemented at present. (EX. M-3 at 6).

With respect to another site for the proposed rebuilt propane-air plant, the most logical one is on Department-owned property behind the Algonquin take station in South Middleborough (Tr. 69). However, the costs of locating the proposed propane-air plant at the alternative site are obviously substantial. Although the Department already owns the land (thus reducing land costs), it would have to relocate the existing propane storage tanks to South Middleborough, incurring an expense not required for the present proposal. The total cost of the alternative site, possibly as much as one to two million dollars, would, of necessity, include construction of cradles for the storage tanks, piles for the piers, a 350-foot access roadway with a turn-around, a 10-foot security fence around the perimeter of the site, and other items. The swampy, low-lying land at the new site could also make construction difficult. The Department would have to spend thousands of dollars to do preliminary testing and engineering at the new site before the construction option could be properly evaluated. Even pre-construction costs alone, as estimated by Mr. Peschong, suggest that building the propane-air plant on a new site is not a

viable economic alternative.[7] (Tr. 32-33, 68-75). While costs for a new site were indeed only on-the-spot estimates made by Mr. Peschong at the hearing, logic dictates that relocation and construction costs at the new site far outstrip the cost of the rebuilding proposal being considered here. Unless persuaded otherwise, the Council has usually followed its bias towards making the best possible use of an existing facility rather than opening a new site. In the instant case, the economics clearly show that this bias is appropriate and to be followed.

Thus from a cost perspective, the Council finds that the Department's proposal is reasonable.

F. Environmental Impacts

The final aspect of the Council's analysis of the Department's proposal is a review of the potential environmental impacts of that proposal. Since the proposal seeks only to rebuild one portion of an existing facility, no significant environmental impacts should be anticipated. Rather, the proposal should be reviewed as to whether it will increase to an unacceptable degree, existing impacts such as noise and emissions to the air or whether it will unduly affect overall facility safety. Based on the record of this case, the Council finds that the proposal would not have an unacceptable environmental effect on the surrounding area.[8]

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[7] Whether safety/environmental considerations make this alterative any more viable or attractive is discussed below in the next section.

[8] It is noted that the existing propane-air facility and tank farm (LNG and propane) is situated in an area zoned for "general use" and is surrounded by residential property as well as a railroad yard and an oil company with oil storage tanks.

The issue of noise from the proposed propane air plant is relevant, but it appears unlikely that the proposed facility would increase the magnitude of noise levels presently detectable at the Department's facilities and at nearby homes. The noisiest equipment at the existing site is the compressor used to fill the Hortonsphere. (Tr. 65). The Department testifies that the proposed propane plant would be quieter than the present operation of the Hortonsphere (Tr. 66). Mr. Peschong stated that with the silencers built into newer plants, there really will not be an appreciable increase in the noise level. (Tr. 64).

However, the incidence of noise depends on how often the Department runs the propane-air plant. The Council finds that operation of the rebuilt plant could possibly increase the incidence and duration of noise at the Department's facilities. But, given the mixed commercial and residential nature of the area, the effect of the propane plant on the magnitude of noise levels would be minimal.

Mr. Peschong was also questioned about propane and LNG truck deliveries. Both trucks follow the same route to the facility and are requested by the Department to make their deliveries only "after most of the people have gone to work in the morning so that ... as much potential disruption as possible" is eliminated. (Tr. 67). Running the plant at maximum capacity, only one truck load of propane per day, on average, would be required. (Tr. 60). There was no evidence that this would create either unreasonable noise or traffic problems in the Town.

As for potential air pollution, Mr. Peschong testified that the only normal propane emissions from the proposed plant would be start-up and annual gas releases which would be flared before dispersing to the atmosphere. (Tr. 67-68). It does not appear that this would be harmful to air quality in the vicinity.

Finally, the Council finds no evidence to indicate that the proposed project - the rebuilding of the propane-air plant - would threaten the safety of Department employees or plant neighborhood residents. Safety, in a very broad sense, was the thrust of the public comments made at the hearing by Middleborough residents. They expressed concern based on recent fires within blocks of the plant and also based on what they considered to be a devaluation of their property due to the plant's presence in the neighborhood. These residents, especially the neighbors of the plant, unanimously felt that the proposed facility should trigger the relocation of existing LNG and propane facilities at Vine Street to a more remote site, for instance, in South Middleborough.

While these concerns are valid and understandable, they do not fall within the purview of the Council's jurisdiction.[9] Locating the gas plant on Vine Street was a decision made long before the Council's existence; even the presence of the tank farm was decided in a pre-Council era. The Council, perhaps unfortunately, does not have the jurisdiction or power to challenge, re-examine or in any way go behind these decisions. The Council must deal with the situation presented to it within its agency parameters.

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[9] Safety aspects of the operation of existing and proposed facilities are regulated by the Department of Public Utilities.

As stated earlier, the Council favors making full use of existing facilities rather than siting new ones, unless convinced otherwise. In the instant case, the economics of the situation militate for the Department's rebuilding proposal and against moving the facility to South Middleborough. No evidence or incidents of negligence on the Department's part in the operation of its plant were introduced; as far as the Council can adduce, the Department is operating its facility at Vine Street as safely as possible and in an entirely responsible manner.

Of course, the Department will still come under a multitude of safety requirements as to the installation of the plant (Tr. 90-92) and the public has every right to make sure these requirements and regulations are followed exactly. Agencies and boards other than the Council will have more to say about this proposal and the residents of Middleborough should not hesitate to say more to them. However, the Council must say that in the case before it now, the proposal is consistent with the Council's mandate to ensure an adequate energy supply for the Commonwealth at the lowest possible cost and least environmental impact. G.L. c. 169, sec. 69H.

III. Order

Based on all the factors discussed above, the Council finds that rebuilding the proposed facility,as proposed by the Department, is reasonable and is a necessary upgrading of Middleborough's gas system. The Council finds that implementing this proposal

now rather than later is justified by 1) the lower present costs; 2) minimal environmental impacts; 3) the protection against disruptions in LNG supplies; and 4) the benefits to be gained if changes occur in relative fuel prices.

Therefore it is ORDERED that said proposal be, and hereby is APPROVED.

Energy Facilities Siting Council

by Dennis J. LaCroix

Dennis J. LaCroix, Esq.
Hearing Officer

This decision was unanimously approved by those members present and voting at the Energy Facilities Siting Council meeting of 21 October, 1980.

Joseph S. Fitzpatrick
Chairman